1) COUNTY: KENT

2) STUDY NAME: SCS BUCK CREEK WATERSHED STUDY

3) WATERCOURSE: BUCK CREEK

4) DOCUMENT TYPE: 50 YEAR PROFILE

D0BREAK00

1 50-YEAR FREQUENCY FLOOD PROFILE BAUERLE
2 UPSTR PRIVATE RD STA 1059<50 TO UPSTR CLYDE PARK AVE STA 350<10 03/27/72
3 BUCK CREEK WATERSHED KENT COUNTY MICHIGAN

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
	-0.	-0.	-0.	-0.	-0.000000	-0.00	-0.0	3070.	632.180	-0.000

CCHV= 0.100 CEHV= 0.300
3280 CROSS SECTION EXTENDED 1.58 FEET

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OTHER LOSS
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TDPWID
			633.46					
15.86	9.68	632.18	629.13	632.18	632.28	0.10	0.00	0.00
3070.	1820.	1038.	211.	1083.	274.	131.	0.	0.
0.00	1.68	3.80	1.61	0.085	0.055	0.085	0.00	622.50
0.001161	-0.	-0.	-0.	0	17	1	0.00	296.80
15.90	9.07	633.07	630.27	0.00	633.12	0.05	0.83	0.01
3070.	2299.	764.	7.	1923.	279.	10.	35.	8.
0.15	1.20	2.74	0.66	0.085	0.055	0.085	0.07	624.00
0.000795	760.	1100.	975.	3	10	1	0.00	599.49

CCHV= 0.300 CEHV= 0.500

3265 DIVIDED FLOW

NORMAL BRIDGE, NRD=14 MIN ELTRD= 638.00 MAX ELLC= 635.80

16.00	9.04	633.04	628.81	0.00	633.38	0.34	0.12	0.15
3070.	0.	3070.	0.	0.	659.	0.	36.	9.
0.15	0.00	4.66	0.00	0.065	0.045	0.065	0.07	624.00
0.003936	50.	50.	50.	2	15	1	0.00	97.79

CCHV= 0.100 CEHV= 0.300

16.10	9.60	633.50	628.83	0.00	633.52	0.01	0.10	0.03
3070.	2700.	288.	82.	3342.	169.	135.	39.	9.
0.17	0.81	1.70	0.61	0.085	0.055	0.085	0.07	623.90
0.000219	50.	50.	50.	2	8	1	0.00	769.23

CCHV= 0.100 CEHV= 0.300

16.30	10.24	633.74	631.41	0.00	633.79	0.04	0.26	0.01
3070.	1921.	991.	158.	1756.	402.	175.	79.	20.
0.27	1.09	2.47	0.91	0.075	0.055	0.075	0.06	623.50
0.000688	580.	550.	600.	3	15	1	0.00	887.90

CCHV= 0.100 CEHV= 0.300

NOTE:
1. INCORRECT STARTING ELEV.
2. WSEL OF UPSTR SEC 320 MAY BE TOO HIGH - SPECIAL BRIDGE SHOULD BE USED AT SEC 320

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OTHER LOSS
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID
16.90	6.88	637.18	635.49	0.00	637.26	0.08	3.46	0.01
3070.	1957.	1066.	48.	1478.	321.	44.	246.	82.
0.77	1.32	3.32	1.09	0.075	0.055	0.075	0.06	630.30
0.001241	3440.	3880.	3160.	6	14	1	0.00	673.13

CCHV= 0.300 CEHV= 0.500

1645 INT SEC ADDED BY RAISING SEC 17.00, 0.600FT AND MULTIPLYING BY 1.137

1.01	6.25	636.35	635.93	0.00	638.30	1.94	0.11	0.93
3070.	0.	3070.	0.	0.	275.	0.	247.	82.
0.77	0.00	11.18	0.00	0.055	0.045	0.055	0.06	630.10
0.015914	13.	13.	13.	3	8	1	0.00	54.58

1645 INT SEC ADDED BY RAISING SEC 1.01, -0.200FT AND MULTIPLYING BY 0.960

1.02	7.20	637.10	635.87	0.00	638.59	1.49	0.16	0.13
3070.	0.	3070.	0.	0.	313.	0.	247.	82.
0.77	0.00	9.81	0.00	0.055	0.045	0.055	0.06	629.90
0.010222	13.	13.	13.	5	5	1	0.00	52.39

1645 INT SEC ADDED BY RAISING SEC 1.02, -0.200FT AND MULTIPLYING BY 0.958

1.03	7.60	637.30	635.81	0.00	638.73	1.43	0.12	0.02
3070.	0.	3070.	0.	0.	320.	0.	247.	82.
0.77	0.00	9.61	0.00	0.055	0.045	0.055	0.06	629.70
0.009249	13.	13.	13.	3	5	1	0.00	50.19

1645 INT SEC ADDED BY RAISING SEC 1.03, -0.200FT AND MULTIPLYING BY 0.956

17.00	7.94	637.44	635.75	0.00	638.85	1.41	0.11	0.01
3070.	0.	3070.	0.	0.	322.	0.	247.	82.
0.77	0.00	9.52	0.00	0.055	0.045	0.055	0.06	629.50
0.008692	13.	13.	13.	3	5	1	0.00	48.00

CCHV= 0.100 CEHV= 0.300

1645 INT SEC ADDED BY RAISING SEC 17.10, -0.067FT AND MULTIPLYING BY 1.110

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OTHER LOSS
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID
1.01	9.54	639.07	635.23	0.00	639.08	0.01	0.09	0.14
3070.	2082.	550.	439.	2947.	371.	654.	248.	82.
0.77	0.71	1.48	0.67	0.075	0.055	0.075	0.06	629.53
0.000165	20.	20.	20.	2	10	1	0.00	851.96

1645 INT SEC ADDED BY RAISING SEC 1.01, 0.033FT AND MULTIPLYING BY 0.951

1.02	9.50	639.07	635.28	0.00	639.09	0.01	0.00	0.00
3070.	2080.	552.	438.	2777.	351.	616.	250.	82.
0.78	0.75	1.57	0.71	0.075	0.055	0.075	0.06	629.57
0.000188	20.	20.	20.	2	5	1	0.00	809.61

1645 INT SEC ADDED BY RAISING SEC 1.02, 0.033FT AND MULTIPLYING BY 0.948

17.10	9.47	639.07	635.39	0.00	639.09	0.02	0.00	0.00
3070.	2080.	553.	438.	2614.	332.	580.	251.	83.
0.79	0.80	1.67	0.75	0.075	0.055	0.075	0.06	629.60
0.000214	20.	20.	20.	2	5	1	0.00	767.32

CCHV= 0.100 CEHV= 0.300

17.30	9.19	640.19	636.96	0.00	640.35	0.16	1.22	0.04
3070.	764.	1562.	743.	336.	389.	416.	327.	99.
0.92	2.27	4.02	1.79	0.075	0.055	0.075	0.06	631.00
0.001497	1400.	1450.	1408.	2	8	1	0.00	244.13

CCHV= 0.100 CEHV= 0.300

17.50	9.97	641.47	638.34	0.00	641.52	0.05	1.16	0.01
3070.	535.	1013.	1522.	503.	369.	1194.	365.	108.
1.08	1.06	2.74	1.28	0.085	0.055	0.085	0.06	631.50
0.000726	1012.	1120.	1000.	3	8	1	0.00	488.21

CCHV= 0.100 CEHV= 0.300

3265 DIVIDED FLOW

17.70	9.76	644.86	643.09	0.00	645.00	0.14	3.45	0.03
3070.	1307.	1337.	426.	966.	308.	403.	469.	142.
1.36	1.35	4.34	1.06	0.095	0.055	0.095	0.06	635.10
0.001961	2240.	2950.	2380.	3	8	1	0.00	789.45

CCHV= 0.100 CEHV= 0.300

3265 DIVIDED FLOW

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OTHER LOSS
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID
17.90	8.05	647.25	644.78	0.00	647.30	0.05	2.29	0.01
3070.	260.	1222.	1588.	253.	475.	1968.	551.	174.
1.67	1.03	2.58	0.81	0.095	0.055	0.095	0.06	639.20
0.000700	1560.	1960.	1560.	4	20	1	0.00	935.44

CCHV= 0.300 CEHV= 0.500

1645 INT SEC ADDED BY RAISING SEC 18.00, 0.375FT AND MULTIPLYING BY 1.533

1.01	7.81	646.89	644.95	0.00	647.76	0.88	0.05	0.41
3070.	0.	3070.	0.	0.	409.	0.	552.	174.
1.67	0.00	7.51	0.00	0.075	0.045	0.075	0.06	639.08
0.006205	15.	15.	15.	2	8	1	0.00	70.51

1645 INT SEC ADDED BY RAISING SEC 1.01, -0.125FT AND MULTIPLYING BY 0.884

1.02	7.94	646.89	645.15	0.00	647.96	1.07	0.10	0.10
3070.	0.	3070.	0.	0.	369.	0.	552.	174.
1.67	0.00	8.31	0.00	0.075	0.045	0.075	0.06	638.95
0.007608	15.	15.	15.	2	8	1	0.00	62.34

1645 INT SEC ADDED BY RAISING SEC 1.02, -0.125FT AND MULTIPLYING BY 0.869

1.03	8.05	646.87	645.45	0.00	648.24	1.37	0.13	0.15
3070.	0.	3070.	0.	0.	327.	0.	552.	174.
1.67	0.00	9.39	0.00	0.075	0.045	0.075	0.06	638.83
0.009870	15.	15.	15.	2	8	1	0.00	54.17

1645 INT SEC ADDED BY RAISING SEC 1.03, -0.125FT AND MULTIPLYING BY 0.849

18.00	8.11	646.81	645.86	0.00	648.67	1.87	0.18	0.25
3070.	0.	3070.	0.	0.	280.	0.	552.	174.
1.67	0.00	10.96	0.00	0.075	0.045	0.075	0.06	638.70
0.013943	15.	15.	15.	2	8	1	0.00	46.00

CCHV= 0.100 CEHV= 0.300

1645 INT SEC ADDED BY RAISING SEC 18.10, -0.225FT AND MULTIPLYING BY 1.118

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OTHER LOSS
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID
1.01	10.16	648.93	644.62	0.00	648.94	0.01	0.09	0.19
3070.	388.	575.	2107.	657.	350.	3415.	553.	174.
1.68	0.59	1.64	0.62	0.095	0.055	0.095	0.06	638.78
0.000210	13.	13.	13.	3	14	1	0.00	1394.39

1645 INT SEC ADDED BY RAISING SEC 1.01, 0.075FT AND MULTIPLYING BY 0.965

1.02	10.08	648.93	644.70	0.00	648.95	0.01	0.00	0.00
3070.	388.	581.	2102.	622.	335.	3213.	554.	174.
1.68	0.62	1.74	0.65	0.095	0.055	0.095	0.06	638.85
0.000238	13.	13.	13.	2	5	1	0.00	1304.75

1645 INT SEC ADDED BY RAISING SEC 1.02, 0.075FT AND MULTIPLYING BY 0.964

1.03	10.01	648.94	644.83	0.00	648.95	0.02	0.00	0.00
3070.	387.	587.	2096.	588.	320.	3019.	555.	175.
1.68	0.66	1.83	0.69	0.095	0.055	0.095	0.06	638.93
0.000270	13.	13.	13.	2	5	1	0.00	1218.15

1645 INT SEC ADDED BY RAISING SEC 1.03, 0.075FT AND MULTIPLYING BY 0.962

18.10	9.94	648.94	644.93	0.00	648.96	0.02	0.00	0.00
3070.	387.	593.	2091.	555.	305.	2834.	556.	175.
1.69	0.70	1.94	0.74	0.095	0.055	0.095	0.06	639.00
0.000307	13.	13.	13.	2	5	1	0.00	1159.57

CCHV= 0.100 CEHV= 0.300

18.20	9.65	649.35	645.91	0.00	649.37	0.02	0.41	0.00
3070.	262.	616.	2192.	325.	300.	2942.	662.	204.
2.04	0.80	2.06	0.75	0.095	0.055	0.095	0.06	639.70
0.000325	1440.	1550.	1208.	2	9	1	0.00	856.52

CCHV= 0.100 CEHV= 0.300

18.40	7.45	652.95	651.05	0.00	653.08	0.13	3.68	0.03
3070.	1465.	1142.	463.	996.	267.	264.	831.	249.
2.38	1.47	4.28	1.76	0.095	0.055	0.095	0.06	645.50
0.002075	2800.	3500.	2840.	4	10	1	0.00	500.86

CCHV= 0.100 CEHV= 0.300

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OTHER LOSS
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID
18.60	9.36	656.16	653.28	0.00	656.24	0.08	3.16	0.00
3070.	348.	1006.	1716.	373.	284.	1362.	917.	276.
2.68	0.93	3.54	1.26	0.085	0.050	0.085	0.06	646.80
0.000890	2100.	2160.	2120.	5	11	1	0.00	611.92

3265 DIVIDED FLOW

18.90	9.86	658.06	653.47	0.00	658.24	0.17	1.97	0.03
3030.	953.	2028.	49.	870.	506.	142.	1011.	317.
2.89	1.10	4.01	0.35	0.075	0.045	0.075	0.06	648.20
0.000788	2400.	2320.	2240.	2	15	1	0.00	969.72

1645 INT SEC ADDED BY RAISING SEC 19.00, -1.533FT AND MULTIPLYING BY 1.191

1.01	9.07	658.03	653.76	0.00	658.27	0.24	0.02	0.02
3030.	296.	2296.	439.	367.	511.	532.	1012.	318.
2.89	0.81	4.50	0.83	0.055	0.035	0.055	0.06	648.97
0.001071	20.	20.	20.	3	11	1	0.00	1117.13

1645 INT SEC ADDED BY RAISING SEC 1.01, 0.767FT AND MULTIPLYING BY 0.920

3265 DIVIDED FLOW

1.02	7.91	657.64	654.77	0.00	658.51	0.87	0.05	0.19
3030.	0.	3030.	0.	0.	405.	0.	1012.	318.
2.89	0.00	7.48	0.02	0.055	0.035	0.055	0.06	649.73
0.003702	20.	20.	20.	2	8	1	0.00	55.59

1645 INT SEC ADDED BY RAISING SEC 1.02, 0.767FT AND MULTIPLYING BY 0.913

19.00	6.87	657.37	655.83	0.00	658.79	1.41	0.11	0.16
3030.	0.	3030.	0.	0.	318.	0.	1013.	318.
2.89	0.00	9.54	0.00	0.055	0.035	0.055	0.06	650.50
0.007400	20.	20.	20.	3	8	1	0.00	50.60

CCHV= 0.100 CEHV= 0.300

1645 INT SEC ADDED BY RAISING SEC 19.10, -0.133FT AND MULTIPLYING BY 0.918

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OTHER LOSS
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID
1.01	8.40	658.97	655.76	0.00	659.00	0.03	0.08	0.14
3030.	1985.	924.	121.	2299.	413.	257.	1013.	318.
2.90	0.86	2.24	0.47	0.075	0.045	0.065	0.06	650.57
0.000303	20.	20.	20.	3	6	1	0.00	1057.33

1645 INT SEC ADDED BY RAISING SEC 1.01, 0.067FT AND MULTIPLYING BY 1.045

1.02	8.34	658.98	655.75	0.00	659.01	0.03	0.01	0.00
3030.	1981.	935.	113.	2360.	428.	248.	1015.	319.
2.90	0.84	2.19	0.46	0.075	0.045	0.065	0.06	650.63
0.000291	20.	20.	20.	2	6	1	0.00	1098.03

1645 INT SEC ADDED BY RAISING SEC 1.02, 0.067FT AND MULTIPLYING BY 1.043

19.10	8.28	658.98	655.76	0.00	659.01	0.03	0.01	0.00
3030.	1977.	946.	106.	2418.	442.	236.	1016.	319.
2.91	0.82	2.14	0.45	0.075	0.045	0.065	0.06	650.70
0.000280	20.	20.	20.	2	6	1	0.00	1135.52

CCHV= 0.100 CEHV= 0.300

19.50	7.85	659.05	654.88	0.00	659.10	0.05	0.09	0.01
3030.	1424.	1596.	10.	1454.	667.	15.	1031.	324.
2.95	0.98	2.39	0.68	0.075	0.045	0.065	0.06	651.20
0.000381	232.	280.	308.	2	19	1	0.00	574.34

CCHV= 0.100 CEHV= 0.300

3265 DIVIDED FLOW

19.90	9.04	659.54	655.78	0.00	659.63	0.09	0.52	0.01
3030.	298.	1734.	999.	557.	558.	1548.	1088.	350.
3.09	0.53	3.11	0.65	0.085	0.045	0.085	0.06	650.50
0.000601	1040.	1090.	1000.	3	14	1	0.00	1591.70

CCHV= 0.300 CEHV= 0.500

1645 INT SEC ADDED BY RAISING SEC 20.00, 0.250FT AND MULTIPLYING BY 1.272

1.01	9.10	659.35	656.18	0.00	660.02	0.66	0.09	0.29
3030.	0.	3030.	0.	0.	463.	0.	1091.	351.
3.10	0.00	6.54	0.00	0.065	0.035	0.065	0.06	650.25
0.002102	70.	70.	70.	2	8	1	0.00	63.59

1645 INT SEC ADDED BY RAISING SEC 1.01, -0.250FT AND MULTIPLYING BY 0.786

SECND	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OTHER LOSS
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID
20.00	9.37	659.37	656.65	0.00	660.37	1.00	0.19	0.17
3030.	0.	3030.	0.	0.	378.	0.	1091.	351.
3.10	0.00	8.02	0.00	0.065	0.035	0.065	0.06	650.00
0.003230	70.	70.	70.	2	8	1	0.00	50.00

CCHV= 0.100 CEHV= 0.300

1645 INT SEC ADDED BY RAISING SEC 20.10, -0.150FT AND MULTIPLYING BY 1.053

3265 DIVIDED FLOW

1.01	10.36	660.51	657.29	0.00	660.53	0.02	0.07	0.10
3030.	1105.	859.	1066.	1745.	414.	1733.	1093.	352.
3.11	0.63	2.08	0.62	0.100	0.045	0.075	0.06	650.15
0.000268	38.	38.	38.	2	8	1	0.00	1265.38

1645 INT SEC ADDED BY RAISING SEC 1.01, 0.150FT AND MULTIPLYING BY 0.950

3265 DIVIDED FLOW

20.10	10.22	660.52	657.58	0.00	660.55	0.03	0.01	0.00
3030.	1110.	887.	1033.	1594.	385.	1538.	1096.	353.
3.12	0.70	2.30	0.67	0.100	0.045	0.075	0.06	650.30
0.000339	38.	38.	38.	2	5	1	0.00	1164.71

CCHV= 0.100 CEHV= 0.300

3265 DIVIDED FLOW

20.90	11.09	661.49	657.52	0.00	661.83	0.34	1.19	0.09
2410.	3.	2201.	206.	5.	448.	229.	1153.	373.
3.19	0.58	4.91	0.90	0.100	0.045	0.075	0.06	650.40
0.001682	1160.	1180.	1200.	3	8	1	0.00	331.35

CCHV= 0.300 CEHV= 0.500
1860 XLCEL OF 662.10 EXCEEDS RDEL OF 660.00

NORMAL BRIDGE, NRD= 5 MIN ELTRD= 660.00 MAX ELLC= 662.80

21.00	8.60	661.40	658.50	0.00	662.13	0.73	0.10	0.19
2410.	0.	2410.	0.	0.	352.	0.	1154.	373.
3.19	0.00	6.84	0.00	0.065	0.035	0.065	0.06	652.80
0.003284	40.	40.	40.	3	15	1	-28.88	50.00

CCHV= 0.100 CEHV= 0.300
3280 CROSS SECTION EXTENDED 6.13 FEET

3301 HV CHANGED MORE THAN HVINS

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OTHER LOSS
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID
21.10	11.63	662.23	657.29	0.00	662.26	0.04	0.07	0.07
2410.	865.	1159.	386.	1308.	542.	797.	1155.	374.
3.20	0.66	2.14	0.48	0.100	0.045	0.075	0.06	650.60
0.000235	40.	40.	40.	3	11	1	0.00	813.13

CCHV= 0.100 CEHV= 0.300

21.50	10.80	662.40	658.90	0.00	662.41	0.02	0.15	0.00
2410.	469.	605.	1336.	1111.	343.	2161.	1207.	390.
3.42	0.42	1.77	0.62	0.100	0.045	0.075	0.06	651.60
0.000177	780.	750.	660.	2	8	1	0.00	1148.82

CCHV= 0.100 CEHV= 0.300

3265 DIVIDED FLOW

21.90	10.50	662.50	658.10	0.00	662.50	0.00	0.09	0.00
2410.	1619.	327.	465.	4566.	300.	1520.	1289.	414.
3.87	0.35	1.09	0.31	0.100	0.045	0.075	0.06	652.00
0.000074	736.	700.	680.	2	9	1	0.00	1882.17

CCHV= 0.300 CEHV= 0.500

1645 INT SEC ADDED BY RAISING SEC 22.00, -2.175FT AND MULTIPLYING BY 1.059

1.01	9.38	662.11	658.20	0.00	662.95	0.84	0.03	0.42
2410.	0.	2410.	0.	0.	328.	0.	1290.	415.
3.88	0.00	7.34	0.00	0.065	0.035	0.065	0.06	652.73
0.004015	13.	13.	13.	2	11	1	0.00	38.13

1645 INT SEC ADDED BY RAISING SEC 1.01, 0.725FT AND MULTIPLYING BY 0.981

1.02	8.61	662.06	659.00	0.00	663.11	1.05	0.06	0.11
2410.	0.	2410.	0.	0.	293.	0.	1290.	415.
3.88	0.00	8.22	0.00	0.065	0.035	0.065	0.06	653.45
0.005608	13.	13.	13.	2	5	1	0.00	37.42

1645 INT SEC ADDED BY RAISING SEC 1.02, 0.725FT AND MULTIPLYING BY 0.981

3265 DIVIDED FLOW

1.03	7.83	662.00	659.79	0.00	663.33	1.33	0.08	0.14
2410.	0.	2410.	0.	0.	260.	0.	1290.	415.
3.88	0.00	9.25	0.00	0.065	0.035	0.065	0.06	654.18
0.007419	13.	13.	13.	2	5	1	0.00	34.57

1645 INT SEC ADDED BY RAISING SEC 1.03, 0.725FT AND MULTIPLYING BY 0.981

SECNO	DEPTH	CH	SEL	CRIWS	WSELK	EG	HV	HL	OTHER LOSS
Q	QLOB	QC	H	QROB	ALOB	ACH	AROB	VOL	TWA
TIME	VLOB	VC	H	VROB	XNL	XNCH	XNR	WTN	ELMIN
SLOPE	XLOBL	XL	CH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID
22.00	7.01	66	1.91	660.59	0.00	663.65	1.74	0.11	0.21
2410.	0.	2	410.	0.	0.	227.	0.	1290.	415.
3.88	0.00	1	0.59	0.00	0.065	0.035	0.065	0.06	654.90
0.010706	13.		13.	13.	3	5	1	0.00	33.90

CCHV= 0.100 CEHV= 0.300
3280 CROSS SECTION EXTENDED 5.13 FEET

3301 HV CHANGED MORE THAN HVINS

22.10	11.54	66	4.04	659.69	0.00	664.04	0.00	0.22	0.17
2410.	1275.		405.	731.	4033.	387.	2139.	1293.	415.
3.90	0.32		1.05	0.34	0.100	0.045	0.075	0.06	652.50
0.000056	40.		40.	40.	3	13	1	0.00	1600.00

CCHV= 0.100 CEHV= 0.300

22.90	11.46	66	4.06	659.63	0.00	664.07	0.01	0.02	0.00
2410.	1760.		400.	250.	3639.	252.	883.	1327.	425.
4.01	0.48		1.58	0.28	0.100	0.045	0.075	0.06	652.60
0.000116	240.		280.	300.	2	6	1	0.00	1494.30

CCHV= 0.300 CEHV= 0.500
3265 DIVIDED FLOW

NORMAL BRIDGE, NRD= 5 MIN ELTRD= 665.60 MAX ELLC= 664.00

23.00	9.05	664.05	662.93	0.00	664.16	0.11	0.04	0.05
2410.	1483.	927.	0.	1021.	239.	0.	1330.	426.
4.02	1.45	3.89	0.00	0.065	0.035	0.065	0.06	655.00
0.001576	50.	50.	50.	3	6	1	-1.33	605.46

CCHV= 0.100 CEHV= 0.300

23.10	11.50	664.20	658.87	0.00	664.21	0.01	0.04	0.01
2410.	1589.	397.	424.	3851.	294.	1213.	1334.	427.
4.04	0.41	1.35	0.35	0.100	0.045	0.075	0.06	652.70
0.000082	50.	50.	50.	3	14	1	0.00	1548.39

CCHV= 0.100 CEHV= 0.300
3265 DIVIDED FLOW

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OTHER LOSS
Q	WLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID
23.30	9.62	664.52	661.42	0.00	664.54	0.02	0.33	0.00
2410.	694.	494.	1222.	1040.	285.	1524.	1478.	472.
4.48	0.67	1.74	0.80	0.100	0.055	0.075	0.06	654.90
0.000347	1540.	1570.	1500.	3	9	1	0.00	982.22

CCHV= 0.100 CEHV= 0.300

23.50	8.22	666.22	665.06	0.00	666.25	0.03	1.70	0.00
1940.	213.	486.	1241.	280.	202.	1555.	1646.	548.
5.18	0.76	2.40	0.80	0.070	0.055	0.075	0.06	658.00
0.000782	2920.	3040.	3020.	4	9	1	0.00	1232.63

CCHV= 0.100 CEHV= 0.300

23.70	8.27	668.37	665.73	0.00	668.87	0.50	2.48	0.14
1940.	80.	1860.	0.	83.	322.	0.	1685.	570.
5.25	0.97	5.78	0.00	0.065	0.040	0.065	0.06	660.10
0.002788	1380.	1390.	1400.	2	15	1	0.00	180.55

CCHV= 0.300 CEHV= 0.500

NORMAL BRIDGE,NRD= 5 MIN ELTRD= 671.60 MAX ELLC= 669.80

23.71	7.39	667.99	666.47	0.00	669.33	1.33	0.04	0.42
1940.	0.	1940.	0.	0.	209.	0.	1685.	570.
5.25	0.00	9.27	0.00	0.050	0.035	0.050	0.06	660.60
0.005693	10.	10.	10.	3	20	1	0.00	34.00

CCHV= 0.100 CEHV= 0.300

23.72	8.12	669.22	665.77	0.00	669.47	0.25	0.04	0.11
1940.	0.	1940.	0.	0.	482.	0.	1685.	570.
5.25	0.00	4.03	0.00	0.065	0.040	0.065	0.06	661.10
0.001451	10.	10.	10.	3	15	1	0.00	98.90

CCHV= 0.100 CEHV= 0.300

3265 DIVIDED FLOW

23.80	9.11	671.11	668.00	0.00	671.14	0.03	1.65	0.02
1470.	731.	547.	192.	929.	261.	248.	1722.	583.
5.62	0.79	2.09	0.77	0.080	0.055	0.080	0.06	662.00
0.000517	1670.	1680.	1670.	3	14	1	0.00	557.72

CCHV= 0.100 CEHV= 0.300

3265 DIVIDED FLOW

SECND	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OTHER LOSS
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID
23.90	7.71	671.91	668.86	0.00	672.05	0.14	0.88	0.03
1470.	268.	1190.	12.	278.	364.	26.	1742.	592.
5.70	0.97	3.27	0.47	0.080	0.055	0.065	0.06	664.20
0.001657	840.	800.	780.	4	15	1	0.00	418.82

CCHV= 0.300 CEHV= 0.500

3265 DIVIDED FLOW

NORMAL BRIDGE, NRD= 3 MIN ELTRD= 674.20 MAX ELLC= 671.20

24.00	8.41	671.81	668.36	0.00	672.44	0.64	0.14	0.25
1470.	0.	1446.	24.	0.	224.	40.	1742.	593.
5.70	0.00	6.46	0.59	0.060	0.035	0.060	0.06	663.40
0.004103	50.	50.	50.	3	20	1	-14.59	226.19

CCHV= 0.100 CEHV= 0.300

1645 INT SEC ADDED BY RAISING SEC 24.10, -0.200FT AND MULTIPLYING BY 0.848

3265 DIVIDED FLOW

1.01	8.95	672.55	669.46	0.00	672.58	0.03	0.08	0.06
1470.	481.	620.	369.	595.	299.	629.	1743.	593.
5.71	0.81	2.07	0.59	0.080	0.055	0.080	0.06	663.60
0.000541	33.	33.	33.	2	8	1	0.00	833.80

1645 INT SEC ADDED BY RAISING SEC 1.01, 0.200FT AND MULTIPLYING BY 1.179

3265 DIVIDED FLOW

24.10	8.77	672.57	669.32	0.00	672.60	0.03	0.02	0.00
1470.	475.	661.	333.	648.	343.	629.	1744.	594.
5.72	0.73	1.93	0.53	0.080	0.055	0.080	0.06	663.80
0.000484	33.	33.	33.	2	12	1	0.00	934.79

CCHV= 0.100 CEHV= 0.300

3265 DIVIDED FLOW

24.90	8.39	672.79	669.97	0.00	672.80	0.01	0.20	0.00
1170.	452.	251.	467.	979.	198.	926.	1768.	607.
5.95	0.46	1.27	0.50	0.080	0.055	0.085	0.06	664.40
0.000238	500.	520.	620.	2	8	1	0.00	1179.61

CCHV= 0.300 CEHV= 0.500

3265 DIVIDED FLOW

SECND	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OTHER LOSS
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID

NORMAL BRIDGE,NRD= 0 MIN ELTRD= 676.30 MAX ELLC= 673.10

25.00	8.56	672.76	669.22	0.00	673.14	0.38	0.16	0.18
1170.	0.	1170.	0.	0.	237.	0.	1769.	608.
5.95	0.00	4.93	0.00	0.060	0.045	0.060	0.06	664.20
0.004965	60.	60.	60.	2	15	1	0.00	35.00

CCHV= 0.100 CEHV= 0.300

3265 DIVIDED FLOW

3280 CROSS SECTION EXTENDED 1.30 FEET

25.10	8.20	673.30	669.28	0.00	673.30	0.00	0.13	0.04
1170.	604.	220.	345.	1767.	354.	1363.	1772.	609.
5.99	0.34	0.62	0.25	0.085	0.065	0.085	0.06	665.10
0.000065	50.	50.	50.	2	10	1	0.00	1254.57

CCHV= 0.100 CEHV= 0.300

3265 DIVIDED FLOW

25.30	9.83	673.33	668.97	0.00	673.34	0.01	0.03	0.00
1170.	309.	226.	635.	635.	196.	1174.	1787.	615.
6.10	0.49	1.15	0.54	0.085	0.065	0.085	0.06	663.50
0.000215	248.	285.	220.	3	11	1	0.00	900.48

CCHV= 0.100 CEHV= 0.300

3280 CROSS SECTION EXTENDED 1.26 FEET

25.90	8.36	673.56	670.36	0.00	673.56	0.00	0.23	0.00
880.	2.	170.	709.	17.	198.	1906.	1845.	641.
6.84	0.10	0.86	0.37	0.085	0.065	0.085	0.06	665.20
0.000155	1180.	1220.	1240.	3	13	1	0.00	975.71

CCHV= 0.300 CEHV= 0.500

NORMAL BRIDGE,NRD= 0 MIN ELTRD= 681.90 MAX ELLC= 679.00

26.00	9.04	673.54	669.04	0.00	673.74	0.20	0.08	0.10
880.	0.	880.	0.	0.	248.	0.	1848.	643.
6.84	0.00	3.55	0.00	0.065	0.045	0.065	0.06	664.50
0.001227	110.	110.	110.	2	18	1	0.00	35.00

CCHV= 0.100 CEHV= 0.300

3280 CROSS SECTION EXTENDED 1.66 FEET

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OTHER LOSS
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID
26.20	9.46	673.86	670.31	0.00	673.88	0.02	0.13	0.02
880.	83.	271.	526.	99.	134.	817.	1850.	644.
6.88	0.83	2.02	0.64	0.085	0.065	0.085	0.06	664.40
0.000625	140.	140.	140.	2	8	1	0.00	675.27

CCHV= 0.100 CEHV= 0.300
3280 CROSS SECTION EXTENDED 0.94 FEET

26.50	8.64	674.44	672.66	0.00	674.44	0.00	0.55	0.00
880.	103.	114.	664.	368.	151.	1863.	1904.	676.
7.84	0.28	0.76	0.36	0.085	0.065	0.085	0.06	665.80
0.000180	1460.	1400.	1360.	3	9	1	0.00	1381.32

CCHV= 0.100 CEHV= 0.300

3265 DIVIDED FLOW

26.90	7.53	677.43	674.32	0.00	677.63	0.20	3.14	0.06
650.	39.	553.	57.	28.	144.	38.	1969.	712.
8.01	1.43	3.85	1.52	0.085	0.065	0.085	0.06	669.90
0.002732	2200.	2150.	2160.	4	14	1	0.00	71.64

CCHV= 0.300 CEHV= 0.500

NORMAL BRIDGE, NRD= 0 MIN ELTRD= 680.90 MAX ELLC= 679.10

27.00	7.82	677.52	673.46	0.00	677.73	0.21	0.09	0.01
650.	0.	650.	0.	0.	175.	0.	1969.	712.
8.01	0.00	3.72	0.00	0.065	0.035	0.065	0.06	669.70
0.000984	50.	50.	50.	2	19	1	0.00	26.00

CCHV= 0.100 CEHV= 0.300

27.10	8.80	677.80	674.77	0.00	677.84	0.04	0.09	0.02
650.	0.	0.	650.	0.	0.	406.	1969.	713.
8.02	0.00	0.00	1.60	0.085	0.065	0.085	0.06	669.00
0.002710	50.	50.	50.	3	14	1	0.00	342.01

CCHV= 0.100 CEHV= 0.300

3265 DIVIDED FLOW

3280 CROSS SECTION EXTENDED 2.14 FEET

27.90	10.64	679.64	673.72	0.00	679.64	0.00	1.80	0.00
650.	446.	188.	16.	2035.	299.	91.	2011.	736.
9.10	0.22	0.63	0.18	0.085	0.065	0.085	0.06	669.00
0.000052	1240.	1430.	1480.	3	12	1	0.00	1229.67

CCHV= 0.300 CEHV= 0.500

1645 INT SEC ADDED BY RAISING SEC 28.00, -1.250FT AND MULTIPLYING BY 1.985

3265 DIVIDED FLOW

3280 CROSS SECTION EXTENDED 0.47 FEET

SECND	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OTHER LOSS
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID
1.01	9.37	679.62	672.66	0.00	679.67	0.05	0.01	0.02
650.	103.	547.	0.	417.	287.	0.	2013.	737.
9.10	0.25	1.91	0.00	0.065	0.045	0.065	0.06	670.25
0.000320	30.	30.	30.	3	8	1	0.00	1171.79

1645 INT SEC ADDED BY RAISING SEC 1.01, 1.250FT AND MULTIPLYING BY 0.504

28.00	8.04	679.54	675.30	0.00	680.00	0.46	0.12	0.21
650.	0.	650.	0.	0.	119.	0.	2013.	737.
9.10	0.00	5.45	0.00	0.065	0.045	0.065	0.06	671.50
0.007824	30.	30.	30.	2	14	1	-4.47	15.40

CCHV= 0.100 CEHV= 0.300

3265 DIVIDED FLOW

3280 CROSS SECTION EXTENDED 0.42 FEET

28.10	9.32	680.32	676.11	0.00	680.32	0.00	0.28	0.05
650.	500.	91.	59.	2080.	190.	370.	2015.	739.
9.18	0.24	0.48	0.16	0.080	0.060	0.080	0.06	671.00
0.000047	70.	70.	70.	2	11	1	0.00	1292.22

CCHV= 0.100 CEHV= 0.300

3265 DIVIDED FLOW

28.60	7.66	683.26	680.65	0.00	683.34	0.09	2.99	0.03
650.	1.	386.	262.	5.	136.	186.	2116.	787.
9.55	0.27	2.84	1.41	0.080	0.060	0.080	0.06	675.60
0.001924	2960.	3160.	2860.	4	5	1	0.00	138.97

CCHV= 0.100 CEHV= 0.300

3265 DIVIDED FLOW

3280 CROSS SECTION EXTENDED 0.59 FEET

28.90	9.18	686.88	682.24	0.00	686.94	0.06	3.59	0.00
520.	12.	464.	45.	28.	231.	120.	2135.	801.
9.91	0.42	2.01	0.37	0.080	0.065	0.080	0.06	677.70
0.001081	2350.	2400.	2325.	4	11	1	0.00	370.91

CCHV= 0.300 CEHV= 0.500

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OTHER LOSS
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID

NORMAL BRIDGE,NRD= 0 MIN ELTRD= 692.80 MAX ELLC= 686.90

29.00	8.52	686.92	682.04	0.00	687.26	0.33	0.18	0.14
520.	0.	520.	0.	0.	112.	0.	2136.	801.
9.92	0.00	4.63	0.00	0.060	0.035	0.060	0.06	678.40
0.003363	80.	80.	80.	2	12	1	-0.30	13.20

CCHV= 0.100 CEHV= 0.300

3265 DIVIDED FLOW

3280 CROSS SECTION EXTENDED 0.41 FEET

29.10	8.71	687.41	682.42	0.00	687.44	0.03	0.16	0.03
520.	17.	384.	119.	45.	223.	245.	2136.	801.
9.93	0.37	1.72	0.49	0.080	0.060	0.080	0.06	678.70
0.000547	80.	80.	80.	2	8	1	0.00	417.62

CCHV= 0.100 CEHV= 0.300

3265 DIVIDED FLOW

29.90	8.38	687.58	682.61	0.00	687.63	0.05	0.19	0.00
520.	0.	513.	7.	0.	288.	30.	2139.	804.
9.98	0.00	1.78	0.24	0.080	0.060	0.080	0.06	679.20
0.000618	240.	320.	400.	2	11	1	0.00	149.83

CCHV= 0.300 CEHV= 0.500

NORMAL BRIDGE,NRD= 0 MIN ELTRD= 690.90 MAX ELLC= 687.40

30.00	8.20	687.70	683.32	0.00	688.15	0.45	0.32	0.20
520.	0.	520.	0.	0.	96.	0.	2140.	804.
9.99	0.00	5.40	0.00	0.060	0.045	0.060	0.06	679.50
0.008485	70.	70.	70.	2	12	1	-3.68	12.20

CCHV= 0.100 CEHV= 0.300

30.10	10.37	688.57	683.13	0.00	688.59	0.02	0.40	0.04
520.	7.	332.	181.	20.	230.	361.	2140.	804.
10.01	0.37	1.44	0.50	0.085	0.065	0.085	0.06	678.20
0.000361	85.	90.	90.	2	11	1	0.00	271.61

CCHV= 0.100 CEHV= 0.300

3280 CROSS SECTION EXTENDED 1.59 FEET

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OTHER LOSS
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN
SLOPE	XLOBL	XLCH	XLOBR	IIRIAL	IDC	ICONT	CORAR	TOPWID
30.50	8.39	688.89	684.53	0.00	688.89	0.00	0.30	0.00
520.	423.	61.	37.	2381.	186.	336.	2201.	831.
12.22	0.18	0.33	0.11	0.085	0.075	0.085	0.06	680.50
0.000030	1520.	1510.	1440.	3	12	1	0.00	1299.86

CCHV= 0.100 CEHV= 0.300

3265 DIVIDED FLOW

3280 CROSS SECTION EXTENDED 1.55 FEET

30.90	6.05	688.95	687.05	0.00	688.95	0.00	0.06	0.00
520.	411.	62.	47.	1936.	142.	306.	2280.	871.
13.78	0.21	0.44	0.15	0.085	0.075	0.085	0.06	682.90
0.000063	1320.	1280.	1220.	3	9	1	0.00	1403.80

CCHV= 0.300 CEHV= 0.500

1645 INT SEC ADDED BY RAISING SEC 31.00, -0.100FT AND MULTIPLYING BY 1.564

1.01	5.90	688.90	686.63	0.00	689.31	0.41	0.15	0.20
520.	0.	520.	0.	0.	101.	0.	2282.	872.
13.78	0.00	5.14	0.00	0.065	0.055	0.065	0.06	683.00
0.006765	48.	45.	43.	2	15	1	0.00	20.33

1645 INT SEC ADDED BY RAISING SEC 1.01, 0.100FT AND MULTIPLYING BY 0.639

31.00	6.11	689.21	687.68	0.00	690.13	0.92	0.57	0.26
520.	0.	520.	0.	0.	67.	0.	2282.	872.
13.78	0.00	7.71	0.00	0.065	0.055	0.065	0.06	683.10
0.018379	48.	45.	43.	2	11	1	0.00	13.00

CCHV= 0.100 CEHV= 0.300

1645 INT SEC ADDED BY RAISING SEC 31.10, 1.200FT AND MULTIPLYING BY 0.905

3265 DIVIDED FLOW

3280 CROSS SECTION EXTENDED 0.09 FEET

3301 HV CHANGED MORE THAN HVINS

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OTHER LOSS
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID
1.01	8.69	690.59	686.71	0.00	690.60	0.00	0.37	0.09
520.	284.	81.	155.	1067.	122.	536.	2283.	873.
13.81	0.27	0.66	0.29	0.085	0.075	0.085	0.06	681.90
0.000115	40.	40.	40.	3	8	1	0.00	1473.56

1645 INT SEC ADDED BY RAISING SEC 1.01, -1.200FT AND MULTIPLYING BY 1.105

3280 CROSS SECTION EXTENDED 1.30 FEET

31.10	9.90	690.60	685.32	0.00	690.60	0.00	0.00	0.00
520.	331.	43.	146.	2734.	159.	1075.	2285.	874.
13.89	0.12	0.27	0.14	0.085	0.075	0.085	0.06	680.70
0.000015	40.	40.	40.	2	8	1	0.00	1747.02

CCHV= 0.100 CEHV= 0.300

31.60	7.41	690.71	687.51	0.00	690.72	0.00	0.12	0.00
520.	270.	110.	140.	985.	151.	543.	2357.	914.
14.74	0.27	0.73	0.26	0.085	0.075	0.085	0.06	683.30
0.000191	1080.	1150.	1180.	4	11	1	0.00	1387.40

CCHV= 0.100 CEHV= 0.300

3265 DIVIDED FLOW

31.90	6.40	691.60	689.05	0.00	691.64	0.03	0.91	0.01
520.	53.	258.	209.	118.	131.	301.	2382.	938.
14.95	0.45	1.96	0.69	0.085	0.075	0.085	0.06	685.20
0.001727	960.	960.	940.	4	11	1	0.00	795.98

CCHV= 0.300 CEHV= 0.500

NORMAL BRIDGE, NRD= 2 MIN ELTRD= 693.00 MAX ELLC= 691.80

32.00	6.36	691.46	690.88	0.00	693.84	2.38	1.03	1.17
520.	0.	520.	0.	0.	42.	0.	2382.	938.
14.95	0.00	12.38	0.00	0.065	0.045	0.065	0.06	685.10
0.049921	40.	40.	40.	2	9	1	0.00	6.60

CCHV= 0.100 CEHV= 0.300

1645 INT SEC ADDED BY RAISING SEC 32.10, -0.075FT AND MULTIPLYING BY 0.493

3280 CROSS SECTION EXTENDED 1.37 FEET

3301 HV CHANGED MORE THAN HVINS

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OTHER LOSS
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID
1.01	9.27	694.39	690.73	0.00	694.39	0.00	0.31	0.24
520.	239.	40.	241.	1065.	108.	894.	2382.	939.
14.96	0.22	0.37	0.27	0.085	0.075	0.085	0.06	685.13
0.000039	13.	13.	13.	3	10	1	0.00	661.88

1645 INT SEC ADDED BY RAISING SEC 1.01, 0.025FT AND MULTIPLYING BY 1.342

3280 CROSS SECTION EXTENDED 1.34 FEET

1.02	9.24	694.39	690.53	0.00	694.39	0.00	0.00	0.00
520.	237.	43.	240.	1417.	145.	1191.	2383.	939.
14.98	0.17	0.30	0.20	0.085	0.075	0.085	0.06	685.15
0.000022	13.	13.	13.	2	9	1	0.00	887.61

1645 INT SEC ADDED BY RAISING SEC 1.02, 0.025FT AND MULTIPLYING BY 1.255

3280 CROSS SECTION EXTENDED 1.32 FEET

1.03	9.22	694.39	690.41	0.00	694.39	0.00	0.00	0.00
520.	236.	45.	239.	1762.	181.	1484.	2384.	939.
15.00	0.13	0.25	0.16	0.085	0.075	0.085	0.06	685.18
0.000014	13.	13.	13.	2	8	1	0.00	1112.93

1645 INT SEC ADDED BY RAISING SEC 1.03, 0.025FT AND MULTIPLYING BY 1.203

3280 CROSS SECTION EXTENDED 1.29 FEET

32.10	9.19	694.39	688.90	0.00	694.40	0.00	0.00	0.00
520.	235.	46.	239.	2100.	217.	1773.	2385.	939.
15.03	0.11	0.21	0.13	0.085	0.075	0.085	0.06	685.20
0.000010	13.	13.	13.	2	14	1	0.00	1337.85

CCHV= 0.100 CEHV= 0.300

3265 DIVIDED FLOW

32.50	0.06	695.46	693.83	0.00	695.46	0.01	1.07	0.00
520.	401.	119.	0.	941.	116.	0.	2605.	1019.
16.88	0.43	1.03	0.11	0.130	0.075	0.130	0.06	689.40
0.000558	3680.	4000.	3760.	6	20	1	0.00	522.18

CCHV= 0.100 CEHV= 0.300

3265 DIVIDED FLOW

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OTHER LOSS
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID
32.80	7.12	704.82	701.71	0.00	704.97	0.15	9.46	0.04
370.	5.	361.	4.	18.	115.	10.	2660.	1049.
17.25	0.27	3.14	0.43	0.130	0.075	0.130	0.06	697.70
0.004017	3960.	4140.	4060.	10	11	1	0.00	132.65

CCHV= 0.300 CEHV= 0.500

3265 DIVIDED FLOW

NORMAL BRIDGE, NRD= 5 MIN ELTRD= 709.60 MAX ELLC= 707.20

33.00	5.77	706.07	703.93	0.00	706.19	0.12	1.21	0.01
370.	176.	194.	0.	253.	52.	0.	2662.	1050.
17.28	0.70	3.73	0.00	0.110	0.045	0.110	0.06	700.30
0.004872	265.	280.	260.	4	12	1	-2.95	435.36

CCHV= 0.100 CEHV= 0.300

3265 DIVIDED FLOW

3280 CROSS SECTION EXTENDED 1.66 FEET

33.10	6.06	706.36	702.37	0.00	706.36	0.00	0.16	0.01
370.	336.	34.	0.	1735.	123.	0.	2663.	1051.
17.37	0.19	0.27	0.00	0.085	0.065	0.085	0.06	700.30
0.000026	65.	65.	65.	2	14	1	0.00	656.28

CCHV= 0.100 CEHV= 0.300

3265 DIVIDED FLOW

33.30	4.12	711.32	710.79	0.00	711.56	0.23	5.12	0.07
370.	127.	242.	1.	78.	52.	1.	2682.	1059.
17.44	1.62	4.63	1.00	0.100	0.070	0.100	0.06	707.20
0.011762	840.	885.	840.	8	14	1	0.00	109.31

CCHV= 0.100 CEHV= 0.300

33.40	5.17	725.97	725.35	0.00	726.04	0.07	14.47	0.02
370.	178.	144.	47.	146.	46.	44.	2689.	1064.
17.68	1.22	3.17	1.07	0.100	0.070	0.100	0.06	720.80
0.005180	1400.	2150.	1520.	11	13	1	0.00	182.88

CCHV= 0.300 CEHV= 0.500

3265 DIVIDED FLOW

3280 CROSS SECTION EXTENDED 1.48 FEET

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OTHER LOSS
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID

NORMAL BRIDGE, NRD= 3 MIN ELTRD= 728.00 MAX ELLC= 724.70

33.50	5.39	726.39	726.06	0.00	726.54	0.15	0.46	0.04
370.	248.	122.	0.	113.	27.	0.	2690.	1064.
17.69	2.18	4.53	0.00	0.080	0.045	0.080	0.06	721.00
0.013403	50.	50.	50.	2	17	1	-9.69	146.17

CCHV= 0.100 CEHV= 0.300

3265 DIVIDED FLOW

33.60	6.54	727.34	725.36	0.00	727.35	0.01	0.79	0.01
370.	213.	82.	75.	316.	62.	131.	2690.	1064.
17.73	0.68	1.32	0.57	0.100	0.070	0.100	0.06	720.80
0.000598	120.	110.	95.	3	13	1	0.00	230.77

CCHV= 0.100 CEHV= 0.300

33.90	3.30	730.90	729.94	0.00	731.03	0.13	3.65	0.04
370.	3.	265.	102.	3.	61.	63.	2696.	1067.
17.82	0.97	3.26	1.62	0.100	0.070	0.100	0.06	727.60
0.006899	760.	1080.	700.	4	11	1	0.00	78.34
33.91	4.21	731.21	729.35	0.00	731.26	0.06	0.22	0.01
370.	5.	242.	123.	7.	110.	103.	2697.	1067.
17.83	0.73	2.19	1.20	0.100	0.070	0.100	0.06	727.00
0.002088	50.	50.	50.	3	5	1	0.00	82.89

CCHV= 0.300 CEHV= 0.500

1645 INT SEC ADDED BY RAISING SEC 34.01, 0.400FT AND MULTIPLYING BY 2.520

1.01	4.34	731.14	728.98	0.00	731.42	0.28	0.05	0.11
370.	0.	370.	0.	0.	88.	0.	2697.	1067.
17.83	0.00	4.22	0.00	0.080	0.045	0.080	0.06	726.80
0.003723	17.	17.	17.	2	11	1	0.00	20.16

1645 INT SEC ADDED BY RAISING SEC 1.01, -0.200FT AND MULTIPLYING BY 0.698

1.02	4.52	731.12	729.37	0.00	731.64	0.53	0.10	0.12
370.	0.	370.	0.	0.	64.	0.	2697.	1067.
17.83	0.00	5.82	0.00	0.080	0.045	0.080	0.06	726.60
0.008042	17.	17.	17.	2	11	1	0.00	14.08

1645 INT SEC ADDED BY RAISING SEC 1.02, -0.200FT AND MULTIPLYING BY 0.568

SECND	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OTHER LOSS
Q	QLOB	QCH	QROB	ALOB	ACH	ARDB	VOL	TWA
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID
34.01	4.53	730.93	730.45	0.00	732.55	1.63	0.36	0.55
370.	0.	370.	0.	0.	36.	0.	2697.	1067.
17.83	0.00	10.24	0.00	0.080	0.045	0.080	0.06	726.40
0.035254	17.	17.	17.	0	11	1	0.00	8.00

CCHV= 0.100 CEHV= 0.300

1645 INT SEC ADDED BY RAISING SEC 34.10, -0.375FT AND MULTIPLYING BY 1.000

3265 DIVIDED FLOW

1.01	6.62	733.15	730.03	0.00	733.16	0.02	0.45	0.16
370.	0.	0.	370.	0.	0.	375.	2697.	1067.
17.84	0.00	0.00	0.99	0.080	0.055	0.080	0.06	726.52
0.000563	25.	25.	25.	2	9	1	0.00	143.95

1645 INT SEC ADDED BY RAISING SEC 1.01, 0.125FT AND MULTIPLYING BY 1.000

3265 DIVIDED FLOW

1.02	6.51	733.16	730.12	0.00	733.18	0.02	0.01	0.00
370.	0.	0.	370.	0.	0.	359.	2697.	1067.
17.85	0.00	0.00	1.03	0.080	0.055	0.080	0.06	726.65
0.000632	25.	25.	25.	2	5	1	0.00	140.67

1645 INT SEC ADDED BY RAISING SEC 1.02, 0.125FT AND MULTIPLYING BY 1.000

3265 DIVIDED FLOW

1.03	6.40	733.18	730.27	0.00	733.20	0.02	0.02	0.00
370.	0.	0.	370.	0.	0.	343.	2697.	1067.
17.85	0.00	0.00	1.08	0.080	0.055	0.080	0.06	726.77
0.000707	25.	25.	25.	2	5	1	0.00	137.54

1645 INT SEC ADDED BY RAISING SEC 1.03, 0.125FT AND MULTIPLYING BY 1.000

3265 DIVIDED FLOW

34.10	6.30	733.20	730.38	0.00	733.22	0.02	0.02	0.00
370.	0.	0.	370.	0.	0.	329.	2698.	1067.
17.86	0.00	0.00	1.13	0.080	0.055	0.080	0.06	726.90
0.000792	25.	25.	25.	2	5	1	0.00	134.50

CCHV= 0.100 CEHV= 0.300

3265 DIVIDED FLOW

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OTHER LOSS
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID
34.90	4.04	742.94	742.26	0.00	743.13	0.19	9.86	0.05
310.	66.	220.	24.	49.	54.	18.	2706.	1072.
18.00	1.36	4.11	1.28	0.100	0.070	0.100	0.06	738.90
0.010721	1564.	1770.	1600.	10	11	1	0.00	131.58

CCHV= 0.300 CEHV= 0.500

NORMAL BRIDGE, NRD= 0 MIN ELTRD= 745.50 MAX ELLC= 743.70

35.00	5.65	743.45	740.98	0.00	743.96	0.51	0.67	0.16
310.	0.	310.	0.	0.	54.	0.	2706.	1072.
18.01	0.00	5.72	0.00	0.080	0.045	0.080	0.06	737.80
0.008410	120.	70.	60.	3	15	1	0.00	9.60

CCHV= 0.100 CEHV= 0.300

3265 DIVIDED FLOW

35.10	5.40	744.30	742.26	0.00	744.32	0.02	0.31	0.05
310.	129.	124.	57.	228.	81.	96.	2706.	1073.
18.03	0.57	1.53	0.59	0.100	0.070	0.100	0.06	738.90
0.000857	65.	70.	65.	2	8	1	0.00	274.22

1) COUNTY: KENT

2) STUDY NAME: (SCS) BUCK CREEK WATERSHED STUDY

3) WATERCOURSE: BUCK CREEK

4) DOCUMENT TYPE: 100 YEAR PROFILE
~~SEC 9.5 (GRAND RIVER)~~
~~TO SECTION 55.4~~
~~(END OF STUDY)~~

00BREAK00

1 100-YEAR FREQUENCY FLOOD PROFILE — BAUERLE
2 SECTION 9.5 (GRAND RIVER) TO SECTION 15.86 — 03/31/72
3 BUCK CREEK WATERSHED KENT COUNTY MICHIGAN

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
	-0.	-0.	-0.	-0.	-0.000000	-0.00	-1.0	3500.	602.400	-0.000
J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN				ITRACE
	2.	-0.	-0.	-0.	-0.000000	-0.00	-0.0	-0.	-0.000	-0.000

CCHV= 0.100 CEHV= 0.300
3280 CROSS SECTION EXTENDED 13.10 FEET

SECNO	DEPTH	CWSEL	CRIWS	WSELK	FG	HV	HL	OTHER LOSS
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID
9.50	17.50	602.40	590.53	602.40	602.40	0.00	0.00	0.00
3500.	984.	369.	2147.	3919.	616.	7341.	0.	0.
0.00	0.25	0.60	0.29	0.110	0.065	0.110	0.00	584.90
0.000017	0.	0.	0.	0	19	1	0.00	1218.00

3280 CROSS SECTION EXTENDED 12.68 FEET

9.53	17.08	602.40	590.98	0.00	602.41	0.00	0.00	0.00
3500.	969.	376.	2154.	3682.	601.	7087.	54.	6.
0.17	0.26	0.63	0.30	0.110	0.065	0.110	0.07	585.32
0.000019	200.	210.	200.	0	5	1	0.00	1208.74

3280 CROSS SECTION EXTENDED 12.54 FEET

9.55	16.94	602.40	591.10	0.00	602.41	0.00	0.00	0.00
3500.	965.	379.	2157.	3604.	596.	7003.	72.	8.
0.23	0.27	0.64	0.31	0.110	0.065	0.110	0.07	585.46
0.000020	70.	70.	70.	0	5	1	0.00	1205.66

3280 CROSS SECTION EXTENDED 12.48 FEET

9.57	16.88	602.41	591.19	0.00	602.41	0.00	0.00	0.00
3500.	962.	380.	2158.	3565.	593.	6961.	81.	9.
0.26	0.27	0.64	0.31	0.110	0.065	0.110	0.07	585.53
0.000020	35.	35.	35.	0	5	1	0.00	1204.12

CCHV= 0.300 CEHV= 0.500
3265 DIVIDED FLOW

NORMAL BRIDGE,NRD= 0 MIN ELTRD= 608.20 MAX ELLC= 604.10

9.90	16.69	602.29	593.54	0.00	602.55	0.26	0.02	0.13

3500.	0.	3500.	0.	0.	858.	0.	85.	9.
0.26	0.00	4.08	0.00	0.090	0.035	0.090	0.06	585.60
0.000913	35.	35.	35.	2	15	1	0.00	86.40

3280 CROSS SECTION EXTENDED 4.03 FEET

SECNO	DEPTH	CWSEL	CRITWS	WSELK	EG	HV	HL	OTHER LOSS
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID
9.91	16.93	602.64	593.36	0.00	602.65	0.00	0.02	0.08
3500.	1471.	461.	1568.	5051.	770.	6389.	91.	10.
0.29	0.29	0.60	0.25	0.110	0.065	0.110	0.06	585.71
0.000023	35.	35.	35.	2	10	1	0.00	1700.00

CCHV= 0.100 CEHV= 0.300
3280 CROSS SECTION EXTENDED 3.94 FEET

9.93	16.83	602.64	593.40	0.00	602.65	0.00	0.00	0.00
3500.	1474.	464.	1569.	5002.	765.	6288.	100.	11.
0.32	0.29	0.61	0.25	0.110	0.065	0.110	0.06	585.81
0.000024	35.	35.	35.	1	5	1	0.00	1700.00

3280 CROSS SECTION EXTENDED 3.75 FEET

9.95	16.65	602.65	593.64	0.00	602.65	0.00	0.00	0.00
3500.	1480.	471.	1549.	4901.	755.	6079.	121.	14.
0.39	0.30	0.62	0.25	0.110	0.065	0.110	0.06	586.00
0.000025	75.	75.	75.	0	5	1	0.00	1700.00

3280 CROSS SECTION EXTENDED 3.76 FEET

9.97	16.65	602.65	593.60	0.00	602.65	0.00	0.00	0.00
3500.	1480.	471.	1549.	4902.	755.	6081.	141.	17.
0.45	0.30	0.62	0.25	0.110	0.065	0.110	0.06	586.00
0.000025	75.	75.	75.	0	5	1	0.00	1700.00

CCHV= 0.300 CEHV= 0.500

3265 DIVIDED FLOW

NORMAL BRIDGE,NRD= 0 MIN ELTRD= 614.50 MAX ELLC= 609.60

10.00	16.55	602.55	594.41	0.00	602.82	0.27	0.03	0.13
3500.	0.	3500.	0.	0.	845.	0.	152.	18.
0.46	0.00	4.14	0.00	0.090	0.035	0.090	0.06	586.00
0.000903	75.	75.	75.	2	19	1	0.00	88.62

3280 CROSS SECTION EXTENDED 4.04 FEET

10.10	16.94	602.94	593.66	0.00	602.94	0.00	0.04	0.08
3500.	1471.	461.	1568.	5052.	770.	6392.	165.	20.
0.54	0.29	0.60	0.25	0.110	0.065	0.110	0.06	586.00
0.000023	90.	90.	90.	2	13	1	0.00	1700.00

CCHV= 0.100 CEHV= 0.300
3280 CROSS SECTION EXTENDED 10.04 FEET

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OTHER LOSS
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID
10.90	16.74	602.94	593.11	0.00	602.95	0.00	0.01	0.00
3500.	2143.	532.	825.	6201.	729.	2741.	239.	30.
0.74	0.35	0.73	0.30	0.110	0.065	0.110	0.06	586.20
0.000028	290.	310.	290.	2	9	1	0.00	1109.56

CCHV= 0.300 CEHV= 0.500

NORMAL BRIDGE,NRD= 0 MIN ELTRD= 603.70 MAX ELLC= 599.80

11.00	15.88	602.88	593.70	0.00	603.31	0.44	0.15	0.22
3500.	0.	3500.	0.	0.	661.	0.	246.	31.
0.75	0.00	5.29	0.00	0.090	0.045	0.090	0.06	587.00
0.005044	60.	60.	60.	2	15	1	-206.31	67.00

3280 CROSS SECTION EXTENDED 6.79 FEET

11.10	16.79	603.59	594.61	0.00	603.60	0.00	0.15	0.13
3500.	2466.	412.	622.	6392.	483.	1894.	252.	31.
0.79	0.39	0.85	0.33	0.110	0.065	0.110	0.06	586.90
0.000041	60.	60.	60.	2	11	1	0.00	1188.15

CCHV= 0.100 CEHV= 0.300
3280 CROSS SECTION EXTENDED 2.47 FEET

11.90	13.18	603.68	596.47	0.00	603.71	0.03	0.10	0.01
3500.	853.	1693.	954.	1507.	825.	1600.	325.	45.
0.91	0.57	2.05	0.60	0.110	0.065	0.110	0.07	590.50
0.000311	450.	680.	550.	2	15	1	0.00	1100.00

CCHV= 0.300 CEHV= 0.500

3265 DIVIDED FLOW

3280 CROSS SECTION EXTENDED 1.52 FEET

3301 HV CHANGED MORE THAN HVINS

NORMAL BRIDGE,NRD= 3 MIN ELTRD= 603.10 MAX ELLC= 600.20

12.00	11.92	603.32	598.25	0.00	604.39	1.07	0.17	0.52
3500.	111.	3151.	238.	127.	360.	196.	327.	45.
0.91	0.88	8.75	1.21	0.090	0.035	0.090	0.07	591.40
0.007978	40.	40.	40.	2	12	1	-97.89	605.96

3280 CROSS SECTION EXTENDED 1.10 FEET

3301 HV CHANGED MORE THAN HVINS

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OTHER LOSS
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID
	12.01	14.60	604.80	598.57	0.00	604.81	0.02	0.10	0.32
	3500.	195.	689.	2616.	635.	397.	3330.	329.	46.
	0.92	0.31	1.74	0.79	0.110	0.065	0.110	0.07	590.20
	0.000244	25.	25.	25.	2	11	1	0.00	1100.00

CCHV= 0.100 CEHV= 0.300
3280 CROSS SECTION EXTENDED 2.51 FEET

	12.10	16.01	604.81	597.23	0.00	604.82	0.01	0.01	0.00
	3500.	399.	588.	2513.	1320.	446.	4150.	332.	47.
	0.93	0.30	1.32	0.61	0.110	0.065	0.110	0.07	588.80
	0.000120	30.	30.	30.	2	5	1	0.00	1100.00

3265 DIVIDED FLOW

3280 CROSS SECTION EXTENDED 1.73 FEET

	12.50	10.72	604.92	598.57	0.00	604.95	0.02	0.12	0.00
	3500.	294.	1380.	1827.	889.	828.	2081.	402.	62.
	1.09	0.33	1.67	0.88	0.100	0.065	0.100	0.07	594.20
	0.000262	620.	660.	620.	0	11	1	0.00	1056.68

CCHV= 0.100 CEHV= 0.300
3280 CROSS SECTION EXTENDED 2.02 FEET

	12.90	12.52	605.22	599.78	0.00	605.42	0.20	0.42	0.05
	3500.	169.	2963.	369.	143.	773.	476.	427.	71.
	1.12	1.18	3.83	0.77	0.085	0.065	0.085	0.07	592.70
	0.001682	530.	440.	350.	2	14	1	0.00	632.93

3265 DIVIDED FLOW

3280 CROSS SECTION EXTENDED 1.13 FEET

	12.99	11.63	605.18	600.62	0.00	605.53	0.35	0.06	0.05
	3500.	101.	3340.	58.	79.	691.	96.	427.	71.
	1.12	1.28	4.83	0.61	0.085	0.065	0.085	0.07	593.55
	0.003100	25.	25.	25.	2	5	1	0.00	433.58

CCHV= 0.300 CEHV= 0.500
3280 CROSS SECTION EXTENDED 1.86 FEET

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OTHER LOSS
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID

NORMAL BRIDGE,NRD= 3 MIN ELTRD= 604.00 MAX ELLC= 601.70

13.00	11.05	605.45	600.39	0.00	605.65	0.20	0.08	0.04
3500.	135.	1911.	1454.	106.	427.	720.	428.	71.
1.13	1.27	4.48	2.02	0.065	0.045	0.065	0.07	594.40
0.003271	25.	25.	25.	2	9	1	-93.75	547.94

13.01	12.05	605.60	601.36	0.00	605.74	0.14	0.08	0.02
3500.	160.	2221.	1119.	172.	605.	812.	429.	72.
1.13	0.93	3.67	1.38	0.100	0.065	0.075	0.07	593.55
0.001797	30.	30.	30.	2	11	1	0.00	594.84

CCHV= 0.100 CEHV= 0.300

13.10	13.02	605.72	600.51	0.00	605.79	0.07	0.04	0.01
3500.	221.	1837.	1442.	277.	681.	1234.	430.	72.
1.13	0.80	2.70	1.17	0.100	0.065	0.075	0.07	592.70
0.000826	30.	30.	30.	2	5	1	0.00	649.61

CCHV= 0.100 CEHV= 0.300

3265 DIVIDED FLOW

3280 CROSS SECTION EXTENDED 2.72 FEET

13.30	10.13	606.43	603.19	0.00	606.48	0.05	0.69	0.00
3500.	1453.	1090.	958.	1333.	401.	696.	472.	85.
1.26	1.09	2.72	1.38	0.085	0.065	0.085	0.07	596.30
0.000916	700.	900.	800.	2	13	1	0.00	851.18

CCHV= 0.100 CEHV= 0.300
3280 CROSS SECTION EXTENDED 1.70 FEET

13.70	9.00	608.70	606.59	0.00	608.88	0.18	2.36	0.04
3500.	1188.	1242.	1070.	800.	253.	414.	522.	107.
1.37	1.49	4.90	2.58	0.085	0.065	0.085	0.07	599.70
0.003281	1150.	1185.	1030.	6	5	1	0.00	829.36

CCHV= 0.100 CEHV= 0.300

3265 DIVIDED FLOW

13.90	10.47	612.47	609.25	0.00	612.85	0.38	3.91	0.06
3500.	666.	2771.	63.	518.	503.	76.	551.	123.
1.43	1.29	5.51	0.83	0.085	0.065	0.085	0.07	602.00
0.004322	910.	1060.	930.	6	8	1	0.00	683.05

CCHV= 0.300 CEHV= 0.500
3280 CROSS SECTION EXTENDED 1.40 FEET

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OTHER LOSS
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID

NORMAL BRIDGE,NRD= 4 MIN ELTRD= 612.40 MAX ELLC= 610.70

14.00	10.30	612.80	608.53	0.00	613.27	0.47	0.37	0.05
3500.	853.	2622.	24.	393.	419.	29.	552.	124.
1.43	2.17	6.25	0.84	0.065	0.045	0.065	0.07	602.50
0.008159	60.	60.	60.	2	16	1	-71.01	544.92
14.10	11.17	613.57	608.00	0.00	613.62	0.05	0.22	0.13
3500.	1071.	1694.	735.	1326.	685.	661.	554.	125.
1.44	0.81	2.47	1.11	0.085	0.065	0.085	0.07	602.40
0.000553	50.	50.	54.	2	11	1	0.00	1065.16

CCHV= 0.100 CEHV= 0.300

14.30	10.17	614.27	610.88	0.00	614.28	0.01	0.66	0.00
3500.	222.	555.	2723.	391.	373.	3806.	687.	164.
1.99	0.57	1.49	0.72	0.085	0.065	0.085	0.07	604.10
0.000247	1450.	1610.	1660.	4	16	1	0.00	1116.48

CCHV= 0.100 CEHV= 0.300

14.50	9.86	615.66	613.54	0.00	615.73	0.07	1.43	0.02
3500.	242.	810.	2448.	190.	245.	1612.	816.	200.
2.24	1.27	3.31	1.52	0.080	0.060	0.080	0.07	605.80
0.001413	1650.	1880.	1680.	3	12	1	0.00	708.08

CCHV= 0.100 CEHV= 0.300
3280 CROSS SECTION EXTENDED 6.16 FEET

14.59	8.35	618.15	616.74	0.00	618.33	0.18	2.57	0.04
3500.	1938.	1234.	328.	761.	258.	199.	847.	211.
2.31	2.55	4.78	1.65	0.080	0.060	0.080	0.07	609.80
0.004690	820.	890.	800.	7	9	1	0.00	467.84

CCHV= 0.300 CEHV= 0.500
3280 CROSS SECTION EXTENDED 6.44 FEET

NORMAL BRIDGE,NRD= 4 MIN ELTRD= 616.00 MAX ELLC= 615.20

14.60	8.64	618.44	616.73	0.00	618.56	0.12	0.20	0.02
3500.	2234.	833.	433.	841.	244.	243.	848.	211.
2.32	2.66	3.41	1.78	0.070	0.050	0.070	0.07	609.80
0.003495	50.	50.	50.	2	11	1	-23.08	478.60

3280 CROSS SECTION EXTENDED 6.60 FEET

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OTHER LOSS
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID
14.61	8.80	618.60	616.79	0.00	618.73	0.13	0.16	0.00
3500.	1992.	1096.	412.	886.	273.	269.	850.	212.
2.32	2.25	4.02	1.53	0.080	0.060	0.080	0.07	609.80
0.003075	50.	50.	50.	2	5	1	0.00	484.69

CCHV= 0.100 CEHV= 0.300
3280 CROSS SECTION EXTENDED 2.20 FEET

14.70	8.20	621.50	618.43	0.00	621.52	0.02	2.78	0.01
3500.	4.	517.	2979.	8.	297.	3052.	937.	236.
2.73	0.48	1.74	0.98	0.075	0.055	0.075	0.06	613.30
0.000381	1540.	1600.	1610.	3	13	1	0.00	826.12

CCHV= 0.100 CEHV= 0.300

3265 DIVIDED FLOW

14.79	8.11	622.31	620.88	0.00	622.49	0.18	0.93	0.05
3500.	28.	1252.	2220.	32.	246.	1133.	968.	246.
2.78	0.86	5.08	1.96	0.075	0.055	0.075	0.06	614.20
0.002939	525.	560.	560.	2	11	1	0.00	808.01

CCHV= 0.300 CEHV= 0.500
3280 CROSS SECTION EXTENDED 3.39 FEET

NORMAL BRIDGE, NRD= 6 MIN ELTRD= 621.30 MAX ELLC= 620.20

14.80	8.79	622.49	620.93	0.00	622.71	0.22	0.20	0.02
3500.	13.	870.	2617.	10.	246.	685.	969.	247.
2.79	1.32	3.53	3.82	0.055	0.045	0.055	0.06	613.70
0.004993	50.	50.	50.	2	11	1	-46.29	309.93

14.81	8.61	622.81	620.94	0.00	622.91	0.10	0.17	0.03
3500.	79.	1068.	2359.	116.	264.	1469.	971.	247.
2.79	0.68	4.04	1.60	0.075	0.055	0.075	0.06	614.20
0.001695	50.	50.	50.	2	10	1	0.00	922.14

CCHV= 0.100 CEHV= 0.300

14.90	8.97	623.17	620.84	0.00	623.24	0.07	0.33	0.00
3500.	130.	955.	2415.	188.	277.	1723.	982.	252.
2.83	0.69	3.44	1.40	0.075	0.055	0.075	0.06	614.20
0.001155	230.	230.	230.	2	5	1	0.00	960.72

SECND	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OTHER LOSS
Q	QLOB	QCH	QROR	ALOB	ACH	AROR	VOL	TWA
TIME	VLOB	VCH	VROR	XNL	XNCH	XNR	WTN	ELMIN
SLOPE	XLOBL	XLCH	XLORR	ITRIAL	IDC	ICONT	CORAR	TOPWID
14.91	9.08	623.28	620.91	0.00	623.35	0.06	0.10	0.00
3500.	146.	923.	243.	213.	281.	1805.	985.	254.
2.84	0.69	3.28	1.35	0.075	0.055	0.075	0.06	614.20
0.001027	220.	275.	26.	2	5	1	0.00	972.98

CCHV= 0.300 CEHV= 0.500

3265 DIVIDED FLOW

3280 CROSS SECTION EXTENDED 0.54 FEET

NORMAL BRIDGE,NRD= 3 MIN ELTRD= 624.70 MAX ELLC= 622.10

15.00	9.04	623.24	619.87	0.00	623.71	0.47	0.16	0.20
3500.	1.	2534.	965.	3.	401.	428.	987.	255.
2.84	0.33	6.31	2.25	0.055	0.045	0.055	0.06	614.20
0.005333	50.	50.	50.	2	9	1	-44.84	473.65
15.10	11.06	623.96	621.12	0.00	624.04	0.07	0.21	0.12
3500.	1576.	1222.	702.	1252.	365.	754.	989.	256.
2.85	1.26	3.34	0.93	0.085	0.055	0.085	0.06	612.90
0.000959	60.	80.	60.	2	14	1	0.00	970.52

CCHV= 0.100 CEHV= 0.300
3280 CROSS SECTION EXTENDED 0.68 FEET

15.30	9.28	626.18	624.58	0.00	626.23	0.05	2.19	0.00
3500.	2701.	779.	20.	2498.	231.	31.	1114.	303.
3.24	1.08	3.37	0.66	0.085	0.055	0.085	0.06	616.90
0.001030	2075.	2650.	1875.	6	13	1	0.00	1051.54

CCHV= 0.100 CEHV= 0.300

3265 DIVIDED FLOW

15.50	8.66	629.46	627.30	0.00	629.61	0.16	3.35	0.03
3500.	1009.	1848.	643.	722.	445.	492.	1229.	348.
3.48	1.40	4.15	1.31	0.085	0.055	0.085	0.06	620.90
0.001729	2200.	2565.	2400.	4	12	1	0.00	664.37

CCHV= 0.100 CEHV= 0.300

3265 DIVIDED FLOW

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OTHER LOSS
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IOC	ICONT	CORAR	TOPWID
15.80	10.96	631.46	627.17	0.00	631.52	0.05	1.89	0.01
3500.	0.	0.	3500.	0.	0.	1907.	1278.	365.
3.66	0.00	0.00	1.84	0.085	0.055	0.085	0.06	620.50
0.001426	1120.	1190.	1200.	2	8	1	0.00	647.92

CCHV= 0.100 CEHV= 0.300

15.84	9.54	632.04	628.11	0.00	632.12	0.08	0.60	0.01
3500.	1633.	1077.	790.	948.	329.	466.	1297.	370.
3.72	1.72	3.28	1.70	0.085	0.055	0.085	0.06	622.50
0.001011	520.	500.	420.	2	9	1	0.00	313.21
15845.00	9.32	632.07	628.39	0.00	632.16	0.09	0.03	0.00
3500.	1623.	1092.	785.	909.	320.	446.	1298.	371.
3.72	1.79	3.42	1.76	0.085	0.055	0.085	0.06	622.75
0.001139	30.	30.	30.	0	5	1	0.00	311.92

CCHV= 0.300 CEHV= 0.500

7185 MIN SPECIFIC ENERGY

3720 ASSUMED CRITICAL DEPTH

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OTHER LOSS
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IOC	ICONT	CORAR	TOPWID

NORMAL BRIDGE,NRD= 3 MIN ELTRD= 630.80 MAX ELLC= 629.27

15.85	9.36	632.36	632.36	0.00	633.24	0.88	0.00	0.00
3500.	779.	1935.	786.	198.	206.	174.	1299.	371.
3.73	3.93	9.41	4.52	0.065	0.045	0.065	0.06	623.00
0.017985	30.	30.	30.	0	10	1	-29.83	286.63

3280 CROSS SECTION EXTENDED 3.10 FEET

3301 HV CHANGED MORE THAN HVINS

15.86	11.19	633.69	629.24	0.00	633.77	0.07	0.28	0.24
3500.	2197.	1030.	274.	1436.	321.	228.	1300.	371.
3.73	1.53	3.21	1.20	0.085	0.055	0.085	0.06	622.50
0.000673	30.	30.	30.	2	13	1	0.00	450.00

1 100-YEAR FREQUENCY FLOOD PROFILE
2 SECTION 15,86 TO SECTION 35,1 (UPSTREAM LIMITS OF STUDY)
3 BUCK CREEK WATERSHED KENT COUNTY MICHIGAN

BAUERLE
04/04/72

ERROR SEC 32.0 : TOP OF DIKE TOO HIGH - MAYBE ?

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
	=0.	=0.	=0.	=0.	=0.000000	=0.00	=0.0	3500.	633,690	=0.000

CCHV= 0.100 CEHV= 0.300
3280 CROSS SECTION EXTENDED 3.09 FEET

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OTHER LOSS
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID
15.86	11.19	633.69	629.21	633.69	633.76	0.07	0.00	0.00
3500.	2197.	1030.	273.	1434.	320.	227.	0.	0.
0.00	1.53	3.21	1.20	0.085	0.055	0.085	0.00	622.50
0.000675	=0.	=0.	=0.	0	13	1	0.00	450.00

3265 DIVIDED FLOW

15.90	10.21	634.21	630.41	0.00	634.24	0.03	0.47	0.00
3500.	2744.	748.	9.	2640.	324.	15.	46.	11.
0.18	1.04	2.31	0.58	0.085	0.055	0.085	0.07	624.00
0.000460	760.	1100.	975.	3	10	1	0.00	767.77

CCHV= 0.300 CEHV= 0.500
3265 DIVIDED FLOW

Abandoned R.R.

NORMAL BRIDGE, NRD=14 MIN ELTRD= 638.00 MAX ELLC= 635.80

16.00	10.16	634.16	629.17	0.00	634.48	0.32	0.10	0.15
3500.	0.	3500.	0.	0.	769.	0.	49.	12.
0.18	0.00	4.55	0.00	0.065	0.045	0.065	0.07	624.00
0.003402	50.	50.	50.	2	12	1	0.00	99.40

CCHV= 0.100 CEHV= 0.300

16.10	10.69	634.59	629.03	0.00	634.60	0.01	0.09	0.03
3500.	3087.	294.	119.	4100.	190.	234.	52.	12.
0.20	0.75	1.55	0.51	0.085	0.055	0.085	0.07	623.90
0.000155	50.	50.	50.	2	6	1	0.00	840.34

CCHV= 0.100 CEHV= 0.300

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OTHER LOSS
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID
16.30	11.23	634.73	631.55	0.00	634.76	0.03	0.15	0.00
3500.	2317.	922.	260.	2408.	459.	372.	103.	24.
0.33	0.96	2.01	0.70	0.075	0.055	0.075	0.06	623.50
0.000383	580.	550.	600.	2	15	1	0.00	951.92
CCHV= 0.100 CEHV= 0.300								
16.90	7.20	637.50	635.61	0.00	637.57	0.08	2.80	0.01
3500.	2316.	1124.	61.	1668.	336.	54.	315.	88.
0.82	1.39	3.34	1.12	0.075	0.055	0.075	0.06	630.30
0.001182	3440.	3880.	3160.	6	14	1	0.00	678.47
CCHV= 0.300 CEHV= 0.500								
1645 INT SEC ADDED BY RAISING SEC 17.00, 0.600FT AND MULTIPLYING BY 1.130								
1.01	6.33	636.43	636.35	0.00	638.91	2.48	0.13	1.20
3500.	0.	3500.	0.	0.	277.	0.	315.	89.
0.82	0.00	12.64	0.00	0.055	0.045	0.055	0.06	630.10
0.020041	13.	13.	13.	3	11	1	0.00	54.24
1645 INT SEC ADDED BY RAISING SEC 1.01, -0.200FT AND MULTIPLYING BY 0.962								
1.02	7.90	637.80	636.29	0.00	639.37	1.57	0.18	0.27
3500.	0.	3500.	0.	0.	348.	0.	315.	89.
0.82	0.00	10.06	0.00	0.055	0.045	0.055	0.06	629.90
0.009557	13.	13.	13.	9	8	1	0.00	52.16
1645 INT SEC ADDED BY RAISING SEC 1.02, -0.200FT AND MULTIPLYING BY 0.960								
1.03	8.26	637.96	636.23	0.00	639.49	1.54	0.12	0.01
3500.	0.	3500.	0.	0.	352.	0.	315.	89.
0.82	0.00	9.95	0.00	0.055	0.045	0.055	0.06	629.70
0.008955	13.	13.	13.	3	8	1	0.00	50.08
1645 INT SEC ADDED BY RAISING SEC 1.03, -0.200FT AND MULTIPLYING BY 0.958								
17.00	8.57	638.07	636.18	0.00	639.60	1.53	0.11	0.00
3500.	0.	3500.	0.	0.	353.	0.	316.	89.
0.82	0.00	9.93	0.00	0.055	0.045	0.055	0.06	629.50
0.008614	13.	13.	13.	2	8	1	0.00	48.00
CCHV= 0.100 CEHV= 0.300								
1645 INT SEC ADDED BY RAISING SEC 17.10, -0.075FT AND MULTIPLYING BY 1.133								

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OTHER LOSS
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA
TIME	VLDB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID
1.01	10.29	639.81	635.34	0.00	639.82	0.01	0.07	0.15
3500.	2417.	565.	518.	3510.	409.	788.	316.	89.
0.83	0.69	1.38	0.66	0.075	0.055	0.075	0.06	629.53
0.000129	15.	15.	15.	2	9	1	0.00	874.01

1645 INT SEC ADDED BY RAISING SEC 1.01, 0.025FT AND MULTIPLYING BY 0.961

1.02	10.26	639.81	635.38	0.00	639.82	0.01	0.00	0.00
3500.	2416.	566.	518.	3354.	392.	752.	318.	89.
0.83	0.72	1.44	0.69	0.075	0.055	0.075	0.06	629.55
0.000143	15.	15.	15.	2	5	1	0.00	839.61

1645 INT SEC ADDED BY RAISING SEC 1.02, 0.025FT AND MULTIPLYING BY 0.959

1.03	10.24	639.81	635.47	0.00	639.83	0.01	0.00	0.00
3500.	2416.	567.	517.	3203.	375.	718.	320.	89.
0.84	0.75	1.51	0.72	0.075	0.055	0.075	0.06	629.58
0.000157	15.	15.	15.	2	5	1	0.00	805.25

1645 INT SEC ADDED BY RAISING SEC 1.03, 0.025FT AND MULTIPLYING BY 0.957

17.10	10.22	639.82	635.54	0.00	639.83	0.01	0.00	0.00
3500.	2416.	567.	517.	3053.	359.	684.	321.	90.
0.84	0.79	1.58	0.76	0.075	0.055	0.075	0.06	629.60
0.000174	15.	15.	15.	2	5	1	0.00	770.90

CCHV= 0.100 CEHV= 0.300

17.30	9.82	640.82	637.25	0.00	640.97	0.16	1.10	0.04
3500.	882.	1689.	929.	378.	419.	498.	408.	106.
0.97	2.33	4.04	1.87	0.075	0.055	0.075	0.06	631.00
0.001370	1400.	1450.	1408.	2	8	1	0.00	252.16

CCHV= 0.100 CEHV= 0.300

17.50	10.49	641.99	638.49	0.00	642.04	0.05	1.06	0.01
3500.	656.	1085.	1758.	593.	394.	1337.	451.	115.
1.14	1.11	2.75	1.31	0.085	0.055	0.085	0.06	631.50
0.000670	1012.	1120.	1000.	3	8	1	0.00	502.00

CCHV= 0.100 CEHV= 0.300

3265 DIVIDED FLOW

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OTHER LOSS
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID
17.70	10.08	645.18	643.28	0.00	645.31	0.13	3.24	0.02
3500.	1542.	1401.	557.	1091.	321.	524.	569.	151.
1.42	1.41	4.36	1.06	0.095	0.055	0.095	0.06	635.10
0.001878	2240.	2950.	2380.	3	11	1	0.00	818.17

CCHV= 0.100 CEHV= 0.300

3265 DIVIDED FLOW

17.90	8.30	647.50	645.02	0.00	647.55	0.05	2.23	0.01
3500.	294.	1326.	1880.	271.	492.	2171.	660.	183.
1.72	1.08	2.69	0.87	0.095	0.055	0.095	0.06	639.20
0.000730	1560.	1960.	1560.	4	16	1	0.00	959.59

CCHV= 0.300 CEHV= 0.500

1645 INT SEC ADDED BY RAISING SEC 18.00, 0.375FT AND MULTIPLYING BY 1.526

1.01	7.97	647.04	645.32	0.00	648.13	1.09	0.06	0.52
3500.	0.	3500.	0.	0.	418.	0.	661.	183.
1.72	0.00	8.37	0.00	0.075	0.045	0.075	0.06	639.08
0.007474	15.	15.	15.	2	8	1	0.00	70.22

1645 INT SEC ADDED BY RAISING SEC 1.01, -0.125FT AND MULTIPLYING BY 0.885

1.02	8.10	647.05	645.55	0.00	648.38	1.33	0.12	0.12
3500.	0.	3500.	0.	0.	378.	0.	661.	183.
1.72	0.00	9.26	0.00	0.075	0.045	0.075	0.06	638.95
0.009184	15.	15.	15.	2	8	1	0.00	62.15

1645 INT SEC ADDED BY RAISING SEC 1.02, -0.125FT AND MULTIPLYING BY 0.870

1.03	8.20	647.02	645.87	0.00	648.72	1.70	0.16	0.19
3500.	0.	3500.	0.	0.	334.	0.	661.	183.
1.72	0.00	10.47	0.00	0.075	0.045	0.075	0.06	638.83
0.011965	15.	15.	15.	2	8	1	0.00	54.07

1645 INT SEC ADDED BY RAISING SEC 1.03, -0.125FT AND MULTIPLYING BY 0.851

18.00	8.22	646.92	646.33	0.00	649.26	2.33	0.22	0.31
3500.	0.	3500.	0.	0.	286.	0.	661.	183.
1.72	0.00	12.26	0.00	0.075	0.045	0.075	0.06	638.70
0.017090	15.	15.	15.	2	8	1	0.00	46.00

CCHV= 0.100 CEHV= 0.300

1645 INT SEC ADDED BY RAISING SEC 18.10, -0.225FT AND MULTIPLYING BY 1.120

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OTHER LOSS
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID
1.01	10.81	649.59	644.69	0.00	649.60	0.01	0.11	0.23
3500.	446.	588.	2466.	773.	376.	4219.	662.	183.
1.73	0.58	1.56	0.58	0.095	0.055	0.095	0.06	638.78
0.000173	13.	13.	13.	3	13	1	0.00	1444.96

1645 INT SEC ADDED BY RAISING SEC 1.01, 0.075FT AND MULTIPLYING BY 0.964

1.02	10.74	649.59	644.86	0.00	649.60	0.01	0.00	0.00
3500.	446.	594.	2461.	732.	359.	3981.	664.	184.
1.73	0.61	1.65	0.62	0.095	0.055	0.095	0.06	638.85
0.000196	13.	13.	13.	2	5	1	0.00	1390.63

1645 INT SEC ADDED BY RAISING SEC 1.02, 0.075FT AND MULTIPLYING BY 0.963

1.03	10.66	649.59	644.94	0.00	649.60	0.01	0.00	0.00
3500.	446.	600.	2455.	693.	344.	3750.	665.	184.
1.74	0.64	1.75	0.65	0.095	0.055	0.095	0.06	638.93
0.000222	13.	13.	13.	2	5	1	0.00	1336.50

1645 INT SEC ADDED BY RAISING SEC 1.03, 0.075FT AND MULTIPLYING BY 0.961

18.10	10.59	649.59	645.08	0.00	649.61	0.02	0.00	0.00
3500.	446.	605.	2449.	655.	328.	3526.	666.	185.
1.74	0.68	1.85	0.69	0.095	0.055	0.095	0.06	639.00
0.000253	13.	13.	13.	2	5	1	0.00	1282.58

CCHV= 0.100 CEHV= 0.300

18.20	10.24	649.94	646.04	0.00	649.96	0.02	0.35	0.00
3500.	298.	642.	2560.	368.	319.	3395.	791.	216.
2.10	0.81	2.01	0.75	0.095	0.055	0.095	0.06	639.70
0.000287	1440.	1550.	1208.	2	9	1	0.00	886.21

CCHV= 0.100 CEHV= 0.300

18.40	7.82	653.32	651.23	0.00	653.45	0.13	3.46	0.03
3500.	1753.	1222.	526.	1146.	282.	292.	984.	262.
2.43	1.53	4.33	1.80	0.095	0.055	0.095	0.06	645.50
0.001982	2800.	3500.	2840.	3	10	1	0.00	534.18

CCHV= 0.100 CEHV= 0.300

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OTHER LOSS
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IOC	ICONT	CORAR	TOPWID
18.60	9.66	656.46	653.77	0.00	656.54	0.08	3.09	0.00
3500.	423.	1086.	1991.	430.	294.	1482.	1079.	290.
2.73	0.98	3.69	1.34	0.085	0.050	0.085	0.06	646.80
0.000921	2100.	2160.	2120.	4	11	1	0.00	627.62

3265 DIVIDED FLOW

18.90	10.20	658.40	653.93	0.00	658.57	0.17	2.00	0.03
3450.	1163.	2151.	136.	1024.	524.	308.	1187.	335.
2.95	1.14	4.10	0.44	0.075	0.045	0.075	0.06	648.20
0.000787	2400.	2320.	2240.	2	12	1	0.00	1043.13

Clyde Park

1645 INT SEC ADDED BY RAISING SEC 19.00, -1.725FT AND MULTIPLYING BY 1.208

1.01	9.68	658.46	653.91	0.00	658.59	0.13	0.01	0.00
3450.	584.	2035.	831.	681.	556.	940.	1188.	335.
2.95	0.86	3.66	0.88	0.055	0.035	0.055	0.06	648.78
0.000643	15.	15.	15.	3	11	1	0.00	1290.57

1645 INT SEC ADDED BY RAISING SEC 1.01, 0.575FT AND MULTIPLYING BY 0.943

1.02	8.93	658.28	654.67	0.00	658.69	0.41	0.02	0.08
3450.	283.	2746.	420.	297.	481.	433.	1188.	335.
2.95	0.95	5.71	0.97	0.055	0.035	0.055	0.06	649.35
0.001000	15.	15.	15.	3	8	1	0.00	1043.84

1645 INT SEC ADDED BY RAISING SEC 1.02, 0.575FT AND MULTIPLYING BY 0.939

1.03	7.86	657.78	655.46	0.00	658.98	1.20	0.05	0.24
3450.	0.	3450.	0.	0.	393.	0.	1189.	336.
2.95	0.00	8.78	0.00	0.055	0.035	0.055	0.06	649.93
0.005188	15.	15.	15.	4	8	1	0.00	54.11

1645 INT SEC ADDED BY RAISING SEC 1.03, 0.575FT AND MULTIPLYING BY 0.935

19.00	6.99	657.49	656.26	0.00	659.26	1.77	0.11	0.17
3450.	0.	3450.	0.	0.	323.	0.	1189.	336.
2.95	0.00	10.67	0.00	0.055	0.035	0.055	0.06	650.50
0.009069	15.	15.	15.	3	8	1	0.00	50.60

CCHV= 0.100 CEHV= 0.300

1645 INT SEC ADDED BY RAISING SEC 19.10, -0.150FT AND MULTIPLYING BY 0.908

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OTHER LOSS
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID
1.01	8.92	659.47	655.89	0.00	659.50	0.03	0.07	0.17
3450.	2277.	954.	219.	2622.	435.	435.	1189.	336.
2.95	0.87	2.20	0.50	0.075	0.045	0.065	0.06	650.55
0.000267	15.	15.	15.	3	10	1	0.00	1098.21

1645 INT SEC ADDED BY RAISING SEC 1.01* 0.050FT AND MULTIPLYING BY 1.034

1.02	8.88	659.48	655.88	0.00	659.50	0.03	0.00	0.00
3450.	2276.	963.	212.	2679.	447.	433.	1191.	336.
2.96	0.85	2.15	0.49	0.075	0.045	0.065	0.06	650.60
0.000259	15.	15.	15.	2	6	1	0.00	1130.68

1645 INT SEC ADDED BY RAISING SEC 1.02* 0.050FT AND MULTIPLYING BY 1.033

1.03	8.83	659.48	655.89	0.00	659.51	0.03	0.00	0.00
3450.	2274.	971.	204.	2733.	459.	430.	1192.	337.
2.96	0.83	2.12	0.47	0.075	0.045	0.065	0.06	650.65
0.000251	15.	15.	15.	2	6	1	0.00	1162.77

1645 INT SEC ADDED BY RAISING SEC 1.03* 0.050FT AND MULTIPLYING BY 1.032

19.10	8.79	659.49	655.89	0.00	659.51	0.03	0.00	0.00
3450.	2273.	980.	197.	2786.	471.	426.	1193.	337.
2.96	0.82	2.08	0.46	0.075	0.045	0.065	0.06	650.70
0.000244	15.	15.	15.	2	6	1	0.00	1194.52

CCHV= 0.100 CEHV= 0.300

19.50	8.34	659.54	655.10	0.00	659.60	0.05	0.08	0.01
3450.	1701.	1734.	15.	1690.	712.	21.	1210.	342.
3.01	1.01	2.44	0.71	0.075	0.045	0.065	0.06	651.20
0.000362	232.	280.	308.	2	15	1	0.00	589.78

CCHV= 0.100 CEHV= 0.300

19.90	9.48	659.98	656.10	0.00	660.05	0.07	0.45	0.00
3450.	430.	1716.	1303.	763.	590.	2038.	1280.	369.
3.17	0.56	2.91	0.64	0.085	0.045	0.085	0.06	650.50
0.000488	1040.	1090.	1000.	3	14	1	0.00	1690.89

CCHV= 0.300 CEHV= 0.500

1645 INT SEC ADDED BY RAISING SEC 20.00* 0.333FT AND MULTIPLYING BY 1.360

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OTHER LOSS
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID
1.01	9.39	659.73	656.43	0.00	660.42	0.70	0.06	0.31
3450.	0.	3450.	0.	0.	515.	0.	1282.	370.
3.17	0.00	6.69	0.00	0.065	0.035	0.065	0.06	650.33
0.002081	47.	47.	47.	2	8	1	0.00	68.00

1645 INT SEC ADDED BY RAISING SEC 1,01, -0.167FT AND MULTIPLYING BY 0.868

1.02	9.58	659.74	656.68	0.00	660.63	0.88	0.11	0.09
3450.	0.	3450.	0.	0.	458.	0.	1282.	370.
3.17	0.00	7.53	0.00	0.065	0.035	0.065	0.06	650.17
0.002653	47.	47.	47.	2	8	1	0.00	59.00

1645 INT SEC ADDED BY RAISING SEC 1,02, -0.167FT AND MULTIPLYING BY 0.847

20.00	9.74	659.74	657.07	0.00	660.92	1.18	0.15	0.15
3450.	0.	3450.	0.	0.	397.	0.	1283.	370.
3.18	0.00	8.70	0.00	0.065	0.035	0.065	0.06	650.00
0.003624	47.	47.	47.	2	8	1	0.00	50.00

CCHV= 0.100 CEHV= 0.300

1645 INT SEC ADDED BY RAISING SEC 20,10, -0.200FT AND MULTIPLYING BY 1.065

1.01	10.96	661.06	657.49	0.00	661.08	0.02	0.05	0.12
3450.	1227.	865.	1358.	2037.	452.	2278.	1284.	371.
3.18	0.60	1.91	0.60	0.100	0.045	0.075	0.06	650.10
0.000206	25.	25.	25.	2	8	1	0.00	1393.10

1645 INT SEC ADDED BY RAISING SEC 1,01, 0.100FT AND MULTIPLYING BY 0.969

1.02	10.87	661.07	657.68	0.00	661.09	0.02	0.01	0.00
3450.	1233.	883.	1335.	1928.	433.	2117.	1287.	371.
3.19	0.64	2.04	0.63	0.100	0.045	0.075	0.06	650.20
0.000238	25.	25.	25.	2	5	1	0.00	1347.28

1645 INT SEC ADDED BY RAISING SEC 1,02, 0.100FT AND MULTIPLYING BY 0.968

20.10	10.77	661.07	657.83	0.00	661.10	0.02	0.01	0.00
3450.	1238.	899.	1313.	1827.	414.	1970.	1289.	372.
3.20	0.68	2.17	0.67	0.100	0.045	0.075	0.06	650.30
0.000275	25.	25.	25.	2	5	1	0.00	1301.94

CCHV= 0.100 CEHV= 0.300

3265 DIVIDED FLOW

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OTHER LOSS
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID
20.90	11.57	661.97	657.97	0.00	662.31	0.34	1.12	0.09
2790.	5.	2400.	385.	8.	478.	385.	1358.	396.
3.27	0.65	5.03	1.00	0.100	0.045	0.075	0.06	650.40
0.001616	1160.	1180.	1200.	3	5	1	0.00	420.66

CCHV= 0.300 CEHV= 0.500
1860 XLCEL OF 662.10 EXCEEDS RDEL OF 660.00

3265 DIVIDED FLOW

NORMAL BRIDGE,NRD= 5 MIN ELTRD= 660.00 MAX ELLC= 662.80

21.00	9.02	661.82	658.92	0.00	662.67	0.85	0.10	0.25
2790.	0.	2765.	25.	0.	373.	43.	1359.	396.
3.27	0.00	7.41	0.59	0.065	0.035	0.065	0.06	652.80
0.003619	40.	40.	40.	3	20	1	-28.88	215.40

CCHV= 0.100 CEHV= 0.300
3280 CROSS SECTION EXTENDED 6.69 FEET

3301 HV CHANGED MORE THAN HVINS

21.10	12.19	662.79	657.67	0.00	662.82	0.03	0.08	0.08
2790.	991.	1230.	569.	1465.	575.	1067.	1360.	396.
3.28	0.68	2.14	0.53	0.100	0.045	0.075	0.06	650.60
0.000217	40.	40.	40.	3	8	1	0.00	827.17

CCHV= 0.100 CEHV= 0.300

3265 DIVIDED FLOW

21.50	11.34	662.94	659.18	0.00	662.96	0.01	0.13	0.00
2790.	577.	622.	1590.	1374.	363.	2559.	1421.	414.
3.52	0.42	1.71	0.62	0.100	0.045	0.075	0.06	651.60
0.000153	780.	750.	660.	2	8	1	0.00	1345.70

CCHV= 0.100 CEHV= 0.300

3265 DIVIDED FLOW

3280 CROSS SECTION EXTENDED 0.13 FEET

21.90	11.03	663.03	658.38	0.00	663.04	0.00	0.08	0.00
2790.	1832.	343.	615.	5182.	320.	1920.	1517.	441.
3.98	0.35	1.07	0.32	0.100	0.045	0.075	0.06	652.00
0.000065	736.	700.	680.	2	10	1	0.00	1987.21

CCHV= 0.300 CEHV= 0.500

1645 INT SEC ADDED BY RAISING SEC 22.00' -2.175FT AND MULTIPLYING BY 1.114

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OTHER LOSS
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID
1.01	9.88	662.61	658.54	0.00	663.51	0.91	0.03	0.45
2790.	0.	2790.	0.	0.	365.	0.	1518.	442.
3.98	0.00	7.64	0.00	0.065	0.035	0.065	0.06	652.73
0.003971	13.	13.	13.	2	11	1	0.00	40.12

1645 INT SEC ADDED BY RAISING SEC 1.01, 0.725FT AND MULTIPLYING BY 0.966

1.02	9.09	662.54	659.39	0.00	663.70	1.17	0.06	0.13
2790.	0.	2790.	0.	0.	322.	0.	1518.	442.
3.98	0.00	8.66	0.00	0.065	0.035	0.065	0.06	653.45
0.005736	13.	13.	13.	2	8	1	0.00	38.75

1645 INT SEC ADDED BY RAISING SEC 1.02, 0.725FT AND MULTIPLYING BY 0.965

3265 DIVIDED FLOW

1.03	8.26	662.44	660.25	0.00	663.98	1.54	0.09	0.19
2790.	0.	2790.	0.	0.	280.	0.	1518.	442.
3.98	0.00	9.96	0.00	0.065	0.035	0.065	0.06	654.18
0.008169	13.	13.	13.	3	8	1	0.00	35.19

1645 INT SEC ADDED BY RAISING SEC 1.03, 0.725FT AND MULTIPLYING BY 0.963

3265 DIVIDED FLOW

22.00	7.39	662.29	661.12	0.00	664.38	2.09	0.13	0.28
2790.	0.	2790.	0.	0.	240.	0.	1519.	442.
3.98	0.00	11.61	0.00	0.065	0.035	0.065	0.06	654.90
0.012347	13.	13.	13.	3	8	1	0.00	33.90

CCHV= 0.100 CEHV= 0.300
3280 CROSS SECTION EXTENDED 5.93 FEET

3301 HV CHANGED MORE THAN HVINS

22.10	12.34	664.84	659.81	0.00	664.84	0.00	0.25	0.21
2790.	1459.	413.	919.	4734.	421.	2682.	1522.	442.
4.01	0.31	0.98	0.34	0.100	0.045	0.075	0.06	652.50
0.000044	40.	40.	40.	3	9	1	0.00	1600.00

CCHV= 0.100 CEHV= 0.300
3280 CROSS SECTION EXTENDED 0.25 FEET

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OTHER LOSS
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID
22.90	12.25	664.85	659.78	0.00	664.86	0.01	0.02	0.00
2790.	1940.	396.	454.	4258.	273.	1464.	1564.	452.
4.13	0.46	1.45	0.31	0.100	0.045	0.075	0.06	652.60
0.000088	240.	280.	300.	2	6	1	0.00	1579.12

CCHV= 0.300 CEHV= 0.500

3265 DIVIDED FLOW

3280 CROSS SECTION EXTENDED 0.16 FEET

NORMAL BRIDGE,NRD= 5 MIN ELTRD= 665.60 MAX ELLC= 664.00

23.00	9.85	664.85	663.12	0.00	664.91	0.06	0.03	0.03
2790.	2067.	723.	0.	1508.	241.	0.	1568.	453.
4.14	1.37	3.01	0.00	0.065	0.035	0.065	0.06	655.00
0.000962	50.	50.	50.	2	11	1	-23.51	656.65

CCHV= 0.100 CEHV= 0.300

23.10	12.23	664.93	659.13	0.00	664.94	0.01	0.03	0.01
2790.	1788.	404.	598.	4476.	316.	1727.	1573.	455.
4.17	0.40	1.28	0.35	0.100	0.045	0.075	0.06	652.70
0.000067	50.	50.	50.	2	14	1	0.00	1598.12

CCHV= 0.100 CEHV= 0.300

3265 DIVIDED FLOW

23.30	10.28	665.18	661.56	0.00	665.20	0.01	0.25	0.00
2790.	790.	503.	1497.	1228.	311.	1974.	1749.	501.
4.65	0.64	1.62	0.76	0.100	0.055	0.075	0.06	654.90
0.000266	1540.	1570.	1500.	3	9	1	0.00	1048.31

CCHV= 0.100 CEHV= 0.300

23.50	8.55	666.55	665.16	0.00	666.57	0.02	1.37	0.00
2260.	267.	479.	1513.	348.	212.	1884.	1953.	581.
5.40	0.77	2.26	0.80	0.070	0.055	0.075	0.06	658.00
0.000646	2920.	3040.	3020.	5	9	1	0.00	1267.39

CCHV= 0.100 CEHV= 0.300

1645 INT SEC ADDED BY RAISING SEC 23.70, -1.050FT AND MULTIPLYING BY 0.813

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OTHER LOSS
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IOC	ICONT	CORAR	TOPWID
1.01	8.69	667.74	665.85	0.00	668.52	0.78	1.72	0.23
2260.	179.	2081.	0.	114.	283.	0.	1976.	592.
5.43	1.57	7.36	0.19	0.065	0.040	0.065	0.06	659.05
0.004310	690.	695.	700.	2	10	1	0.00	175.41

1645 INT SEC ADDED BY RAISING SEC 1.01, 1.050FT AND MULTIPLYING BY 1.229

23.70	10.10	670.20	666.20	0.00	670.39	0.20	1.82	0.06
2260.	474.	1751.	35.	421.	435.	61.	1987.	597.
5.49	1.13	4.03	0.58	0.065	0.040	0.065	0.06	660.10
0.000932	690.	695.	700.	3	12	1	0.00	430.81

CCHV= 0.300 CEHV= 0.500

3265 DIVIDED FLOW

NORMAL BRIDGE,NRD= 5 MIN ELTRD= 671.60 MAX ELLC= 669.80

23.71	9.17	669.77	666.96	0.00	670.86	1.09	0.02	0.44
2260.	0.	2260.	0.	0.	270.	0.	1987.	597.
5.49	0.20	8.38	0.00	0.050	0.035	0.050	0.06	660.60
0.003689	10.	10.	10.	3	16	1	0.00	47.37

CCHV= 0.100 CEHV= 0.300

3265 DIVIDED FLOW

23.72	9.72	670.82	666.13	0.00	670.98	0.16	0.02	0.09
2260.	9.	2136.	114.	35.	655.	165.	1987.	597.
5.49	0.26	3.26	0.69	0.065	0.040	0.065	0.06	661.10
0.000785	10.	10.	10.	2	15	1	0.00	408.64

CCHV= 0.100 CEHV= 0.300

23.80	9.90	671.90	669.02	0.00	671.92	0.02	0.93	0.01
1700.	910.	521.	269.	1224.	292.	479.	2042.	624.
5.94	0.74	1.78	0.56	0.080	0.055	0.080	0.06	662.00
0.000324	1670.	1680.	1670.	2	12	1	0.00	992.98

CCHV= 0.100 CEHV= 0.300

3265 DIVIDED FLOW

23.90	8.27	672.47	669.18	0.00	672.57	0.10	0.63	0.03
1700.	399.	1213.	88.	391.	403.	154.	2069.	639.
6.03	1.02	3.01	0.57	0.080	0.055	0.065	0.06	664.20
0.001228	840.	800.	780.	4	16	1	0.00	604.03

CCHV= 0.300 CEHV= 0.500

3265 DIVIDED FLOW

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OTHER LOSS
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID

NORMAL BRIDGE,NRD= 3 MIN ELTRD= 674.20 MAX ELLC= 671.20

24.00	8.98	672.38	668.77	0.00	672.92	0.54	0.13	0.22
1700.	0.	1451.	249.	0.	229.	216.	2070.	639.
6.03	0.00	6.35	1.15	0.060	0.035	0.060	0.06	663.40
0.003956	50.	50.	50.	3	16	1	-28.32	426.69

CCHV= 0.100 CEHV= 0.300

1645 INT SEC ADDED BY RAISING SEC 24.10, -0.200FT AND MULTIPLYING BY 0.822

3265 DIVIDED FLOW

1.01	9.41	673.01	669.81	0.00	673.04	0.03	0.07	0.05
1700.	559.	617.	524.	690.	312.	888.	2071.	640.
6.04	0.81	1.98	0.59	0.080	0.055	0.080	0.06	663.60
0.000449	33.	33.	33.	2	11	1	0.00	948.24

1645 INT SEC ADDED BY RAISING SEC 1.01, 0.200FT AND MULTIPLYING BY 1.216

3265 DIVIDED FLOW

24.10	9.23	673.03	669.55	0.00	673.05	0.02	0.01	0.00
1700.	558.	657.	485.	785.	369.	935.	2072.	641.
6.05	0.71	1.78	0.52	0.080	0.055	0.080	0.06	663.80
0.000372	33.	33.	33.	2	11	1	0.00	1128.04

CCHV= 0.100 CEHV= 0.300

3265 DIVIDED FLOW

24.90	8.80	673.20	670.17	0.00	673.21	0.01	0.16	0.00
1360.	549.	254.	557.	1198.	213.	1209.	2102.	657.
6.31	0.46	1.19	0.46	0.080	0.055	0.085	0.06	664.40
0.000191	500.	520.	620.	2	5	1	0.00	1308.86

CCHV= 0.300 CEHV= 0.500

NORMAL BRIDGE,NRD= 0 MIN ELTRD= 676.30 MAX ELLC= 673.10

25.00	9.08	673.28	669.56	0.00	673.75	0.46	0.31	0.23
1360.	0.	1360.	0.	0.	249.	0.	2104.	658.
6.31	0.00	5.46	0.00	0.060	0.045	0.060	0.06	664.20
0.010008	60.	60.	60.	6	20	1	-6.93	38.00

CCHV= 0.100 CEHV= 0.300
3280 CROSS SECTION EXTENDED 2.04 FEET

1) COUNTY: KENT

2) STUDY NAME: ADA, CITY OF

3) WATERCOURSE: GRAND RIVER

4) DOCUMENT TYPE: 100-YEAR PROFILE

THIS RUN EXECUTED 01/26/7

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*****************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED  AUG1977
  ERROR CORR -  01.02
  MODIFICATION -  50,51,52,53
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T1      ADA TOWNSHIP HUD1 62-0104-009
T2      100-YEAR FLOOD
T3      GRAND RIVER,ADA TWP.KENT COUNTY

J1  ICHECK    INQ       NINV      IDIF      STRT      METRIC    PVINS     Q         WSEL      FC
      0.        4.        0.        0.   0.0          0.0       0.0       0.     631.950     0.0
J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE
    -1.000     1.000    -1.000     0.0       0.0       0.0       0.0       0.0       0.0      15.000
J3  VARIABLE CODES FOR SUMMARY PRINTOUT
    110.000   150.000     0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
QT      4.000  25000.000  36300.000  41600.000  56000.000     0.0       0.0       0.0       0.0       0.0
NC      0.100      0.100      0.030      0.100      0.300     0.0       0.0       0.0       0.0       0.0

X1     13.000     34.000   2300.000   2647.000      0.0       0.0       0.0       0.0       0.0       0.0
GR    700.000      0.0      680.000    100.000    660.000   200.000   640.000   670.000   618.700  2000.000
GR    619.800   2100.000    619.900   2200.000    621.900  2266.000   616.600  2300.000   615.400  2301.000
GR    612.200   2310.000    609.800   2320.000    608.300  2330.000   608.200  2350.000   608.600  2360.000
GR    608.700   2370.000    608.300   2380.000    608.600  2400.000   608.200  2450.000   607.000  2560.000
GR    607.500   2600.000    609.500   2620.000    620.200  2647.000   618.000  2750.000   618.800  2770.000
GR    619.800   2825.000    620.800   2840.000    620.400  2900.000   620.800  2950.000   640.000  [illegible]
GR    660.000   4175.000    680.000   4225.000    680.000  4550.000   700.000  4650.000     0.0       0.0

X1     14.000     41.000   2590.000   2950.000   5175.000  5175.000  5175.000     0.0       0.0       0.0
GR    640.000   1680.000    640.000   1680.000    640.000  1680.000   640.000  1680.000   640.000  1680.000
GR    618.000   2100.000    619.000   2300.000    619.000  2345.000   622.500  2385.000   620.500  2500.000
GR    618.100   2550.000    620.800   2590.000    610.800  2600.000   610.500  2610.000   609.500  2620.000
GR    609.300   2660.000    609.100   2670.000    608.400  2700.000   608.000  2760.000   607.700  2770.000
GR    608.100   2790.000    607.800   2800.000    607.700  2810.000   607.100  2820.000   607.200  [illegible]
GR    607.000   2870.000    607.100   2880.000    607.200  2900.000   610.200  2930.000   614.700  [illegible]
GR    619.900   2950.000    619.000   3000.000    619.400  3050.000   619.000  3100.000   623.300  3200.000
GR    622.800   3250.000    624.100   3300.000    625.000  3350.000   623.500  3450.000   630.000  [illegible]
GR    640.000   4780.000      0.0       0.0         0.0       0.0       0.0       0.0       0.0       0.0

X1     15.000     49.000   2550.000   2950.000   5700.000  5700.000  5700.000     0.0       0.0       0.0
GR    640.000    900.000    630.000   2050.000    630.000  2050.000   630.000  2050.000   630.000  [illegible]
GR    619.300   2100.000    619.000   2150.000    619.700  2200.000   620.100  2300.000   621.600  [illegible]
GR    621.700   2400.000    622.600   2450.000    621.800  2500.000   622.500  2540.000   623.500  2550.000
GR    614.300   2580.000    610.600   2590.000    610.400  2600.000   609.900  2610.000   609.400  [illegible]
GR    608.700   2630.000    608.500   2660.000    609.200  2700.000   608.900  2710.000   609.100  2720.000
GR    608.700   2740.000    608.700   2790.000    609.100  2800.000   610.000  2850.000   609.600  [illegible]
GR    610.000   2890.000    610.600   2900.000    610.900  2910.000   611.900  2920.000   615.100  [illegible]
GR    622.100   2950.000    618.300   2980.000    622.700  3040.000   613.700  3070.000   620.500  [illegible]
GR    616.500   3120.000    616.300   3150.000    615.700  3200.000   614.900  3250.000   616.400  [illegible]
GR    622.000   3310.000    620.800   3340.000    630.000  3500.000   640.000  4150.000     0.0       0.0
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EJ       0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0

*PROF 1

CCHV=   0.100 CEHV=   0.300
*SECNO 13.000
   SECNO      DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        LOSS     BANK ELEV
   Q          QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA      LEFT/RIGHT
   TIME       VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN       SSTA
   SLOPE      XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID      ENDST

    13.00      24.95     631.95      0.0     631.95    632.13      0.18      0.0       0.0     516.60
   41600.      5644.     31647.     4309.     9122.     8039.     6789.       0.        0.      620.20
      0.0       0.62       3.94      0.63      0.100     0.030     0.100     0.0     607.00    1172.65
 0.000097         0.         0.        0.        0         0         0       0.0    2329.03    3501.69

FLOW DISTRIBUTION FOR SECNO=      13.00          CWSEL=     631.95

STA=     1173.     2000.     2200.     2300.     2647.     2770.     2950.     3502.
  PER Q=      6.8       4.7       2.1      76.1       3.1       3.9       3.4
   AREA=   5481.2    2480.0    1161.1    8039.5    1594.5    2119.0    3075.6
    VEL=      0.5       0.8       0.7       3.9       0.8       0.8       0.5

*SECNO 14.000
    14.00      25.44     632.44      0.0       0.0     632.60      0.16      0.46      0.00     620.80
   41600.      5689.     31068.     4844.     8294.     8500.     8611.     2932.      279.      619.90
      0.50       0.69       3.65      0.56      0.100     0.030     0.100     0.030   607.00    1824.11
 0.000082      5175.      5175.     5175.        0         0         0       0.0    2367.10    4191.21

FLOW DISTRIBUTION FOR SECNO=      14.00          CWSEL=     632.44

STA=     1824.     2300.     2500.     2590.     2950.     3100.     3300.     4000.     4191.
  PER Q=      7.7       3.9       2.1      74.7       3.6       3.2       4.8       0.1
   AREA=   4783.8    2332.8    1177.6    8500.5    1975.2    2050.3    4351.0     234.4
    VEL=      0.7       0.7       0.7       3.7       0.8       0.6       0.5       0.2

*SECNO 15.000
    15.00      24.42     632.92      0.0       0.0     633.07      0.15      0.48      0.00     623.50
   41600.      4256.     31820.     5524.     6345.     8888.     7296.     6068.      563.      622.10
      1.04       0.67       3.58      0.76      0.100     0.030     0.100     0.030   608.50    1714.15
 0.000085      5700.      5700.     5700.        2         0         0       0.0    1975.67    3689.83

FLOW DISTRIBUTION FOR SECNO=      15.00          CWSEL=     632.92

STA=     1714.     2200.     2350.     2540.     2550.     2950.     3090.     3200.     3280.     3690.
  PER Q=      3.3       3.4       3.3       0.2      76.5       3.5       3.7       3.1       3.0
   AREA=   2271.0    1905.6    2068.9      99.2    8887.6    1884.9    1774.2    1399.1    2237.7
    VEL=      0.6       0.7       0.7       0.6       3.6       0.8       0.9       0.9       0.6
```

1) COUNTY: KENT

2) STUDY NAME: DDA, CITY OF

3) WATERCOURSE: GRAND ~~& ...~~ RIVER

4) DOCUMENT TYPE: REPORT

00BREAK00

TO: C. L. [illegible] Hydraulic Review Unit | D. H. Morgan Flood Insurance Unit

SUBJECT: FIS- Ada Twp- Grand River - Kent Co. | OUR JOB NO. | DATE OF MEMO 2-8-79

MESSAGE

Please review the hydraulic analyses for the Grand River & comment on its adequacy. Comment on those modifications that cannot be resolved in Telecon with G.C.A. Included: Hydraulic booklet with maps & profile. 100 year HEC2 runs with summary printout.

SIGNED [signature]

SENDER – DO NOT WRITE BELOW THIS LINE

REPLY

Rick
Please review Q's [signature]

Q's OK
RCS 2/9/79

SIGNED DATE

FOLLOW-UP SENDER — Retain part 2 for your follow-up, send parts 1 and 3 to addressee
RECIPIENT — Retain part 1 and return part 3

ZONE AIO

635
630
625
620
615
610
605
600
595

ELEVATION IN FEET (M.S.L.)

56.75
57.0
57.5
58.0
58.5
59.0

STREAM DISTANCE IN MILES

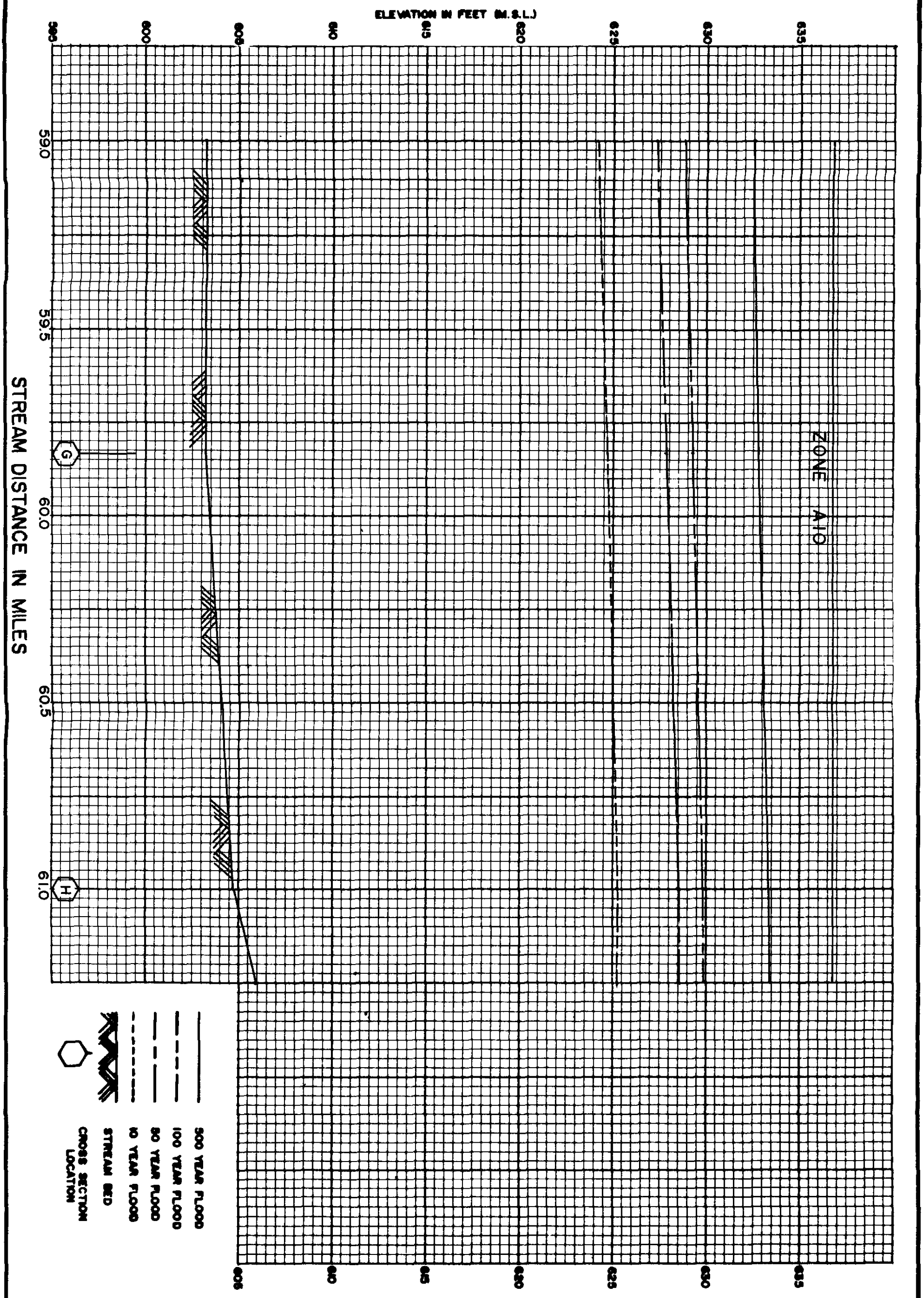
E
F

500 YEAR FLOOD
100 YEAR FLOOD
50 YEAR FLOOD
10 YEAR FLOOD
STREAM BED
CROSS SECTION LOCATION

FLOOD PROFILES

GRAND RIVER

TOWNSHIP OF ADA, MI



TOWNSHIP OF ADA ,MI

FLOOD PROFILES

GRAND RIVER

Grand River

THIS RUN EXECUTED 01/26/79

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*****************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED  AUG1977
  ERROR CORR -  01.02
  MODIFICATION -  50.51.52.53
*****************************************************

T1      ADA TOWNSHIP HUD1 62-0104-009
T2      10-YEAR FLOOD
T3      GRAND RIVER, KENT COUNTY, MICHIGAN.

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      EQ

      0.        2.        0.        0.  0.0          0.0       0.0       0.   626.660     0.0

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

     1.000     0.0      -1.000     0.0       0.0       0.0       0.0       0.0       0.0       0.0

J5  LPRNT     NUMSEC                  ********REQUESTED SECTION NUMBERS********

    -10.000   -10.000     0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
QT      4.000  25000.000  36300.000  41600.000  56000.000   0.0       0.0       0.0       0.0       0.0
NC      0.100      0.100      0.030      0.100      0.300   0.0       0.0       0.0       0.0       0.0

X1     13.000     34.000   2300.000   2647.000      0.0       0.0       0.0       0.0       0.0       0.0
GR    700.000      0.0     680.000    100.000    660.000    200.000   640.000   670.000   618.700  2000.000
GR    619.800   2100.000   619.900   2200.000    621.900   2266.000   616.600  2300.000   615.400  2301.000
GR    612.200   2310.000   609.800   2320.000    608.300   2330.000   608.200  2350.000   608.600  2360.000
GR    608.700   2370.000   608.300   2380.000    608.600   2400.000   608.200  2450.000   607.000  2560.000
GR    607.500   2600.000   609.500   2620.000    620.200   2647.000   618.000  2750.000   618.800  2770.000
GR    619.800   2825.000   620.800   2840.000    620.400   2900.000   620.800  2950.000   640.000  3900.000
GR    660.000   4175.000   680.000   4225.000    680.000   4550.000   700.000  4650.000     0.0       0.0

X1     14.000     41.000   2590.000   2950.000   5175.000   5175.000  5175.000     0.0       0.0       0.0
GR    640.000   1680.000   640.000   1680.000    640.000   1680.000   640.000  1680.000   640.000  1680.000
GR    618.000   2100.000   619.000   2300.000    619.000   2345.000   622.500  2385.000   620.500  2500.000
GR    618.100   2550.000   620.800   2590.000    610.800   2600.000   610.500  2610.000   609.500  2620.000
GR    609.300   2660.000   609.100   2670.000    608.400   2700.000   608.000  2760.000   607.700  2770.00
GR    608.100   2790.000   607.800   2800.000    607.700   2810.000   607.100  2820.000   607.200  2830.000
GR    607.000   2870.000   607.100   2880.000    607.200   2900.000   610.200  2930.000   614.700  2940.000
GR    619.900   2950.000   619.000   3000.000    619.400   3050.000   619.000  3100.000   623.300  3200.000
GR    622.800   3250.000   624.100   3300.000    625.000   3350.000   623.500  3450.000   630.000  4000.000
GR    640.000   4780.000     0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0

X1     15.000     49.000   2550.000   2950.000   5700.000   5700.000  5700.000     0.0       0.0       0.0
GR    640.000    900.000   630.000   2050.000    630.000   2050.000   630.000  2050.000   630.000  2050.000
GR    619.300   2100.000   619.000   2150.000    619.700   2200.000   620.100  2300.000   621.600  2350.000
GR    621.700   2400.000   622.600   2450.000    621.800   2500.000   622.500  2540.000   623.500  2550.000
GR    614.300   2580.000   610.600   2590.000    610.400   2600.000   609.900  2610.000   609.400  2620.000
GR    608.700   2630.000   608.500   2660.000    609.200   2700.000   608.900  2710.000   609.100  2720.000
GR    608.700   2740.000   608.700   2790.000    609.100   2800.000   610.000  2850.000   609.600  2870.000
GR    610.000   2890.000   610.600   2900.000    610.900   2910.000   611.900  2920.000   615.100  2930.000
GR    622.100   2950.000   618.300   2980.000    622.700   3040.000   613.700  3070.000   620.500  3090.000
GR    616.500   3120.000   616.300   3150.000    615.700   3200.000   614.900  3250.000   616.400  3280.000
GR    622.000   3310.000   620.800   3340.000    630.000   3500.000   640.000  4150.000     0.0       0.0
EJ      0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
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THIS RUN EXECUTED 01/26/79

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**********************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED  AUG1977
  ERROR CORR -  01.02
  MODIFICATION -  50.51.52.53
**********************************************************

T1      ADA TOWNSHIP HUD1 62-0104-009
T2      50-YEAR FLOOD
T3      GRAND RIVER, KENT COUNTY, MICHIGAN.
```

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
	0.	3.	0.	0.	0.0	0.0	0.0	0.	630.390	0.0
J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	2.000	0.0	-1.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0

THIS RUN EXECUTED 01/26/79

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**********************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED  AUG1977
  ERROR CORR -  01.02
  MODIFICATION -  50.51.52.53
**********************************************************

T1      ADA TOWNSHIP HUD1 62-0104-009
T2      100-YEAR FLOOD
T3      GRAND RIVER, KENT COUNTY, MICHIGAN.
```

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
	0.	4.	0.	0.	0.0	0.0	0.0	0.	631.950	0.0

J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLOC	IBW	CHNIM	ITRACE
	3.000	0.0	-1.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0

THIS RUN EXECUTED 01/26/79

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**********************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED  AUG1977
  ERROR CORR -  01.02
  MODIFICATION -  50.51.52.53
**********************************************************

T1      ADA TOWNSHIP HUD1 62-0104-009
T2      500-YEAR FLOOD
T3      GRAND RIVER, KENT COUNTY, MICHIGAN.

J1  ICHECK    INQ      NINV     IDIR     STRT     METRIC   HVINS    Q        WSEL     FQ
        0.      5.       0.       0.  0.0          0.0      0.0      0.    636.130   0.0
J2  NPROF     IPLOT    PRFVS    XSECV    XSECH    FN       ALLDC    IBW      CHNIM    ITPACE
    15.000     0.0     -1.000     0.0      0.0      0.0      0.0      0.0      0.0      0.0
```

THIS RUN EXECUTED 01/26/79

****
HEC2 RELEASE DATED NOV 76 UPDATED AUG1977
ERROR CORR - 01.02
MODIFICATION - 50.51.52.53
****

NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

GRAND RIVER, KENT COUNTY

SUMMARY PRINTOUT TABLE 150

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10K*S	VCH	AREA	.01K
N	13.000	0.0	0.0	0.0	607.00	25000.00	626.66	0.0	626.82	1.07	3.49	13196.24	24118.36
	13.000	0.0	0.0	0.0	607.00	36300.00	630.39	0.0	630.57	1.00	3.82	20453.66	36251.45
	13.000	0.0	0.0	0.0	607.00	41600.00	631.95	0.0	632.13	0.97	3.94	23950.90	42248.32
	13.000	0.0	0.0	0.0	607.00	56000.00	636.13	0.0	636.31	0.84	4.09	34663.83	61170.02
	14.000	5175.00	0.0	0.0	607.00	25000.00	627.19	0.0	627.33	0.90	3.22	14329.19	26405.29
	14.000	5175.00	0.0	0.0	607.00	36300.00	630.90	0.0	631.05	0.85	3.55	21855.21	39393.63
	14.000	5175.00	0.0	0.0	607.00	41600.00	632.44	0.0	632.60	0.82	3.65	25405.52	45847.57
	14.000	5175.00	0.0	0.0	607.00	56000.00	636.56	0.0	636.72	0.72	3.81	35960.02	65858.44
	15.000	5700.00	0.0	0.0	608.50	25000.00	627.72	0.0	627.84	0.88	3.05	14275.83	26681.60
	15.000	5700.00	0.0	0.0	608.50	36300.00	631.39	0.0	631.54	0.86	3.44	19716.38	39193.79
	15.000	5700.00	0.0	0.0	608.50	41600.00	632.92	0.0	633.07	0.85	3.58	22528.13	45199.17
	15.000	5700.00	0.0	0.0	608.50	56000.00	636.98	0.0	637.14	0.77	3.81	32030.41	63866.27

GRAND RIVER, KENT COUNTY

SUMMARY PRINTOUT TABLE 150

SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
13.000	25000.00	626.66	0.0	0.0	0.0	1736.97	0.0
13.000	36300.00	630.39	3.73	0.0	0.0	2154.43	0.0
13.000	41600.00	631.95	1.56	0.0	0.0	2329.03	0.0
13.000	56000.00	636.13	4.18	0.0	0.0	2796.85	0.0
14.000	25000.00	627.19	0.0	0.53	0.0	1838.12	5175.00
14.000	36300.00	630.90	3.70	0.51	0.0	2216.70	5175.00
14.000	41600.00	632.44	1.55	0.49	0.0	2367.10	5175.00
14.000	56000.00	636.56	4.12	0.43	0.0	2766.34	5175.00
15.000	25000.00	627.72	0.0	0.52	0.0	1399.67	5700.00
15.000	36300.00	631.39	3.67	0.49	0.0	1700.31	5700.00
15.000	41600.00	632.92	1.53	0.48	0.0	1975.67	5700.00
15.000	56000.00	636.98	4.06	0.42	0.0	2706.30	5700.00

SUMMARY OF ERRORS

THIS RUN EXECUTED 01/26/79

```
**************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED  AUG1977
  ERROR CORR -  01.02
  MODIFICATION -  50.51.52.53
**************************************************
```

THIS RUN EXECUTED 01/26/79

****
HEC2 RELEASE DATED NOV 76 UPDATED AUG1977
ERROR CORR - 01.02
MODIFICATION - 50.51.52.53
****

THIS RUN EXECUTED 01/17/79

```
*****************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED  AUG1977
  ERROR CORR -  01.02
  MODIFICATION -  50.51.52.53
*****************************************************

C
T1      ADA TOWNSHIP HUD1 62-0104-009
T2      100-YEAR FLOOD
T3      GRAND RIVER.ADA TWP.KENT COUNTY

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ
      0.        4.        0.        0.   0.0          0.0       0.0       0.    626.040     0.0

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE
    -1.000     0.0      -1.000     0.0       0.0       0.0      -1.000     0.0       0.0      15.000

J3  VARIABLE CODES FOR SUMMARY PRINTOUT
    110.000   150.000     0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0

NC      0.080      0.100      0.030      0.100      0.300      0.0        0.0        0.0        0.0        0.0
QT      4.000  30800.000  44900.000  51400.000  69200.000      0.0        0.0        0.0        0.0        0.0

              CANNON-ADA TOWNSHIP LINE
               STARTING ELEVATIONS FROM FIS OF PLAINFIELD TWP
               REC INT(YEARS)  FLOW(CFS)  ELEVATION
               10              30800      621.46
               50              44900      624.70
               100             51400      626.04
               500             72700      629.61

X1      1.000     56.000    980.000   1370.000      0.0        0.0        0.0        0.0        0.0        0.0
X3      0.0        0.0        0.0      600.000      0.0     2600.000      0.0        0.0        0.0        0.0
GR    644.800      0.0      644.200     10.000    640.100     30.000    638.000    100.000    633.100    200.000
GR    629.000    300.000    620.800    400.000    617.000    500.000    614.600    600.000    613.700    700.000
GR    614.700    800.000    614.600    900.000    615.100    980.000    611.700    980.000    608.900    990.000
GR    599.900   1010.000    598.200   1020.000    598.200   1040.000    598.900   1070.000    600.700   1090.000
GR    601.000   1100.000    601.000   1110.000    601.700   1130.000    601.600   1140.000    601.900   1170.00
GR    602.500   1190.000    602.500   1200.000    602.800   1210.000    603.000   1220.000    603.500   1230.000
GR    603.700   1240.000    603.700   1250.000    603.900   1260.000    604.200   1270.000    604.700   1280.000
GR    605.200   1300.000    605.700   1310.000    605.700   1320.000    606.200   1330.000    608.900   1350.000
GR    612.700   1360.000    614.300   1370.000    614.300   1400.000    612.600   1425.000    611.700   1500.000
GR    611.500   1600.000    612.600   1620.000    612.800   1700.000    613.200   1800.000    613.000   1900.000
GR    612.500   1960.000    611.300   2000.000    609.900   2100.000    612.500   2500.000    627.000   2700.000
GR    640.000   2780.000      0.0        0.0        0.0        0.0        0.0        0.0        0.0        0.0
NC      0.100      0.080      0.030      0.0        0.0        0.0        0.0        0.0        0.0        0.0

              CROSS SECTION NO. 2
```

X1	2.000	33.000	2121.000	2478.000	3150.000	3050.000	3650.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	793.000	0.0	0.0	0.0	0.0	0.0	0.0
GR	670.000	0.0	650.000	100.000	640.000	200.000	630.000	250.000	620.000	450.000
GR	615.800	1850.000	616.700	1919.000	615.800	1952.000	617.000	2050.000	619.800	2121.000
GR	613.600	2137.000	613.100	2144.000	611.800	2150.000	605.800	2160.000	602.800	2180.000
GR	601.700	2200.000	601.700	2250.000	599.500	2340.000	599.800	2350.000	599.500	2400.000
GR	601.100	2420.000	605.600	2450.000	613.500	2466.000	618.500	2478.000	616.100	2500.000
GR	617.600	2532.000	618.400	2593.000	623.900	2608.000	630.000	2766.000	630.000	3066.000
GR	640.000	3516.000	650.000	3766.000	670.000	3816.000	0.0	0.0	0.0	0.0
X1	2.100	0.0	0.0	0.0	2150.000	2150.000	2150.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	1360.000	0.0	4171.000	0.0	0.0	0.0	0.0
NC	0.0	0.0	0.0	0.300	0.500	0.0	0.0	0.0	0.0	0.0
NC	0.090	0.100	0.030	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X1	3.000	66.000	2850.000	3325.000	3100.000	2800.000	3263.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	2838.000	0.0	4303.000	0.0	0.0	0.0	0.0
GR	670.000	0.0	660.000	150.000	660.000	1300.000	670.000	1500.000	660.000	1670.000
GR	650.000	1850.000	640.000	2800.000	630.000	2200.000	616.300	2550.000	617.300	2835.000
GR	613.100	2850.000	611.000	2854.000	606.00	2860.000	605.000	2880.000	605.000	2890.000
GR	604.100	2910.000	603.900	2940.000	604.6	2960.000	604.200	3000.000	604.100	3020.000
GR	603.600	3050.000	604.000	3090.000	603.900	3120.000	604.200	3130.000	604.100	3150.000
GR	603.700	3160.000	604.500	3170.000	604.100	3180.000	604.300	3190.000	604.700	3200.000
GR	604.100	3210.000	604.300	3220.000	604.900	3230.000	603.600	3240.000	604.700	3260.000
GR	604.900	3270.000	605.400	3300.000	606.900	3310.000	611.400	3325.000	612.900	3330.000
GR	616.600	3355.000	614.000	3360.000	615.600	3365.000	616.700	3370.000	612.000	3384.000
GR	616.700	3400.000	617.000	3407.000	616.900	3414.000	615.300	3417.000	614.700	3442.000
GR	613.400	3450.000	613.900	3510.000	620.000	4625.000	630.000	4875.000	640.000	4925.000
GR	650.000	4975.000	660.000	5050.000	670.000	5130.000	670.000	5330.000	660.000	5530.000
GR	650.000	5680.000	640.000	6330.000	640.000	7030.000	650.000	7430.000	660.000	7730.000
GR	670.000	7980.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

1 FT DOWNSTREAM OF KNAPP ROAD BRIDGE

X1	3.100	36.000	1300.000	1851.000	49.000	49.000	49.000	0.930	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	2849.000	0.0	630.000	620.000	0.0
GR	660.000	0.0	650.000	200.000	640.000	430.000	630.000	600.000	633.000	1300.000
GR	624.200	1300.000	624.200	1304.000	605.600	1350.000	603.100	1370.000	601.900	1400.000
GR	599.300	1413.000	599.500	1420.000	599.500	1420.000	599.000	1425.000	603.100	1430.000
GR	604.600	1490.000	604.100	1520.000	602.000	1525.000	603.000	1530.000	604.700	1630.000
GR	602.000	1635.000	603.000	1640.000	605.100	1650.000	605.100	1670.000	604.700	1680.000
GR	605.300	1710.000	605.000	1750.000	605.000	1755.000	605.500	1780.000	608.000	1810.000
GR	623.700	1846.000	624.100	1851.000	626.700	1851.000	620.000	2100.000	630.000	3150.000
GR	640.000	3550.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NH	3.000	0.100	1300.000	0.015	1851.000	0.100	3550.000	0.0	0.0	0.0
X1	3.110	0.0	0.0	0.0	1.000	1.000	1.000	0.930	0.0	0.0
X2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.930	0.0
BT	25.000	0.0	660.000	0.0	200.000	650.000	0.0	430.000	640.000	0.0
BT	600.000	630.000	0.0	1300.000	633.000	626.700	1420.000	633.700	626.700	1420.000
BT	633.700	599.500	1425.000	633.700	599.000	1425.000	633.700	626.700	1525.000	634.700
BT	626.700	1525.000	634.700	602.000	1530.000	634.700	603.000	1530.000	634.700	626.700
BT	1635.000	634.700	626.700	1635.000	634.700	602.000	1640.000	634.700	603.000	1640.000
BT	634.700	626.700	1750.000	634.700	626.700	1750.000	634.700	605.000	1755.000	634.700
BT	605.000	1755.000	634.700	626.700	1851.000	633.900	626.700	2100.000	620.000	0.0
BT	3150.000	630.000	0.0	3550.000	640.000	0.0	0.0	0.0	0.0	0.0
X1	3.190	0.0	0.0	0.0	44.000	44.000	44.000	0.0	0.0	0.0
X2	0.0	0.0	0.0	0.0	0.0	0.0	1.000	0.0	0.0	0.0

1 FT UPSTREAM OF KNAPP ROAD BRIDGE

X1	3.200	0.0	0.0	0.0	1.000	1.000	1.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	2651.000	0.0	630.000	620.000	0.0
NC	0.080	0.100	0.030	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X1	4.000	66.000	2850.000	3325.000	49.000	49.000	49.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	2800.000	0.0	4342.000	0.0	0.0	0.0	0.0
GR	670.000	0.0	660.000	150.000	660.000	1300.000	670.000	1500.000	660.000	1670.000
GR	650.000	1850.000	640.000	2000.000	630.000	2200.000	616.300	2550.000	617.300	2835.000
GR	613.100	2850.000	611.000	2854.000	606.200	2860.000	605.000	2880.000	605.000	2890.000
GR	604.100	2910.000	603.900	2940.000	604.200	2960.000	604.200	3000.000	604.100	3020.000
GR	603.600	3050.000	604.000	3090.000	603.900	3120.000	604.200	3130.000	604.100	3150.000
GR	603.700	3160.000	604.500	3170.000	604.100	3180.000	604.300	3190.000	604.700	3200.000
GR	604.100	3210.000	604.300	3220.000	604.900	3230.000	603.600	3240.000	604.700	3260.000
GR	604.900	3270.000	605.400	3300.000	606.900	3310.000	611.400	3325.000	612.900	3330.000
GR	616.600	3355.000	614.000	3360.000	615.600	3365.000	616.700	3370.000	612.000	3384.000
GR	616.700	3400.000	617.000	3407.000	616.900	3414.000	615.300	3417.000	614.700	3442.000
GR	613.400	3450.000	613.900	3510.000	620.000	4625.000	630.000	4875.000	640.000	4925.000
GR	650.000	4975.000	660.000	5050.000	670.000	5130.000	670.000	5330.000	660.000	5530.000
GR	650.000	5680.000	640.000	6330.000	640.000	7030.000	650.000	7430.000	660.000	7730.000
GR	670.000	7980.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X1	4.100	0.0	0.0	0.0	500.000	500.000	500.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	2300.000	0.0	3875.000	0.0	0.0	0.0	0.0
NC	0.100	0.100	0.030	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.0	0.0	0.0	0.100	0.300	0.0	0.0	0.0	0.0	0.0

CROSS SECTION NO. 5

X1	5.000	47.000	2050.000	2453.000	6250.000	5500.000	6398.000	0.0	0.0	0.0
GR	680.000	0.0	650.000	50.000	640.000	100.000	630.000	250.000	620.000	800.000
GR	616.500	1750.000	617.300	1821.000	616.100	1850.000	613.800	1902.000	613.900	1950.000
GR	615.900	2011.000	618.800	2039.000	613.700	2050.000	611.700	2051.000	606.600	2060.000
GR	601.600	2190.000	602.400	2260.000	604.200	2320.000	603.900	2330.000	604.200	2340.000
GR	604.800	2350.000	607.000	2370.000	611.700	2388.000	613.100	2410.000	614.700	2420.000
GR	614.600	2436.000	617.600	2453.000	617.600	2468.000	614.000	2489.000	614.300	2500.000
GR	615.500	2511.000	614.600	2524.000	614.300	2583.000	619.600	2616.000	615.400	2699.000
GR	620.000	3300.000	630.000	3450.000	640.000	3650.000	650.000	4050.000	640.000	4750.000
GR	640.000	4950.000	650.000	5750.000	650.000	7050.000	660.000	7250.000	660.000	7950.000
GR	670.000	8750.000	680.000	9450.000	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.110	0.110	0.030	0.0	0.0	0.0	0.0	0.0	0.0	0.0

CROSS SECTION NO. 6

X1	6.000	46.000	2900.000	3242.000	5500.000	4500.000	6335.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	1300.000	0.0	4751.000	0.0	0.0	0.0	0.0
GR	680.000	0.0	660.000	150.000	650.000	250.000	640.000	400.000	630.000	850.000
GR	620.000	2500.000	617.700	2600.000	618.200	2630.000	617.700	2750.000	618.200	2733.000
GR	617.200	2770.000	617.100	2800.000	618.200	2831.000	618.600	2865.000	616.700	2900.000
GR	607.600	2905.000	605.300	2910.000	603.100	2920.000	602.600	2990.000	602.300	3030.000
GR	602.500	3040.000	602.400	3070.000	606.200	3120.000	606.300	3130.000	607.500	3150.000
GR	608.400	3160.000	607.900	3190.000	610.800	3210.000	611.600	3230.000	613.200	3242.000
GR	613.900	3265.000	611.500	3296.000	614.900	3323.000	615.300	3335.000	613.100	3362.000
GR	617.400	3410.000	615.500	3436.000	615.600	3550.000	620.000	4450.000	630.000	4900.000
GR	640.000	4950.000	650.000	4975.000	650.000	7700.000	660.000	7850.000	670.000	7925.000
GR	680.000	8300.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.090	0.100	0.030	0.0	0.0	0.0	0.0	0.0	0.0	0.0

CROSS SECTION NO. 7

X1	7.000	47.000	3650.000	4125.000	3800.000	4100.000	4380.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	1300.000	0.0	4500.000	0.0	0.0	0.0	0.0
GR	680.000	0.0	650.000	200.000	640.000	500.000	630.000	950.000	620.000	2800.000

GR	618.500	3350.000	619.700	3389.000	618.000	3405.000	618.200	3463.000	620.700	3480.000
GR	620.800	3495.000	618.600	3570.000	621.600	3575.000	621.000	3610.000	621.600	3620.000
GR	620.000	3650.000	612.900	3654.000	609.600	3660.000	606.100	3670.000	605.300	3690.000
GR	604.500	3700.000	605.000	3710.000	604.900	3720.000	604.500	3730.000	604.500	3760.000
GR	604.200	3800.000	604.700	3810.000	603.500	3850.000	604.600	3880.000	604.900	3910.000
GR	604.500	3940.000	603.900	3970.000	603.200	3990.000	604.800	4020.000	613.000	4077.000
GR	614.000	4107.000	617.600	4125.000	617.000	4128.000	617.400	4150.000	620.500	4250.000
GR	620.000	4311.000	624.900	4340.000	630.000	4675.000	640.000	5275.000	640.000	6425.000
GR	650.000	6625.000	680.000	6755.000	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.100	0.100	0.033	0.0	0.0	0.0	0.0	0.0	0.0	0.0

CROSS SECTION NO. 8

X1	8.000	51.000	3134.000	3583.000	6400.000	5000.000	6180.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	1879.000	0.0	0.0	0.0	0.0	0.0	0.0
GR	633.000	894.000	632.650	924.000	632.100	994.000	629.700	1054.000	629.000	1154.000
GR	628.000	1234.000	631.000	1254.000	630.700	1584.000	628.000	1834.000	617.000	1854.000
GR	616.000	2084.000	615.000	2684.000	612.700	2834.000	612.400	2924.000	614.600	3034.000
GR	625.000	3094.000	625.700	3106.000	625.700	3106.000	625.700	3106.000	625.700	3106.000
GR	625.700	3118.000	615.800	3134.000	615.600	3150.000	609.400	3160.000	608.000	3170.000
GR	607.900	3180.000	606.800	3200.000	607.400	3210.000	607.400	3220.000	609.600	3230.000
GR	609.100	3240.000	609.600	3250.000	607.800	3280.000	605.100	3440.000	605.200	3490.000
GR	604.700	3500.000	605.100	3520.000	606.000	3540.000	608.300	3560.000	610.000	3570.000
GR	613.700	3581.000	618.500	3583.000	619.000	3600.000	617.200	3765.000	617.400	3776.000
GR	619.900	3800.000	628.000	3900.000	640.000	4250.000	660.000	4350.000	680.000	4550.000
GR	700.000	4700.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

X1	8.100	46.000	3134.000	3583.000	1100.000	1500.000	1250.000	0.0	0.0	0.0
GR	640.000	1984.000	628.800	1984.000	628.900	2054.000	628.000	2084.000	615.400	2134.000
GR	616.000	2254.000	616.900	2554.000	615.400	2654.000	613.300	2764.000	613.100	2864.000
GR	613.600	2974.000	616.200	3054.000	626.000	3114.000	626.000	3114.000	626.000	3114.000
GR	625.700	3118.000	615.800	3134.000	615.600	3150.000	609.400	3160.000	608.000	3170.000
GR	607.900	3180.000	606.800	3200.000	607.400	3210.000	607.400	3220.000	609.600	3230.000
GR	609.100	3240.000	609.600	3250.000	607.800	3280.000	605.100	3440.000	605.200	3490.000
GR	604.700	3500.000	605.100	3520.000	606.000	3540.000	608.300	3560.000	610.000	3570.000
GR	613.700	3581.000	618.500	3583.000	619.000	3600.000	617.200	3765.000	617.400	3776.000
GR	619.900	3800.000	628.000	3900.000	640.000	4250.000	660.000	4350.000	680.000	4550.000
GR	700.000	4700.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

X1	8.900	0.0	0.0	0.0	1200.000	1200.000	1200.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	2456.000	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.100	0.100	0.033	0.0	0.0	0.0	0.0	0.0	0.0	0.0

CROSS SECTION NO. 9

X1	9.000	33.000	3600.000	3960.000	720.000	720.000	720.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	3100.000	0.0	0.0	0.0	0.0	0.0	0.0
GR	700.000	0.0	680.000	350.000	660.000	650.000	640.000	1125.000	620.000	3440.000
GR	614.800	3518.000	616.800	3531.000	625.200	3564.000	625.700	3587.000	619.300	3594.000
GR	616.300	3600.000	609.900	3610.000	607.700	3640.000	608.900	3690.000	608.500	3700.000
GR	609.100	3710.000	608.900	3810.000	608.600	3820.000	608.800	3860.000	609.100	3890.000
GR	610.800	3940.000	611.600	3950.000	615.300	3960.000	616.300	3967.000	618.400	3993.000
GR	627.200	4013.000	626.000	4031.000	618.100	4058.000	620.000	4065.000	640.000	4485.000
GR	660.000	5010.000	680.000	5160.000	700.000	5335.000	0.0	0.0	0.0	0.0
NC	0.0	0.0	0.0	0.300	0.500	0.0	0.0	0.0	0.0	0.0
NC	0.100	0.100	0.030	0.0	0.0	0.0	0.0	0.0	0.0	0.0

X1	9.900	38.000	2500.000	2864.000	1415.000	1415.000	1415.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	2134.000	0.0	3250.000	0.0	0.0	0.0	0.0
GR	700.000	0.0	680.000	100.000	660.000	1250.000	640.000	1775.000	620.000	2100.000
GR	615.700	2260.000	617.200	2400.000	615.900	2500.000	614.400	2502.000	610.200	2510.000
GR	607.500	2530.000	606.900	2550.000	606.300	2560.000	605.300	2570.000	604.800	2600.000
GR	605.200	2620.000	604.100	2650.000	603.700	2670.000	604.000	2680.000	603.800	2690.000

GR	604.300	2710.000	605.800	2750.000	605.400	2780.000	604.700	2790.000	605.300	2800.000
GR	604.400	2840.000	604.700	2850.000	606.200	2860.000	608.500	2870.000	614.500	2880.000
GR	619.200	2884.000	616.900	2940.000	617.000	2985.000	619.300	2998.000	640.000	3310.000
GR	660.000	3535.000	680.000	3785.000	700.000	3885.000	0.0	0.0	0.0	0.0
X1	10.000	0.0	0.0	0.0	1415.000	1415.000	1415.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	2488.000	0.0	2897.000	0.0	0.0	0.0	0.0

DOWNSTREAM M-21 HIGHWAY BRIDGE

X1	10.100	40.000	4350.000	4830.000	50.000	50.000	50.000	0.838	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	631.500	631.500	0.0
GR	640.000	0.0	630.000	900.000	620.000	3800.000	620.000	4350.000	620.000	4375.000
GR	604.000	4412.000	604.000	4415.000	603.000	4420.000	603.000	4430.000	606.500	4460.000
GR	606.000	4470.000	604.500	4480.000	605.500	4483.000	605.000	4500.000	606.000	4510.000
GR	605.500	4520.000	602.000	4555.000	602.000	4558.000	602.000	4565.000	600.000	4570.000
GR	604.500	4580.000	605.000	4600.000	604.500	4612.000	606.000	4620.000	600.000	4625.000
GR	600.000	4628.000	605.000	4650.000	605.000	4675.000	603.500	4690.000	605.500	4695.000
GR	605.500	4698.000	604.500	4700.000	605.800	4710.000	606.000	4755.000	606.000	4758.000
GR	609.000	4770.000	620.000	4795.000	620.000	4830.000	630.000	5000.000	640.000	5140.000
SB	0.900	1.500	2.800	0.0	300.000	18.000	8450.000	2.500	604.700	604.700

UPSTREAM M-21 HIGHWAY BRIDGE

X1	10.200	0.0	0.0	0.0	34.000	34.000	34.000	0.0	0.0	0.0
X2	0.0	0.0	1.000	629.200	633.900	0.0	0.0	0.0	0.838	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	633.900	633.900	0.0
BT	7.000	0.0	640.000	640.000	900.000	633.900	633.900	4350.000	633.900	633.900
BT	4350.000	633.900	629.200	4830.000	633.900	629.200	4830.000	633.900	633.900	5140.000
BT	640.000	640.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

X1	11.000	38.000	2500.000	2884.000	50.000	50.000	50.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	2450.000	0.0	2934.000	0.0	0.0	0.0	0.0
GR	700.000	0.0	680.000	100.000	660.000	1250.000	640.000	1775.000	620.000	2100.000
GR	615.700	2260.000	617.200	2400.000	615.900	2500.000	614.400	2502.000	610.200	2510.000
GR	607.500	2530.000	606.900	2550.000	606.300	2560.000	605.300	2570.000	604.800	2600.000
GR	605.200	2620.000	604.100	2650.000	603.700	2670.000	604.000	2680.000	603.800	2690.000
GR	604.300	2710.000	605.800	2750.000	605.400	2780.000	604.700	2790.000	605.300	2800.000
GR	604.400	2840.000	604.700	2850.000	606.200	2860.000	608.500	2870.000	614.500	2880.000
GR	619.200	2884.000	616.900	2940.000	617.000	2985.000	619.300	2998.000	640.000	3310.000
GR	660.000	3535.000	680.000	3785.000	700.000	3885.000	0.0	0.0	0.0	0.0
QT	4.000	30300.000	44100.000	50500.000	67900.000	0.0	0.0	0.0	0.0	0.0
X1	11.100	0.0	0.0	0.0	243.000	243.000	243.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	2207.000	0.0	3177.000	0.0	0.0	0.0	0.0

CONFLUENCE THORNAPPLE RIVER

X1	11.500	0.0	0.0	0.0	243.000	243.000	243.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	1964.000	0.0	0.0	0.0	0.0	0.0	0.0
QT	4.000	25000.000	36300.000	41600.000	56000.000	0.0	0.0	0.0	0.0	0.0
X1	11.700	0.0	0.0	0.0	182.000	182.000	182.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	1782.000	0.0	0.0	0.0	0.0	0.0	0.0
X1	11.900	38.000	5250.000	5611.000	182.000	182.000	182.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	4350.000	0.0	0.0	0.0	0.0	0.0	0.0
GR	700.000	0.0	680.000	425.000	660.000	1250.000	640.000	2400.000	630.000	3775.000
GR	615.900	4950.000	619.400	4980.000	619.400	5050.000	620.000	5110.000	621.200	5130.000
GR	622.500	5240.000	618.300	5250.000	614.800	5252.000	610.300	5260.000	608.200	5270.000

GR	607.200	5360.000	606.700	5370.000	607.000	5380.000	607.400	5390.000	606.900	5410.000
GR	606.700	5430.000	607.000	5450.000	607.300	5520.000	607.000	5530.000	607.700	5560.000
GR	608.100	5570.000	610.200	5590.000	614.400	5610.000	615.500	5611.000	616.900	5620.000
GR	618.800	5650.000	622.600	5750.000	623.900	5800.000	624.500	5850.000	640.000	6136.000
GR	660.000	6400.000	680.000	6510.000	700.000	6600.000	0.0	0.0	0.0	0.0
NC	0.0	0.0	0.0	0.100	0.300	0.0	0.0	0.0	0.0	0.0

CROSS SECTION NO. 12

X1	12.000	0.0	0.0	0.0	146.000	146.000	146.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	4204.000	0.0	0.0	0.0	0.0	0.0	0.0

CASCADE-ADA TOWNSHIP LINE

X1	13.000	34.000	2300.000	2647.000	4870.000	4870.000	4870.000	0.0	0.0	0.0
GR	700.000	0.0	680.000	100.000	660.000	200.000	640.000	670.000	618.700	2000.000
GR	619.800	2100.000	619.900	2200.000	621.900	2266.000	616.600	2300.000	615.400	2301.000
GR	612.200	2310.000	609.800	2320.000	608.300	2330.000	608.200	2350.000	608.600	2360.000
GR	608.700	2370.000	608.300	2380.000	608.600	2400.000	608.200	2450.000	607.000	2560.000
GR	607.500	2600.000	609.500	2620.000	620.200	2647.000	618.000	2750.000	618.800	2770.000
GR	619.800	2825.000	620.800	2840.000	620.400	2900.000	620.800	2950.000	640.000	3900.000
GR	660.000	4175.000	680.000	4225.000	680.000	4550.000	700.000	4650.000	0.0	0.0
EJ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

THIS RUN EXECUTED 01/17/79

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  HEC2 RELEASE DATED NOV 76 UPDATED  AUG1977
  ERROR CORR -  01.02
  MODIFICATION -  50.51.52.53
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FLOOD INSURANCE ZONE DATA FOR GRAND RIVER, KENT COUNTY

FLOOD HAZARD FACTOR FOR ENTIRE REACH USING SECTIONS

SECTION NUMBER	CUMULATIVE DISTANCE	ELEVATION DIFFERENCE BETWEEN BASE FLOOD AND 1%	2%	0.2%
1.000	0.	-4.58	-1.34	3.57
2.000	3650.	-4.58	-1.34	3.56
2.100	5800.	-4.58	-1.34	3.53
3.000	9063.	-4.68	-1.36	3.56
3.100	9112.	-4.66	-1.35	3.56
3.110	9113.	-4.62	-1.34	3.45
3.190	9157.	-4.63	-1.35	3.4
3.200	9158.	-4.70	-1.37	3.4
4.000	9207.	-4.79	-1.40	3.76
4.100	9707.	-4.80	-1.40	3.76
5.000	16105.	-4.84	-1.41	3.76
6.000	22440.	-4.75	-1.39	3.68
7.000	26820.	-4.70	-1.37	3.62
8.000	33000.	-4.71	-1.36	3.57
8.100	34250.	-4.71	-1.36	3.57
8.900	35450.	-4.71	-1.36	3.56
9.000	36170.	-4.68	-1.35	3.54
9.900	37585.	-4.72	-1.36	3.53
10.000	39000.	-4.73	-1.36	3.51
10.100	39050.	-4.73	-1.36	4.08
10.200	39084.	-5.12	-1.50	4.33
11.000	39134.	-5.15	-1.51	4.07
11.100	39377.	-5.24	-1.54	4.16
11.500	39620.	-5.27	-1.55	4.18
11.700	39802.	-5.31	-1.56	4.21
11.900	39984.	-5.32	-1.57	4.22
12.000	40130.	-5.33	-1.57	4.23
13.000	45000.	-5.29	-1.56	4.19
WEIGHTED AVG FOR REACH		-4.79	-1.40	3.71

FHF FOR THE REACH = 050 WITH 100.0% OF THE REACH WITHIN 1.0 FEET
ZONE FOR THE REACH = A10

FHF Table Revised including Results from Part 2

GRAND RIVER, KENT COUNTY

SUMMARY PRINTOUT TABLE 150

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
A	1.000	30800.00	621.46	0.0	0.0	0.0	2000.00	0.0
	1.000	44900.00	624.70	3.24	0.0	0.0	2000.00	0.0
	1.000	51400.00	626.04	1.34	0.0	0.0	2000.00	0.0
	1.000	69200.00	629.61	3.57	0.0	0.0	2000.00	0.0
B	2.000	30800.00	621.76	0.0	0.30	0.0	1809.16	3650.00
	2.000	44900.00	625.00	3.24	0.30	0.0	1843.32	3650.00
	2.000	51400.00	626.34	1.34	0.30	0.0	1878.18	3650.00
	2.000	69200.00	629.90	3.56	0.29	0.0	1970.65	3650.00
	2.100	30800.00	622.08	0.0	0.32	0.0	1243.04	2150.00
	2.100	44900.00	625.32	3.24	0.32	0.0	1284.82	2150.00
	2.100	51400.00	626.66	1.34	0.31	0.0	1319.42	2150.00
	2.100	69200.00	630.18	3.53	0.28	0.0	1714.29	2150.00
	3.000	30800.00	622.59	0.0	0.51	0.0	1465.00	3263.00
	3.000	44900.00	625.91	3.32	0.59	0.0	1465.00	3263.00
	3.000	51400.00	627.27	1.36	0.62	0.0	1465.00	3263.00
	3.000	69200.00	630.84	3.56	0.65	0.0	1465.00	3263.00
C	3.100	30800.00	622.57	0.0	-0.03	0.0	837.23	49.00
	3.100	44900.00	625.87	3.30	-0.04	0.0	1288.08	49.00
	3.100	51400.00	627.22	1.35	-0.05	0.0	1440.57	49.00
	3.100	69200.00	630.78	3.56	-0.06	0.0	1621.58	49.00
	3.110	30800.00	622.52	0.0	-0.05	0.0	830.72	1.00
	3.110	44900.00	625.80	3.28	-0.07	0.0	1278.94	1.00
	3.110	51400.00	627.14	1.34	-0.08	0.0	1441.33	1.00
	3.110	69200.00	630.59	3.45	-0.19	0.0	1880.19	1.00
	3.190	30800.00	622.52	0.0	0.00	0.0	831.29	44.00
	3.190	44900.00	625.80	3.28	0.00	0.0	1279.59	44.00
	3.190	51400.00	627.15	1.35	0.01	0.0	1442.02	44.00
	3.190	69200.00	630.60	3.46	0.01	0.0	1882.86	44.00
	3.200	30800.00	622.65	0.0	0.13	0.0	848.19	1.00
D	3.200	44900.00	625.97	3.33	0.17	0.0	1302.20	1.00
	3.200	51400.00	627.35	1.37	0.20	0.0	1442.00	1.00
	3.200	69200.00	631.05	3.71	0.45	0.0	1686.87	1.00
	4.000	30800.00	622.74	0.0	0.09	0.0	1542.00	49.00
	4.000	44900.00	626.13	3.39	0.15	0.0	1542.00	49.00
	4.000	51400.00	627.53	1.40	0.18	0.0	1542.00	49.00
	4.000	69200.00	631.28	3.76	0.23	0.0	1542.00	49.00
	4.100	30800.00	622.78	0.0	0.04	0.0	1490.32	500.00
	4.100	44900.00	626.17	3.40	0.05	0.0	1575.00	500.00
	4.100	51400.00	627.58	1.40	0.05	0.0	1575.00	500.00
	4.100	69200.00	631.34	3.76	0.05	0.0	1575.00	500.00
	5.000	30800.00	623.37	0.0	0.59	0.0	2735.79	6398.00
E	5.000	44900.00	626.79	3.43	0.62	0.0	2975.63	6398.00
	5.000	51400.00	628.21	1.41	0.63	0.0	3074.48	6398.00
	5.000	69200.00	631.97	3.76	0.63	0.0	3268.88	6398.00

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
	6.000	30800.00	624.09	0.0	0.72	0.0	2808.01	6335.00
	6.000	44900.00	627.45	3.36	0.65	0.0	3451.00	6335.00
F	6.000	51400.00	628.84	1.39	0.63	0.0	3451.00	6335.00
	6.000	69200.00	632.52	3.68	0.55	0.0	3451.00	6335.00
	7.000	30800.00	624.59	0.0	0.50	0.0	2387.68	4380.00
	7.000	44900.00	627.92	3.33	0.47	0.0	3165.62	4380.00
G	7.000	51400.00	629.29	1.37	0.45	0.0	3200.00	4380.00
	7.000	69200.00	632.90	3.62	0.39	0.0	3200.00	4380.00
	8.000	30800.00	625.17	0.0	0.59	0.0	1964.24	6180.00
H	8.000	44900.00	628.52	3.35	0.60	0.0	2036.23	6180.00
	8.000	51400.00	629.88	1.36	0.59	0.0	2075.83	6180.00
	8.000	69200.00	633.45	3.57	0.54	0.0	2180.03	6180.00
	8.100	30800.00	625.27	0.0	0.10	0.0	1762.48	1250.00
	8.100	44900.00	628.62	3.35	0.10	0.0	1855.33	1250.00
	8.100	51400.00	629.98	1.36	0.10	0.0	1973.95	1250.00
	8.100	69200.00	633.55	3.57	0.10	0.0	2078.02	1250.00
	8.900	30800.00	625.37	0.0	0.10	0.0	1403.29	1200.00
	8.900	44900.00	628.73	3.35	0.10	0.0	1465.43	1200.00
	8.900	51400.00	630.08	1.36	0.10	0.0	1504.93	1200.00
	8.900	69200.00	633.64	3.56	0.09	0.0	1608.54	1200.00
	9.000	30800.00	625.33	0.0	-0.04	0.0	1035.18	720.00
	9.000	44900.00	628.66	3.33	-0.07	0.0	1146.88	720.00
I	9.000	51400.00	630.01	1.35	-0.07	0.0	1175.18	720.00
	9.000	69200.00	633.55	3.54	-0.09	0.0	1249.47	720.00
	9.900	30800.00	625.77	0.0	0.44	0.0	961.55	1415.00
	9.900	44900.00	629.14	3.36	0.48	0.0	1012.25	1415.00
	9.900	51400.00	630.49	1.36	0.49	0.0	1032.73	1415.00
	9.900	69200.00	634.03	3.53	0.48	0.0	1085.94	1415.00
	10.000	30800.00	625.90	0.0	0.13	0.0	409.00	1415.00
	10.000	44900.00	629.27	3.37	0.14	0.0	409.00	1415.00
	10.000	51400.00	630.63	1.36	0.13	0.0	409.00	1415.00
	10.000	69200.00	634.14	3.51	0.12	0.0	409.00	1415.00
	10.100	30800.00	625.89	0.0	-0.01	0.0	402.22	50.00
	10.100	44900.00	629.26	3.37	-0.01	0.0	402.22	50.00
J	10.100	51400.00	630.62	1.36	-0.01	0.0	402.22	50.00
	10.100	69200.00	634.70	4.08	0.56	0.0	3845.69	50.00
	10.200	30800.00	625.90	0.0	0.01	0.0	402.22	34.00
	10.200	44900.00	629.52	3.62	0.25	0.0	402.22	34.00
K	10.200	51400.00	631.02	1.50	0.40	0.0	402.22	34.00
	10.200	69200.00	635.35	4.33	0.65	0.0	3902.22	34.00
	11.000	30800.00	625.96	0.0	0.06	0.0	484.00	50.00
	11.000	44900.00	629.59	3.64	0.08	0.0	484.00	50.00
	11.000	51400.00	631.11	1.51	0.08	0.0	484.00	50.00
	11.000	69200.00	635.18	4.07	-0.18	0.0	484.00	50.00

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
	11.100	30300.00	626.05	0.0	0.09	0.0	892.76	243.00
	11.100	44100.00	629.75	3.70	0.16	0.0	948.53	243.00
	11.100	50500.00	631.29	1.54	0.19	0.0	970.00	243.00
	11.100	67900.00	635.45	4.16	0.28	0.0	970.00	243.00
	11.500	30300.00	626.09	0.0	0.04	0.0	1099.07	243.00
	11.500	44100.00	629.81	3.72	0.06	0.0	1192.37	243.00
L	11.500	50500.00	631.36	1.55	0.07	0.0	1215.76	243.00
	11.500	67900.00	635.54	4.18	0.09	0.0	1278.83	243.00
	11.700	25000.00	626.17	0.0	0.09	0.0	1101.96	182.00
	11.700	36300.00	629.92	3.75	0.11	0.0	1219.31	182.00
	11.700	41600.00	631.48	1.56	0.12	0.0	1268.24	182.00
	11.700	56000.00	635.69	4.21	0.15	0.0	1399.94	182.00
	11.900	25000.00	626.17	0.0	-0.00	0.0	1531.02	182.00
	11.900	36300.00	629.93	3.76	0.01	0.0	1600.32	182.00
	11.900	41600.00	631.49	1.57	0.01	0.0	1629.14	182.00
	11.900	56000.00	635.72	4.22	0.03	0.0	1706.87	182.00
	12.000	25000.00	626.19	0.0	0.01	0.0	1677.09	146.00
	12.000	36300.00	629.95	3.76	0.02	0.0	1746.39	146.00
M	12.000	41600.00	631.51	1.57	0.02	0.0	1775.28	146.00
	12.000	56000.00	635.74	4.23	0.02	0.0	1853.33	146.00
	13.000	25000.00	626.66	0.0	0.47	0.0	1736.84	4870.00
	13.000	36300.00	630.39	3.73	0.44	0.0	2153.69	4870.00
N	13.000	41600.00	631.95	1.56	0.43	0.0	2327.70	4870.00
	13.000	56000.00	636.13	4.19	0.39	0.0	2796.80	4870.00

SUMMARY OF ERRORS

SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10K*S	VCH	AREA	.01K
10.100	50.00	0.0	0.0	600.00	30800.00	625.89	0.0	626.17	1.55	4.18	7362.53	24708.05
10.100	50.00	0.0	0.0	600.00	44900.00	629.26	0.0	629.68	1.89	5.15	8718.80	32691.20
10.100	50.00	0.0	0.0	600.00	51400.00	630.62	0.0	631.10	2.02	5.55	9264.81	36140.60
10.100	50.00	0.0	0.0	600.00	69200.00	634.70	0.0	634.90	0.96	4.27	43608.61	70780.25
10.200	34.00	633.90	629.20	600.00	30800.00	625.90	0.0	626.18	1.55	4.18	7364.20	24717.30
10.200	34.00	633.90	629.20	600.00	44900.00	629.52	0.0	629.92	1.82	5.09	8818.57	33311.68
10.200	34.00	633.90	629.20	600.00	51400.00	631.02	0.0	631.48	1.91	5.45	9422.74	37162.59
10.200	34.00	633.90	629.20	600.00	69200.00	635.35	0.0	635.53	0.85	4.08	46121.34	75170.69
11.000	50.00	0.0	0.0	603.70	30800.00	625.96	0.0	626.19	1.16	3.91	8623.37	28641.27
11.000	50.00	0.0	0.0	603.70	44900.00	629.59	0.0	629.95	1.40	4.80	10382.34	37941.11
11.000	50.00	0.0	0.0	603.70	51400.00	631.11	0.0	631.51	1.49	5.16	11113.34	42107.68
11.000	50.00	0.0	0.0	603.70	69200.00	635.18	0.0	635.71	1.63	5.96	13083.61	54177.12
11.100	243.00	0.0	0.0	603.70	30300.00	626.05	0.0	626.23	0.96	3.57	11890.89	30905.75
11.100	243.00	0.0	0.0	603.70	44100.00	629.75	0.0	630.00	1.10	4.27	15297.57	42111.48
11.100	243.00	0.0	0.0	603.70	50500.00	631.29	0.0	631.58	1.14	4.54	16778.30	47250.80
11.100	243.00	0.0	0.0	603.70	67900.00	635.45	0.0	635.80	1.18	5.10	20815.00	62528.16
11.500	243.00	0.0	0.0	603.70	30300.00	626.09	0.0	626.26	0.92	3.50	13024.17	31574.20
11.500	243.00	0.0	0.0	603.70	44100.00	629.81	0.0	630.04	1.02	4.13	17318.37	43619.59
11.500	243.00	0.0	0.0	603.70	50500.00	631.36	0.0	631.61	1.05	4.37	19187.09	49214.88
11.500	243.00	0.0	0.0	603.70	67900.00	635.54	0.0	635.84	1.06	4.85	24405.91	65879.87
11.700	182.00	0.0	0.0	603.70	25000.00	626.17	0.0	626.29	0.62	2.87	13125.37	31849.00
11.700	182.00	0.0	0.0	603.70	36300.00	629.92	0.0	630.07	0.68	3.38	17474.03	43996.67
11.700	182.00	0.0	0.0	603.70	41600.00	631.48	0.0	631.65	0.70	3.58	19417.12	49640.66
11.700	182.00	0.0	0.0	603.70	56000.00	635.69	0.0	635.89	0.71	3.98	25026.42	66526.06
11.900	182.00	0.0	0.0	606.70	25000.00	626.17	0.0	626.32	0.93	3.28	13524.44	25973.37
11.900	182.00	0.0	0.0	606.70	36300.00	629.93	0.0	630.09	0.89	3.65	19404.29	38422.25
11.900	182.00	0.0	0.0	606.70	41600.00	631.49	0.0	631.67	0.88	3.79	21927.30	44312.90
11.900	182.00	0.0	0.0	606.70	56000.00	635.72	0.0	635.91	0.81	4.06	28953.41	62174.30
12.000	146.00	0.0	0.0	606.70	25000.00	626.19	0.0	626.33	0.93	3.28	13852.34	25954.43
12.000	146.00	0.0	0.0	606.70	36300.00	629.95	0.0	630.11	0.88	3.61	20281.37	38779.09
12.000	146.00	0.0	0.0	606.70	41600.00	631.51	0.0	631.68	0.86	3.74	23038.26	44894.04
12.000	146.00	0.0	0.0	606.70	56000.00	635.74	0.0	635.92	0.78	3.97	30712.94	63554.98
13.000	4870.00	0.0	0.0	607.00	25000.00	626.66	0.0	626.82	1.07	3.49	13194.26	24114.97
13.000	4870.00	0.0	0.0	607.00	36300.00	630.39	0.0	630.57	1.00	3.82	20439.47	36227.35
13.000	4870.00	0.0	0.0	607.00	41600.00	631.95	0.0	632.13	0.97	3.94	23923.05	42200.24
13.000	4870.00	0.0	0.0	607.00	56000.00	636.13	0.0	636.31	0.84	4.09	34662.47	61167.54

SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10K*S	VCH	AREA	.01K
4.000	49.00	0.0	0.0	603.60	30800.00	622.74	0.0	622.87	0.86	3.15	15901.58	33262.73
4.000	49.00	0.0	0.0	603.60	44900.00	626.13	0.0	626.30	0.93	3.67	21133.50	46680.79
4.000	49.00	0.0	0.0	603.60	51400.00	627.53	0.0	627.72	0.95	3.87	23291.41	52803.38
4.000	49.00	0.0	0.0	603.60	69200.00	631.28	0.0	631.51	0.95	4.30	29084.82	70827.62
4.100	500.00	0.0	0.0	603.60	30800.00	622.78	0.0	622.91	0.85	3.15	15387.11	33362.71
4.100	500.00	0.0	0.0	603.60	44900.00	626.17	0.0	626.35	0.92	3.66	20595.07	46830.40
4.100	500.00	0.0	0.0	603.60	51400.00	627.58	0.0	627.77	0.94	3.86	22802.02	53090.98
4.100	500.00	0.0	0.0	603.60	69200.00	631.34	0.0	631.56	0.93	4.26	28742.11	71686.44
5.000	6398.00	0.0	0.0	601.60	30800.00	623.37	0.0	623.51	1.06	3.43	19869.38	29962.33
5.000	6398.00	0.0	0.0	601.60	44900.00	626.79	0.0	626.95	0.98	3.71	29653.99	45437.96
5.000	6398.00	0.0	0.0	601.60	51400.00	628.21	0.0	628.36	0.95	3.82	33925.70	52837.55
5.000	6398.00	0.0	0.0	601.60	69200.00	631.97	0.0	632.12	0.84	3.98	45916.82	75605.25
6.000	6335.00	0.0	0.0	602.30	30800.00	624.09	0.0	624.25	1.42	3.73	19079.63	25875.45
6.000	6335.00	0.0	0.0	602.30	44900.00	627.45	0.0	627.62	1.34	4.05	29694.42	38831.59
6.000	6335.00	0.0	0.0	602.30	51400.00	628.84	0.0	629.01	1.28	4.13	34481.23	45397.15
6.000	6335.00	0.0	0.0	602.30	69200.00	632.52	0.0	632.68	1.12	4.25	47185.12	65487.95
7.000	4380.00	0.0	0.0	603.20	30800.00	624.59	0.0	624.73	0.87	3.18	16169.20	33072.11
7.000	4380.00	0.0	0.0	603.20	44900.00	627.92	0.0	628.08	0.88	3.58	25441.34	47939.97
7.000	4380.00	0.0	0.0	603.20	51400.00	629.29	0.0	629.45	0.86	3.68	29820.96	55495.74
7.000	4380.00	0.0	0.0	603.20	69200.00	632.90	0.0	633.07	0.77	3.86	41400.62	78672.44
8.000	6180.00	0.0	0.0	604.70	30800.00	625.17	0.0	625.26	0.84	2.79	21787.79	33530.27
8.000	6180.00	0.0	0.0	604.70	44900.00	628.52	0.0	628.63	0.89	3.21	28500.90	47677.20
8.000	6180.00	0.0	0.0	604.70	51400.00	629.88	0.0	630.00	0.90	3.38	31291.84	54063.12
8.000	6180.00	0.0	0.0	604.70	69200.00	633.45	0.0	633.59	0.91	3.74	38894.23	72594.37
8.100	1250.00	0.0	0.0	604.70	30800.00	625.27	0.0	625.37	0.92	2.93	19538.27	32117.10
8.100	1250.00	0.0	0.0	604.70	44900.00	628.62	0.0	628.75	0.98	3.39	25572.81	45387.61
8.100	1250.00	0.0	0.0	604.70	51400.00	629.98	0.0	630.12	1.00	3.57	28209.23	51406.76
8.100	1250.00	0.0	0.0	604.70	69200.00	633.55	0.0	633.71	1.01	3.95	35438.44	68971.50
8.900	1200.00	0.0	0.0	604.70	30800.00	625.37	0.0	625.50	1.03	3.10	16522.54	30398.79
8.900	1200.00	0.0	0.0	604.70	44900.00	628.73	0.0	628.89	1.13	3.65	21332.55	42294.24
8.900	1200.00	0.0	0.0	604.70	51400.00	630.08	0.0	630.26	1.17	3.86	23344.40	47611.43
8.900	1200.00	0.0	0.0	604.70	69200.00	633.64	0.0	633.86	1.21	4.34	28874.12	62924.02
9.000	720.00	0.0	0.0	607.70	30800.00	625.33	0.0	625.68	2.98	4.93	8812.77	17848.09
9.000	720.00	0.0	0.0	607.70	44900.00	628.66	0.0	629.10	3.04	5.74	12482.67	25758.14
9.000	720.00	0.0	0.0	607.70	51400.00	630.01	0.0	630.48	3.06	5.92	14047.21	29395.43
9.000	720.00	0.0	0.0	607.70	69200.00	633.55	0.0	634.09	2.98	6.49	18336.25	40076.34
9.900	1415.00	0.0	0.0	603.70	30800.00	625.77	0.0	625.96	1.02	3.65	12201.78	30454.20
9.900	1415.00	0.0	0.0	603.70	44900.00	629.14	0.0	629.40	1.21	4.41	15522.00	40740.69
9.900	1415.00	0.0	0.0	603.70	51400.00	630.49	0.0	630.80	1.29	4.72	16910.96	45282.14
9.900	1415.00	0.0	0.0	603.70	69200.00	634.03	0.0	634.41	1.42	5.41	20651.01	58105.62
10.000	1415.00	0.0	0.0	603.70	30800.00	625.90	0.0	626.14	1.20	3.97	7933.67	28094.45
10.000	1415.00	0.0	0.0	603.70	44900.00	629.27	0.0	629.65	1.52	4.96	9312.43	36399.12
10.000	1415.00	0.0	0.0	603.70	51400.00	630.63	0.0	631.07	1.65	5.37	9867.71	39981.76
10.000	1415.00	0.0	0.0	603.70	69200.00	634.14	0.0	634.76	1.93	6.33	11305.00	49865.09

THIS RUN EXECUTED 01/17/79

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  HEC2 RELEASE DATED NOV 76 UPDATED  AUG1977
  ERROR CORR -  01.02
  MODIFICATION -  50.51.52.53
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NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

GRAND RIVER, KENT COUNTY

SUMMARY PRINTOUT TABLE 150

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10K*S	VCH	AREA	.01K
	1.000	0.0	0.0	0.0	598.20	30800.00	621.46	0.0	621.57	0.84	3.12	21105.39	33538.16
A	1.000	0.0	0.0	0.0	598.20	44900.00	624.70	0.0	624.84	0.89	3.58	27585.38	47474.51
	1.000	0.0	0.0	0.0	598.20	51400.00	626.04	0.0	626.19	0.91	3.77	30265.54	53853.00
	1.000	0.0	0.0	0.0	598.20	69200.00	629.61	0.0	629.78	0.91	4.15	37405.68	72488.75
	2.000	3650.00	0.0	0.0	599.50	30800.00	621.76	0.0	622.00	1.53	4.21	12992.15	24921.54
	2.000	3650.00	0.0	0.0	599.50	44900.00	625.00	0.0	625.29	1.58	4.76	18872.22	35767.79
B	2.000	3650.00	0.0	0.0	599.50	51400.00	626.34	0.0	626.65	1.58	4.96	21376.23	40906.42
	2.000	3650.00	0.0	0.0	599.50	69200.00	629.90	0.0	630.23	1.51	5.35	28246.52	56257.14
	2.100	2150.00	0.0	0.0	599.50	30800.00	622.08	0.0	622.33	1.51	4.23	11327.86	25092.22
	2.100	2150.00	0.0	0.0	599.50	44900.00	625.32	0.0	625.65	1.67	4.95	15395.45	34742.49
	2.100	2150.00	0.0	0.0	599.50	51400.00	626.66	0.0	627.02	1.72	5.23	17134.68	39182.49
	2.100	2150.00	0.0	0.0	599.50	69200.00	630.18	0.0	630.61	1.76	5.80	22005.13	52205.04
	3.000	3263.00	0.0	0.0	603.60	30800.00	622.59	0.0	622.73	0.89	3.20	15312.27	32563.07
	3.000	3263.00	0.0	0.0	603.60	44900.00	625.91	0.0	626.10	0.98	3.76	20174.17	45328.78
	3.000	3263.00	0.0	0.0	603.60	51400.00	627.27	0.0	627.48	1.01	3.97	22169.41	51107.67
	3.000	3263.00	0.0	0.0	603.60	69200.00	630.84	0.0	631.09	1.05	4.46	27387.75	67618.62
	3.100	49.00	0.0	0.0	599.00	30800.00	622.57	0.0	622.77	1.26	3.63	8901.26	27416.02
	3.100	49.00	0.0	0.0	599.00	44900.00	625.87	0.0	626.15	1.49	4.34	12415.37	36753.01
C	3.100	49.00	0.0	0.0	599.00	51400.00	627.22	0.0	627.54	1.54	4.60	14277.60	41385.50
	3.100	49.00	0.0	0.0	599.00	69200.00	630.78	0.0	631.15	1.55	5.10	19469.74	55557.49
	3.110	1.00	620.00	626.70	599.00	30800.00	622.52	0.0	622.82	0.60	4.39	7418.64	39906.39
	3.110	1.00	620.00	626.70	599.00	44900.00	625.80	0.0	626.22	0.70	5.27	10639.80	53563.96
	3.110	1.00	620.00	626.70	599.00	51400.00	627.14	0.0	627.62	1.84	5.65	12129.84	37841.61
	3.110	1.00	620.00	626.70	599.00	69200.00	630.59	0.0	631.34	3.04	7.24	15546.68	39720.74
	3.190	44.00	620.00	626.70	599.00	30800.00	622.52	0.0	622.82	0.60	4.39	7421.77	39922.43
	3.190	44.00	620.00	626.70	599.00	44900.00	625.80	0.0	626.23	0.70	5.27	10645.70	53587.42
	3.190	44.00	620.00	626.70	599.00	51400.00	627.15	0.0	627.63	1.84	5.65	12135.53	37844.25
	3.190	44.00	620.00	626.70	599.00	69200.00	630.60	0.0	631.35	3.03	7.24	15559.05	39729.10
	3.200	1.00	0.0	0.0	599.00	30800.00	622.65	0.0	622.85	0.31	3.62	8968.85	55164.81
	3.200	1.00	0.0	0.0	599.00	44900.00	625.97	0.0	626.27	0.37	4.36	12553.59	73477.25
	3.200	1.00	0.0	0.0	599.00	51400.00	627.35	0.0	627.68	0.39	4.64	14457.66	82391.87
	3.200	1.00	0.0	0.0	599.00	69200.00	631.05	0.0	631.46	0.40	5.21	19928.86	109493.81

THIS RUN EXECUTED 01/17/79

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**********************************************************
 HEC2 RELEASE DATED NOV 76 UPDATED AUG1977
 ERROR CORR - 01.02
 MODIFICATION - 50.51.52.53
**********************************************************

T1      ADA TOWNSHIP HUD1 62-0104-009
T2      500-YEAR FLOOD
T3      GRAND RIVER, KENT COUNTY, MICHIGAN.
J1  ICHECK    INQ      NINV     IDIR     STRT     METRIC   HVINS    Q        WSEL     FQ
        0.       5.       0.       0.  0.0          0.0      0.0       0.  629.610    0.0
J2  NPROF     IPLOT    PRFVS    XSECV    XSECH    FN       ALLDC    IBW      CHNIM    ITRACE
    15.000     0.0     -1.000     0.0      0.0      0.0      0.0      0.0      0.0      0.0
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THIS RUN EXECUTED 01/17/79

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**********************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED  AUG1977
  ERROR CORR -  01.02
  MODIFICATION -  50.51.52.53
**********************************************************

T1      ADA TOWNSHIP HUD1 62-0104-009
T2      100-YEAR FLOOD
T3      GRAND RIVER. KENT COUNTY. MICHIGAN.
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J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
	0.	4.	8.	0.	0.0	0.0	0.0	0.	626.040	0.0

J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	3.000	0.0	-1.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0

THIS RUN EXECUTED 01/17/79

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**********************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED  AUG1977
  ERROR CORR -  01,02
  MODIFICATION -  50,51,52,53
**********************************************************

T1      ADA TOWNSHIP HUD1 62-0104-009
T2      50-YEAR FLOOD
T3      GRAND RIVER, KENT COUNTY, MICHIGAN.
J1  ICHECK     INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ
        0.       3.        0.        0.  0.0           0.0       0.0       0.   624.700       0.0
J2  NPROF      IPLOT     PREVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE
    2.000        0.0    -1.000       0.0       0.0       0.0       0.0       0.0       0.0        0.0
```

GR	700.000	0.0	680.000	425.000	660.000	1250.000	640.000	2400.000	630.000	3775.000
GR	615.900	4950.000	619.400	4980.000	619.400	5050.000	620.000	5110.000	621.200	5130.000
GR	622.500	5240.000	618.300	5250.000	614.800	5252.000	610.300	5260.000	608.200	5270.000
GR	607.200	5360.000	606.700	5370.000	607.000	5380.000	607.400	5390.000	606.900	5410.000
GR	606.700	5430.000	607.000	5450.000	607.300	5520.000	607.000	5530.000	607.700	5560.000
GR	608.100	5570.000	610.200	5590.000	614.400	5610.000	615.500	5611.000	616.900	5620.000
GR	618.800	5650.000	622.600	5750.000	623.900	5800.000	624.500	5850.000	640.000	6136.000
GR	660.000	6400.000	680.000	6510.000	700.000	6600.000	0.0	0.0	0.0	0.0
NC	0.0	0.0	0.0	0.100	0.300	0.0	0.0	0.0	0.0	0.0

CROSS SECTION NO. 12

X1	12.000	0.0	0.0	0.0	146.000	146.000	146.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	4204.000	0.0	0.0	0.0	0.0	0.0	0.0

CASCADE-ADA TOWNSHIP LINE

X1	13.000	34.000	2300.000	2647.000	4870.000	4870.000	4870.000	0.0	0.0	0.0
GR	700.000	0.0	680.000	100.000	660.000	200.000	640.000	670.000	618.700	2000.000
GR	619.800	2100.000	619.000	2200.000	621.900	2266.000	616.600	2300.000	615.400	2301.000
GR	612.200	2310.000	609.800	2320.000	608.300	2330.000	608.200	2350.000	608.600	2360.000
GR	608.700	2370.000	608.300	2380.000	608.600	2400.000	608.200	2450.000	607.000	2560.000
GR	607.500	2600.000	609.500	2620.000	620.200	2647.000	618.000	2750.000	618.800	2770.000
GR	619.800	2825.000	620.800	2840.000	620.400	2900.000	620.800	2950.000	640.000	3900.000
GR	660.000	4175.000	680.000	4225.000	680.000	4550.000	700.000	4650.000	0.0	0.0
EJ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

GR	615.700	226 .000	617.200	2400.000	615.900	2500.000	614.400	2502.000	610.200	2510.000
GR	607.500	2530.000	606.900	2550.000	606.300	2560.000	605.300	2570.000	604.800	2600.000
GR	605.200	2620.000	604.100	2650.000	603.700	2670.000	604.000	2680.000	603.800	2690.000
GR	604.300	2710.000	605.800	2750.000	605.400	2780.000	604.700	2790.000	605.300	2800.000
GR	604.400	2840.000	604.700	2850.000	606.200	2860.000	608.500	2870.000	614.500	2880.000
GR	619.200	2884.000	616.900	2940.000	617.000	2985.000	619.300	2998.000	640.000	3310.000
GR	660.000	353 .000	680.000	3785.000	700.000	3885.000	0.0	0.0	0.0	0.0
X1	10.000	0.0	0.0	0.0	1415.000	1415.000	1415.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	2488.000	0.0	2897.000	0.0	0.0	0.0	0.0

DOWNSTREAM M-21 HIGHWAY BRIDGE

X1	10.100	40.000	4350.000	4830.000	50.000	50.000	50.000	0.838	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	631.500	631.500	0.0
GR	640.000	0.0	630.000	900.000	620.000	3800.000	620.000	4350.000	620.000	4375.000
GR	604.000	4412.000	604.000	4415.000	603.000	4420.000	603.000	4430.000	606.500	4460.000
GR	606.000	4470.000	604.500	4480.000	605.500	4483.000	605.000	4500.000	606.000	4510.000
GR	605.500	4520.000	602.000	4555.000	602.000	4558.000	602.000	4565.000	600.000	4570.000
GR	604.500	4580.000	605.000	4600.000	606.500	4612.000	606.000	4620.000	600.000	4625.000
GR	600.000	4628.000	605.000	4650.000	605.000	4675.000	603.500	4690.000	605.500	4695.000
GR	605.500	4698.000	604.500	4700.000	605.800	4710.000	606.000	4755.000	606.000	4758.000
GR	609.000	4770.000	620.000	4795.000	620.000	4830.000	630.000	5000.000	640.000	5140.000
SB	0.900	1.500	2.800	0.0	300.000	18.000	8450.000	2.500	604.700	604.700

UPSTREAM M-21 HIGHWAY BRIDGE

X1	10.200	0.0	0.0	0.0	34.000	34.000	34.000	0.0	0.0	0.0
X2	0.0	0.0	1.000	629.200	633.900	0.0	0.0	0.0	0.838	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	633.900	633.900	0.0
BT	7.000	0.0	640.000	640.000	900.000	633.900	633.900	4350.000	633.900	633.900
BT	4350.000	633.900	629.200	4830.000	633.900	629.200	4830.000	633.900	633.900	5140.000
BT	640.000	640.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

X1	11.000	38.000	2500.000	2884.000	50.000	50.000	50.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	2450.000	0.0	2934.000	0.0	0.0	0.0	0.0
GR	700.000	0.0	680.000	100.000	660.000	1250.000	640.000	1775.000	620.000	2100.000
GR	615.700	2260.000	617.200	2400.000	615.900	2500.000	614.400	2502.000	610.200	251 .000
GR	607.500	2530.000	606.900	2550.000	606.300	2560.000	605.300	2570.000	604.800	2600.000
GR	605.200	2620.000	604.100	2650.000	603.700	2670.000	604.000	2680.000	603.800	2690.000
GR	604.300	2710.000	605.800	2750.000	605.400	2780.000	604.700	2790.000	605.300	2800.000
GR	604.400	2840.000	604.700	2850.000	606.200	2860.000	608.500	2870.000	614.500	2880.000
GR	619.200	2884.000	616.900	2940.000	617.000	2985.000	619.300	2998.000	640.000	3310.000
GR	660.000	3535.000	680.000	3785.000	700.000	3885.000	0.0	0.0	0.0	0.0
QT	4.000	30300.000	44100.000	50500.000	67900.000	0.0	0.0	0.0	0.0	0.0
X1	11.100	0.0	0.0	0.0	243.000	243.000	243.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	2207.000	0.0	3177.000	0.0	0.0	0.0	0.0

CONFLUENCE THORNAPPLE RIVER

X1	11.500	0.0	0.0	0.0	243.000	243.000	243.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	1964.000	0.0	0.0	0.0	0.0	0.0	0.0
QT	4.000	25000.000	36300.000	41600.000	56000.000	0.0	0.0	0.0	0.0	0.0
X1	11.700	0.0	0.0	0.0	182.000	182.000	182.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	1782.000	0.0	0.0	0.0	0.0	0.0	0.0
X1	11.900	38.000	5250.000	5611.000	182.000	182.000	182.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	4350.000	0.0	0.0	0.0	0.0	0.0	0.0

X1	7.000	47.000	3650.000	4125.000	3800.000	4100.000	4380.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	1300.000	0.0	4500.000	0.0	0.0	0.0	0.0
GR	680.000	0.0	650.000	200.000	640.000	500.000	630.000	950.000	620.000	2800.000
GR	618.500	3350.000	619.700	3389.000	618.000	3405.000	618.200	3463.000	620.700	3480.000
GR	620.800	3495.000	618.600	3570.000	621.600	3575.000	621.000	3610.000	621.600	3620.000
GR	620.000	3650.000	612.900	3654.000	609.600	3660.000	606.100	3670.000	605.300	3690.000
GR	604.500	3700.000	605.000	3710.000	604.900	3720.000	604.500	3730.000	604.500	3760.000
GR	604.200	3800.000	604.700	3810.000	603.500	3850.000	604.600	3880.000	604.900	3910.000
GR	604.500	3940.000	603.900	3970.000	603.200	3990.000	604.800	4020.000	613.000	4077.000
GR	614.000	4107.000	617.600	4125.000	617.000	4128.000	617.400	4150.000	620.500	4250.000
GR	620.000	4311.000	624.900	4340.000	630.000	4675.000	640.000	5275.000	640.000	6425.000
GR	650.000	6625.000	680.000	6755.000	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.100	0.100	0.033	0.0	0.0	0.0	0.0	0.0	0.0	0.0

CROSS SECTION NO. 8

X1	8.000	51.000	3134.000	3583.000	6400.000	5000.000	6180.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	1879.000	0.0	0.0	0.0	0.0	0.0	0.0
GR	633.000	894.000	632.650	924.000	632.100	994.000	629.700	1054.000	629.000	1154.000
GR	628.000	1234.000	631.000	1254.000	630.700	1584.000	628.000	1834.000	617.000	1854.000
GR	616.000	2084.000	615.000	2684.000	612.700	2834.000	612.400	2924.000	614.600	3034.000
GR	625.000	3094.000	625.700	3106.000	625.700	3106.000	625.700	3106.000	625.700	3106.000
GR	625.700	3118.000	615.800	3134.000	615.600	3150.000	609.400	3160.000	608.000	3170.000
GR	607.900	3180.000	606.800	3200.000	607.400	3210.000	607.400	3220.000	609.600	3230.000
GR	609.100	3240.000	609.600	3250.000	607.800	3280.000	605.100	3440.000	605.200	3490.000
GR	604.700	3500.000	605.100	3520.000	606.000	3540.000	608.300	3560.000	610.000	3570.000
GR	613.700	3581.000	618.500	3583.000	619.000	3600.000	617.200	3765.000	617.400	3776.000
GR	619.900	3800.000	628.000	3900.000	640.000	4250.000	660.000	4350.000	680.000	4550.000
GR	700.000	4700.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

X1	8.100	46.000	3134.000	3593.000	1100.000	1500.000	1250.000	0.0	0.0	0.0
GR	640.000	1984.000	628.800	1984.000	628.900	2054.000	628.000	2084.000	615.400	2134.000
GR	616.000	2254.000	616.900	2554.000	615.400	2654.000	613.300	2764.000	613.100	2864.000
GR	613.600	2974.000	616.200	3054.000	626.000	3114.000	626.000	3114.000	626.000	3114.000
GR	625.700	3118.000	615.800	3134.000	615.600	3150.000	609.400	3160.000	608.000	3170.000
GR	607.900	3180.000	606.800	3200.000	607.400	3210.000	607.400	3220.000	609.600	3230.000
GR	609.100	3240.000	609.600	3250.000	607.800	3280.000	605.100	3440.000	605.200	3490.000
GR	604.700	3500.000	605.100	3520.000	606.000	3540.000	608.300	3560.000	610.000	3570.000
GR	613.700	3581.000	618.500	3583.000	619.000	3600.000	617.200	3765.000	617.400	3776.000
GR	619.900	3800.000	628.000	3900.000	640.000	4250.000	660.000	4350.000	680.000	4550.000
GR	700.000	4700.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

X1	8.900	0.0	0.0	0.0	1200.000	1200.000	1200.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	2456.000	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.100	0.100	0.033	0.0	0.0	0.0	0.0	0.0	0.0	0.0

CROSS SECTION NO. 9

X1	9.000	33.000	3600.000	3960.000	720.000	720.000	720.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	3100.000	0.0	0.0	0.0	0.0	0.0	0.0
GR	700.000	0.0	680.000	350.000	660.000	650.000	640.000	1125.000	620.000	3440.000
GR	614.800	3518.000	616.800	3531.000	625.200	3564.000	625.700	3587.000	619.300	3594.000
GR	616.300	3600.000	609.900	3610.000	607.700	3640.000	608.900	3690.000	608.500	3700.000
GR	609.100	3710.000	608.900	3810.000	608.600	3820.000	608.800	3860.000	609.100	3890.000
GR	610.800	3940.000	611.600	3950.000	615.300	3960.000	616.300	3967.000	618.400	3993.000
GR	627.200	4013.000	626.000	4031.000	618.100	4058.000	620.000	4065.000	640.000	4485.000
GR	660.000	5010.000	680.000	5160.000	700.000	5335.000	0.0	0.0	0.0	0.0
NC	0.0	0.0	0.0	0.300	0.500	0.0	0.0	0.0	0.0	0.0
NC	0.100	0.100	0.030	0.0	0.0	0.0	0.0	0.0	0.0	0.0

X1	9.900	38.000	2500.000	2884.000	1415.000	1415.000	1415.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	2134.000	0.0	3250.000	0.0	0.0	0.0	0.0
GR	700.000	0.0	680.000	100.000	660.000	1250.000	640.000	1775.000	620.000	2100.000

1 FT UPSTREAM OF KNAPP ROAD BRIDGE

X1	3.200	0.0	0.0	0.0	1.000	1.000	1.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	2651.000	0.0	630.000	620.000	0.0
NC	0.080	0.100	0.030	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X1	4.000	66.000	2250.000	3325.000	49.000	49.000	49.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	2800.000	0.0	4342.000	0.0	0.0	0.0	0.0
GR	670.000	0.0	660.000	150.000	660.000	1300.000	670.000	1500.000	660.000	1670.000
GR	650.000	1850.000	640.000	2000.000	630.000	2200.000	616.300	2550.000	617.300	2835.000
GR	613.100	2850.000	611.000	2854.000	606.200	2860.000	605.000	2880.000	605.000	2890.000
GR	604.100	2910.000	603.900	2940.000	604.200	2960.000	604.200	3000.000	604.100	3020.000
GR	603.600	3050.000	604.000	3090.000	603.900	3120.000	604.200	3130.000	604.100	3150.000
GR	603.700	3160.000	604.500	3170.000	604.100	3180.000	604.300	3190.000	604.700	3200.000
GR	604.100	3210.000	604.300	3220.000	604.900	3230.000	603.600	3240.000	604.700	3260.000
GR	604.900	3270.000	605.400	3300.000	606.900	3310.000	611.400	3325.000	612.900	3330.000
GR	616.600	3355.000	614.000	3360.000	615.600	3365.000	616.700	3370.000	612.000	3384.000
GR	616.700	3400.000	617.000	3407.000	616.900	3414.000	615.300	3417.000	614.700	3442.000
GR	613.400	3450.000	613.900	3510.000	620.000	4625.000	630.000	4875.000	640.000	4925.000
GR	650.000	4975.000	660.000	5050.000	670.000	5130.000	670.000	5330.000	660.000	5530.000
GR	650.000	5680.000	640.000	6330.000	640.000	7030.000	650.000	7430.000	660.000	7730.000
GR	670.000	7980.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X1	4.100	0.0	0.0	0.0	500.000	500.000	500.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	2300.000	0.0	3875.000	0.0	0.0	0.0	0.0
NC	0.100	0.100	0.030	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.0	0.0	0.0	0.100	0.300	0.0	0.0	0.0	0.0	0.0

CROSS SECTION NO. 5

X1	5.000	47.000	2050.000	2453.000	6250.000	5500.000	6398.000	0.0	0.0	0.0
GR	680.000	0.0	650.000	50.000	640.000	100.000	630.000	250.000	620.000	800.000
GR	616.500	1750.000	617.300	1821.000	616.100	1850.000	613.800	1902.000	613.900	1950.000
GR	615.900	2011.000	618.800	2039.000	613.700	2050.000	611.700	2051.000	606.600	2060.000
GR	601.600	2190.000	602.400	2260.000	604.200	2320.000	603.900	2330.000	604.200	2340.000
GR	604.800	2350.000	607.000	2370.000	611.700	2388.000	613.100	2410.000	614.700	2420.000
GR	614.600	2436.000	617.600	2453.000	617.600	2468.000	614.000	2489.000	614.300	2500.000
GR	615.500	2511.000	614.600	2524.000	614.300	2583.000	619.600	2616.000	615.400	2699.000
GR	620.000	3300.000	630.000	3450.000	640.000	3650.000	650.000	4050.000	640.000	4750.000
GR	640.000	4950.000	650.000	5750.000	650.000	7050.000	660.000	7250.000	660.000	7950.000
GR	670.000	8750.000	680.000	9450.000	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.110	0.110	0.033	0.0	0.0	0.0	0.0	0.0	0.0	0.0

CROSS SECTION NO. 6

X1	6.000	46.000	2900.000	3242.000	5500.000	4500.000	6335.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	1300.000	0.0	4751.000	0.0	0.0	0.0	0.0
GR	660.000	0.0	660.000	150.000	650.000	250.000	640.000	400.000	630.000	850.000
GR	620.000	2500.000	617.700	2600.000	618.200	2630.000	617.700	2700.000	618.200	2733.000
GR	617.200	2770.000	617.100	2800.000	618.200	2831.000	618.600	2865.000	616.700	2900.000
GR	607.600	2905.000	605.300	2910.000	603.100	2920.000	602.600	2990.000	602.300	3030.000
GR	602.500	3040.000	602.400	3070.000	606.200	3120.000	606.300	3130.000	607.500	3150.000
GR	608.400	3160.000	607.900	3190.000	610.800	3210.000	611.600	3230.000	613.200	3242.000
GR	613.900	3265.000	611.500	3296.000	614.900	3323.000	615.300	3335.000	613.100	3362.000
GR	617.400	3410.000	615.500	3436.000	615.600	3550.000	620.000	4450.000	630.000	4900.000
GR	640.000	4950.000	650.000	4975.000	650.000	7700.000	660.000	7850.000	670.000	7925.000
GR	680.000	8300.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.090	0.100	0.030	0.0	0.0	0.0	0.0	0.0	0.0	0.0

CROSS SECTION NO. 7

CROSS SECTION NO. 2

X1	2.000	33.000	2121.000	2478.000	3150.000	3050.000	3650.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	793.000	0.0	0.0	0.0	0.0	0.0	0.0
GR	670.000	0.0	650.000	100.000	640.000	200.000	630.000	250.000	620.000	450.000
GR	615.800	1850.000	616.700	1919.000	615.800	1952.000	617.000	2050.000	619.800	2121.000
GR	613.600	2137.000	613.100	2144.000	611.800	2150.000	605.800	2160.000	602.800	2180.000
GR	601.700	2200.000	601.700	2250.000	599.500	2340.000	599.800	2350.000	599.500	2400.000
GR	601.100	2420.000	605.600	2450.000	613.500	2466.000	618.500	2478.000	616.100	2500.000
GR	617.600	2532.000	618.400	2593.000	623.900	2608.000	630.000	2766.000	630.000	3066.000
GR	640.000	3516.000	650.000	3766.000	670.000	3816.000	0.0	0.0	0.0	0.0
X1	2.100	0.0	0.0	0.0	2150.000	2150.000	2150.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	1360.000	0.0	4171.000	0.0	0.0	0.0	0.0
NC	0.0	0.0	0.0	0.300	0.500	0.0	0.0	0.0	0.0	0.0
NC	0.090	0.100	0.030	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X1	3.000	66.000	2850.000	3325.000	3100.000	2800.000	3263.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	2838.000	0.0	4303.000	0.0	0.0	0.0	0.0
GR	670.000	0.0	660.000	150.000	660.000	1300.000	670.000	1500.000	660.000	1670.000
GR	650.000	1850.000	640.000	2000.000	630.000	2200.000	616.300	2550.000	617.300	2835.000
GR	613.100	2850.000	611.000	2854.000	606.200	2860.000	605.000	2880.000	605.000	2890.000
GR	604.100	2910.000	603.900	2940.000	604.200	2960.000	604.200	3000.000	604.100	3020.000
GR	603.600	3050.000	604.000	3090.000	603.900	3120.000	604.200	3130.000	604.100	3150.000
GR	603.700	3160.000	604.500	3170.000	604.100	3180.000	604.300	3190.000	604.700	3200.000
GR	604.100	3210.000	604.300	3220.000	604.900	3230.000	603.600	3240.000	604.700	3260.000
GR	604.900	3270.000	605.400	3300.000	606.900	3310.000	611.400	3325.000	612.900	3330.000
GR	616.600	3355.000	614.000	3360.000	615.600	3365.000	616.700	3370.000	612.000	3384.000
GR	616.700	3400.000	617.000	3407.000	616.900	3414.000	615.300	3417.000	614.700	3442.000
GR	613.400	3450.000	613.900	3510.000	620.000	4625.000	630.000	4875.000	640.000	4925.000
GR	650.000	4975.000	660.000	5050.000	670.000	5130.000	670.000	5330.000	660.000	5530.000
GR	650.000	5680.000	640.000	6330.000	640.000	7030.000	650.000	7430.000	660.000	7730.000
GR	670.000	7980.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

1 FT DOWNSTREAM OF KNAPP ROAD BRIDGE

X1	3.100	36.000	1300.000	1851.000	49.000	49.000	49.000	0.930	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	2849.000	0.0	630.000	620.000	0.0
GR	660.000	0.0	650.000	200.000	640.000	430.000	630.000	600.000	633.000	1300.000
GR	624.200	1300.000	624.200	1304.000	605.600	1350.000	603.100	1370.000	601.900	1400.000
GR	599.300	1413.000	599.500	1420.000	599.500	1420.000	599.000	1425.000	603.100	1430.000
GR	604.600	1490.000	604.100	1520.000	602.000	1525.000	603.000	1530.000	604.700	1630.000
GR	602.000	1635.000	603.000	1640.000	605.100	1650.000	605.100	1670.000	604.700	1680.000
GR	605.300	1710.000	605.000	1750.000	605.000	1755.000	605.500	1780.000	608.000	1810.000
GR	623.700	1846.000	624.100	1851.000	626.700	1851.000	620.000	2100.000	630.000	3150.000
GR	640.000	3550.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NH	3.000	0.100	1300.000	0.015	1851.000	0.100	3550.000	0.0	0.0	0.0
X1	3.110	0.0	0.0	0.0	1.000	1.000	1.000	0.930	0.0	0.0
X2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.930	0.0
BT	25.000	0.0	660.000	0.0	200.000	650.000	0.0	430.000	640.000	0.0
BT	600.000	630.000	0.0	1300.000	633.000	626.700	1420.000	633.700	626.700	1420.000
BT	633.700	599.500	1425.000	633.700	599.000	1425.000	633.700	626.700	1525.000	634.700
BT	626.700	1525.000	634.700	602.000	1530.000	634.700	603.000	1530.000	634.700	626.700
BT	1635.000	634.700	626.700	1635.000	634.700	602.000	1640.000	634.700	603.000	1640.000
BT	634.700	626.700	1750.000	634.700	626.700	1750.000	634.700	605.000	1755.000	634.700
BT	605.000	1755.000	634.700	626.700	1851.000	633.900	626.700	2100.000	620.000	0.0
BT	3150.000	630.000	0.0	3550.000	640.000	0.0	0.0	0.0	0.0	0.0
X1	3.190	0.0	0.0	0.0	44.000	44.000	44.000	0.0	0.0	0.0
X2	0.0	0.0	0.0	0.0	0.0	0.0	1.000	0.0	0.0	0.0

THIS RUN EXECUTED 01/17/79

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  HEC2 RELEASE DATED NOV 76 UPDATED  AUG1977
  ERROR CORR -  01.02
  MODIFICATION -  50.51.52.53
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C
T1      ADA TOWNSHIP HUD1 62-0104-009
T2      10-YEAR FLOOD
T3      GRAND RIVER, KENT COUNTY, MICHIGAN.
J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ
        0.      2.        0.        0.  0.0           0.0       0.0        0.   621.460     0.0
J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE
    1.000       0.0    -1.000       0.0       0.0       0.0       0.0       0.0       0.0       0.0
J3  VARIABLE CODES FOR SUMMARY PRINTOUT
  150.000   201.000       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
J5  LPRNT     NUMSEC                    ********REQUESTED SECTION NUMBERS********
  -10.000   -10.000       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
NC    0.080     0.100     0.030     0.100     0.300       0.0       0.0       0.0       0.0       0.0
OT    4.000 30800.000 44900.000 51400.000 69200.000       0.0       0.0       0.0       0.0       0.0

                CANNON-ADA TOWNSHIP LINE
                STARTING ELEVATIONS FROM FIS OF PLAINFIELD TWP
                REC INT(YEARS)  FLOW(CFS)  ELEVATION
                10              30800      621.46
                50              44900      624.70
                100             51400      626.04
                500             72700      629.61

X1      1.000    56.000   980.000  1370.000       0.0       0.0       0.0       0.0       0.0       0.0
X3        0.0       0.0       0.0   600.000       0.0  2600.000       0.0       0.0       0.0       0.0
GR    644.800       0.0   644.200    10.000   640.100    30.000   638.000   100.000   633.100   200.000
GR    629.000   300.000   620.800   400.000   617.000   500.000   614.600   600.000   613.700   700.000
GR    614.700   800.000   614.600   900.000   615.100   980.000   611.700   980.000   608.900   990.000
GR    599.900  1010.000   598.200  1020.000   598.200  1040.000   598.900  1070.000   600.700  1090.000
GR    601.000  1100.000   601.000  1110.000   601.700  1130.000   601.600  1140.000   601.900  1170.000
GR    602.500  1190.000   602.500  1200.000   602.800  1210.000   603.000  1220.000   603.500  1230.000
GR    603.700  1240.000   603.700  1250.000   603.900  1260.000   604.200  1270.000   604.700  1280.000
GR    605.200  1300.000   605.700  1310.000   605.700  1320.000   606.200  1330.000   608.900  1350.000
GR    612.700  1360.000   614.300  1370.000   614.300  1400.000   612.600  1425.000   611.700  1500.000
GR    611.500  1600.000   612.600  1620.000   612.800  1700.000   613.200  1800.000   613.000  1900.000
GR    612.500  1960.000   611.300  2000.000   609.900  2100.000   612.500  2500.000   627.000  2700.000
GR    640.000  2780.000       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
NC      0.100     0.080     0.030       0.0       0.0       0.0       0.0       0.0       0.0       0.0
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GRAND
RIVER

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NC
X1    0.0      45.0     800.0    1090.0
GR  590.2     100.0     588.5     300.0     590.0     350.0     590.8     400.0     587.4     450.0
GR  587.0     500.0     591.0     540.0     586.9     550.0     586.5     581.0     584.0     583.0
GR  583.4     590.0     584.0     600.0     583.4     611.0     584.5     620.0     589.0     650.0
GR  583.0     680.0     587.0     700.0     586.5     730.0     588.0     750.0     588.1     780.0
GR  589.3     800.0     583.0     820.0     583.0     830.0     580.0     860.0     576.0     900.0
GR  575.5     920.0     575.8     935.0     575.3     950.0     576.0     960.0     575.1     970.0
GR  577.0    1000.0     580.5    1020.0     580.8    1030.0     588.0    1045.0     592.2    1090.0
GR  591.5    1110.0     588.2    1120.0     588.7    1160.0     591.5    1175.0     593.0    1200.0
GR  592.6    1325.0     590.0    1450.0     589.0    1500.0     589.0    1550.0     591.0    1750.0
NC
X1    0.5      37.0     500.0     830.0    2750.0    1600.0    2300.0
GR  607.0     120.0     589.5     160.0     587.8     200.0     590.0     270.0     591.5     350.0
GR  591.1     400.0     588.0     420.0     588.5     450.0     591.5     475.0     590.8     500.0
GR  583.0     520.0     578.0     530.0     577.0     540.0     576.8     560.0     577.0     570.0
GR  576.4     580.0     576.8     630.0     577.8     650.0     578.0     680.0     578.2     700.0
GR  579.0     750.0     579.8     780.0     584.0     782.0     588.0     810.0     594.5     830.0
GR  591.5     850.0     595.2     875.0     593.0     900.0     594.5    1000.0     594.0    1020.0
GR  589.0    1030.0     588.0    1050.0     587.0    1100.0     586.5    1150.0     586.7    1200.0
GR  586.0    1300.0     586.5    1400.0
NC
X1    0.8      55.0     370.0     864.0    2550.0    2050.0    1938.0
GR  609.2      50.0     609.6     150.0     610.2     250.0     611.0     370.0     592.7     370.0
GR  592.7     390.0     592.4     410.0     590.2     415.0     586.1     420.0     586.2     460.0
GR  586.7     474.0     583.2     500.0     580.0     530.0     580.2     545.0     578.2     564.0
GR  579.0     579.0     579.2     590.0     579.7     618.0     581.1     624.0     580.2     634.0
GR  580.2     660.0     578.2     708.0     573.9     738.0     575.6     775.0     575.2     785.0
GR  575.6     794.0     573.8     815.0     575.2     820.0     575.6     839.0     580.6     855.0
GR  591.4     864.0     590.2     885.0     593.2     920.0     611.3     920.0     611.3     950.0
GR  609.5     975.0     610.2    1000.0     610.0    1050.0     609.7    1100.0     609.2    1200.0
GR  609.1    1300.0     608.1    1500.0     607.2    1700.0     606.0    1704.0     604.2    1750.0
GR  597.0    1800.0     596.0    1850.0     592.2    1900.0     591.1    1950.0     590.8    2000.0
GR  588.6    2050.0     589.2    2100.0     589.6    2150.0     592.2    2210.0     605.0    2248.0
NC
X1    0.9      65.0     370.0     864.0      49.0      49.0      49.0
X3   10.0                                                     610.3     610.3
GR  610.0     100.0     611.0     250.0     612.1     370.0     593.5     370.0     593.4     390.0
GR  593.1     410.0     590.9     415.0     586.8     420.0     587.0     425.0     587.0     430.0
GR  585.9     460.0     587.4     474.0     585.0     495.0     584.5     500.0     580.7     530.0
GR  580.9     545.0     578.9     564.0     579.3     570.0     579.7     575.0     579.7     579.0
GR  579.9     590.6     580.4     618.0     581.8     624.0     580.9     634.0     581.0     645.0
GR  581.0     650.0     580.9     660.0     578.9     708.0     576.0     720.0     575.0     725.0
GR  574.6     738.0     576.3     775.0     575.9     785.0     576.5     795.0     576.0     800.0
GR  574.5     815.0     575.9     820.0     576.3     839.0     592.0     870.0     592.0     875.0
GR  581.3     855.0     592.1     864.0     590.9     885.0     593.9     920.0     612.1     920.0
GR  612.1     950.0     610.3     975.0     611.0    1000.0     610.8    1050.0     610.5    1100.0
GR  610.0    1200.0     609.9    1300.0     608.9    1500.0     608.0    1700.0     606.8    1704.0
GR  605.0    1750.0     597.8    1800.0     596.8    1850.0     593.0    1900.0     591.9    1950.0
GR  591.6    2000.0     589.4    2050.0     590.0    2100.0     590.4    2150.0     605.0    2248.0
SB
NC
X1    1.0       0.0                         44.0      44.0      44.0
X2                       1.0     610.3     610.3
X3   10.0                                                     612.1     612.1
BT   36.0     250.0     611.0     611.0     370.0     612.1     612.1     370.0     612.1     610.3
BT  425.0     612.1     610.3     425.0     612.1     587.0     430.0     612.1     587.0     430.0
BT  612.1     610.3     495.0     612.1     610.3     495.0     612.1     585.0     500.0     612.1
BT  584.5     500.0     612.1     610.3     570.0     612.1     610.3     570.0     612.1     579.3
BT  575.0     612.1     579.7     575.0     612.1     610.3     645.0     612.1     610.3     645.0
BT  612.1     581.0     650.0     612.1     581.0     650.0     612.1     610.3     720.0     612.1
BT  610.3     720.0     612.1     576.0     725.0     612.1     575.5     725.0     612.1     610.3
BT  795.0     612.1     610.3     795.0     612.1     576.5     800.0     612.1     576.0     800.0
BT  612.1     610.3     870.0     612.1     610.3     870.0     612.1     592.0     875.0     612.1
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BT 592.0   875.0   612.1   610.3   920.0   612.1   610.3   920.0   612.1   612.1
BT 950.0   612.1   612.1   975.0   610.3   610.3  1000.0   611.0   611.0
NC
X1   2.0    72.0  1060.0  1600.0   443.0   643.0   655.0
GR 608.0     0.0   608.4    50.0   607.0   100.0   607.3   130.0   607.0   150.0
GR 606.8   190.0   600.0   220.0   596.8   285.0   586.4   300.0   587.0   350.0
GR 587.4   400.0   587.3   450.0   587.2   540.0   587.6   550.0   587.6   550.0
GR 588.0   630.0   588.0   650.0   586.8   655.0   594.7   675.0   594.0   700.0
GR 595.0   750.0   590.8   850.0   592.0   900.0   588.8   950.0   589.7  1003.0
GR 589.3  1007.0   593.0  1015.0   593.7  1050.0   595.0  1060.0   595.0  1090.0
GR 588.7  1108.0   588.7  1140.0   589.0  1150.0   589.5  1190.0   585.0  1190.0
GR 584.0  1193.0   579.8  1200.0   579.8  1270.0   581.0  1300.0   581.0  1320.0
GR 581.6  1330.0   581.6  1360.0   579.0  1380.0   577.3  1410.0   577.1  1420.0
GR 577.5  1450.0   577.0  1460.0   577.6  1485.0   578.5  1497.0   578.5  1520.0
GR 585.0  1535.0   595.2  1575.0   596.0  1600.0   596.0  1700.0   605.0  1750.0
GR 607.2  1770.0   607.4  1800.0   594.7  1855.0   591.0  1900.0   590.8  1930.0
GR 590.3  1940.0   590.3  2000.0   588.0  2100.0   588.0  2260.0   591.7  2396.0
GR 591.7  2445.0   590.0  2500.0   591.6  2650.0   595.0  2700.0   600.6  2790.0
GR 603.0  2860.0   608.9  2940.0
NC
X1   3.0    55.0  1420.0  1900.0  4500.0  4600.0  4450.0
GR 589.5   100.0   589.0   200.0   590.0   250.0   589.0   289.0   588.8   350.0
GR 589.0   420.0   589.0   450.0   588.6   550.0   592.0   600.0   592.3   650.0
GR 589.0   700.0   589.0   750.0   592.0   850.0   592.0   870.0   593.5   950.0
GR 589.0  1200.0   590.0  1245.0   594.3  1300.0   590.5  1350.0   589.5  1375.0
GR 598.2  1390.0   598.8  1400.0   598.5  1415.0   600.0  1420.0   598.0  1440.0
GR 597.0  1441.0   588.5  1480.0   588.0  1490.0   585.0  1490.0   582.2  1515.0
GR 580.0  1550.0   579.7  1570.0   580.0  1587.0   579.0  1600.0   579.0  1620.0
GR 578.0  1635.0   578.0  1650.0   576.7  1665.0   576.0  1695.0   575.0  1701.0
GR 575.0  1718.0   577.0  1735.0   580.0  1743.0   588.0  1780.0   590.0  1780.0
GR 590.6  1790.0   595.0  1850.0   591.0  1860.0   615.0  1900.0   616.0  1960.0
NC
X1   4.0    47.0  1270.0  1500.0  6000.0  6550.0  6510.0
GR 594.5     0.0   595.7    50.0   592.7   100.0   592.0   150.0   591.7   200.0
GR 592.0   250.0   591.4   290.0   591.4   700.0   594.0   750.0   594.4   800.0
GR 593.4   850.0   593.4   900.0   597.4  1000.0   597.7  1050.0   599.5  1100.0
GR 599.0  1110.0   600.3  1135.0   589.8  1155.0   587.9  1180.0   586.5  1200.0
GR  86.9  1225.0   593.2  1270.0   583.0  1310.0   576.3  1335.0   576.8  1360.0
GR 575.7  1368.0   576.0  1395.0   577.5  1410.0   577.5  1435.0   580.0  1460.0
GR 591.5  1500.0   589.9  1550.0   589.9  1565.0   595.6  1635.0   595.6  1650.0
GR 588.6  17  .0   587.7  1750.0   593.3  1800.0   596.7  1850.0   599.5  1870.0
GR 599.8  19  .0   596.8  1930.0   596.8  1970.0   598.6  2100.0   600.0  2130.0
GR 613.0  2150.0   614.5  2200.0
NC
X1  39.0    51.0  1930.0  2570.0  3600.0
GR 631.2   500.0   622.8   750.0   622.0   800.0   620.0   840.0   615.0   990.0
GR 615.0  1050.0   616.2  1100.0   614.0  1180.0   614.0  1320.0   613.6  1350.0
GR 610.7  1450.0   610.3  1480.0   611.0  1540.0   611.0  1750.0   612.8  1800.0
GR 606.0  1930.0   600.1  1930.0   599.9  1940.2   595.8  1940.9   595.8  1970.0
GR 594.5  1980.0   596.5  2000.0   596.4  2010.0   600.0  2070.0   600.6  2120.0
GR 600.0  2130.0   601.0  2150.0   600.0  2160.0   601.0  2200.0   600.8  2210.0
GR 601.2  2230.0   600.9  2250.0   601.0  2260.0   600.5  2280.0   601.0  2290.0
GR 600.6  2320.0   600.9  2340.0   599.5  2390.0   599.9  2420.0   599.5  2440.0
GR 598.7  2450.0   598.0  2480.0   599.0  2490.0   597.5  2520.0   599.0  2550.0
GR 605.0  2570.0   611.0  2570.0   610.0  2590.0   610.0    50.0   613.4  2750.0
GR 618.7  2800.0
NC
X1  40.0    38.0  1850.0  2730.0  2550.0  2500.0  2750.0
GR 611.6   750.0   610.5   820.0   611.4  1000.0   611.0  1110.0   609.6  1250.0
GR 609.4  1400.0   610.3  1550.0   611.0  1640.0   610.8  1780.0   610.2  1850.0
GR 610.8  1900.0   609.3  2000.0   610.0  2070.0   610.0  2140.0   604.5  2210.0
GR 604.5  2230.0   603.3  2290.0   600.0  2390.0   598.2  2410.0   598.2  2430.0
GR 597.5  2440.5   596.8  2450.0   596.7  2480.0   597.0  2500.5   596.5  2520.0
GR 596.8  2540.0   596.8  2560.0   597.1  2580.0   597.1  2610.0   598.0  2620.0
GR 598.0  2650.0   598.6  2670.0   598.0  2690.0   603.0  2720.0   604.0  2730.0
GR 609.0  2730.0   611.0  2750.0   613.0  2770.0
NC
X1  40.1    42.0   500.0  1300.0  3700.0  4100.0  3950.0
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GR 635.0   100.0   634.0   150.0   630.0   200.0   626.0   210.0   624.0   250.0
GR 621.0   300.0   621.0   310.0   612.0   500.0   608.9   600.0   608.9   620.0
GR 608.5   630.5   599.3   680.5   599.3   710.0   597.6   730.0   600.0   760.0
GR 600.0   820.0   598.9   850.0   599.8   950.0   599.0   960.0   599.0  1010.0
GR 600.0  1050.0   600.0  1070.0   600.5  1080.0   599.5  1130.0   600.1  1150.0
GR 601.0  1200.0   601.0  1230.0   601.5  1240.0   601.5  1250.0   601.5  1250.0
GR 600.5  1280.0   612.0  1300.0   615.0  1330.0   616.2  1400.0   614.0  1510.0
GR 614.0  1640.0   613.3  1670.0   613.7  1700.0   613.5  1725.0   614.5  1750.0
GR 614.0  1800.0   613.5  2000.0
X1  40.2     60.0   110.0   920.0    50.0    50.0    50.0
X3  10.0                                              623.6   623.6
GR 637.6   110.0   623.6   150.0   607.5   180.0   604.0   210.0   604.0   240.0
GR 599.5   260.0   623.6   260.0   623.6   265.0   599.0   265.0   599.0   267.0
GR 599.5   270.0   597.5   290.0   597.5   310.0   597.0   320.0   598.0   340.0
GR 598.3   370.0   598.0   380.0   599.2   385.0   623.6   385.0   623.6   390.0
GR 599.2   390.0   599.1   398.8   599.1   399.5   598.0   400.0   598.4   410.0
GR 598.0   420.0   598.6   430.0   599.3   500.0   597.7   510.0   599.5   515.0
GR 623.6   515.0   623.6   520.0   599.5   520.0   599.7   522.0   598.8   530.0
GR 599.5   550.0   599.6   570.0   600.1   600.0   600.1   630.0   599.3   640.0
GR 599.0   645.0   623.6   645.0   623.6   650.0   599.0   650.0   599.3   660.0
GR 600.1   680.0   600.0   690.0   601.0   750.0   599.3   770.0   599.0   775.0
GR 623.6   775.0   623.6   780.0   599.0   780.0   599.3   777.0   601.0   790.0
GR 606.0   800.0   610.5   823.0   611.8   865.0   623.6   885.0   637.6   920.0
SB
X1  40.3     0.0                    24.0    24.0    24.0
X2                  1.0   623.6   637.6
X3  10.0                                              637.6   637.6
BT   4.0   110.0   637.6   637.6   150.0   637.6   623.6   885.0   637.6   623.6
BT 920.0   637.6   637.6
X1  40.4     0.0                   100.0   100.0   100.0
X3  10.0                                              623.6   637.6
SB
X1  40.5     0.0                    24.0    24.0    24.0
X2                  1.0   623.6   637.6
X3  10.0                                              637.6   637.6
BT   4.0   110.0   637.6   637.6   150.0   637.6   623.6   885.0   637.6   623.6
BT 920.0   637.6   637.6
NC
X1  41.0    47.0   250.0  1000.0    50.0    50.0    50.0
GR 620.5     0.0   613.7   100.0   612.0   150.0   614.5   200.0   613.7   250.0
GR 605.0   335.0   598.5   365.0   596.5   405.0   597.5   415.0   597.5   430.0
GR 598.5   435.0   598.1   450.0   598.5   465.0   598.2   480.0   598.5   485.0
GR 598.8   490.0   599.2   525.0   599.2   535.0   598.5   575.0   598.3   580.0
GR 598.6   610.0   599.0   650.0   598.4   680.0   598.5   710.0   599.2   710.0
GR 599.2   720.0   600.3   750.0   599.0   795.0   600.0   820.0   599.6   825.0
GR 600.3   870.0   600.1   800.0   600.6   900.0   600.6   920.0   602.0   930.0
GR 607.0   940.0   613.5  1000.0   616.0  1090.0   616.2  1130.0   612.0  1180.0
GR 609.9  1370.0   609.3  1580.0   611.0  1770.0   611.0  1880.0   613.5  1935.0
GR 617.5  1950.0   618.5  2000.0
NC
X1  42.0    70.0  1973.0  2570.0   400.0   648.0   548.0
X3  10.0                                              620.0   620.0
GR 618.8   100.0   617.5   150.0   617.2   250.0   616.5   300.0   615.7   550.0
GR 617.0  1100.0   618.8  1600.0   620.8  1900.0   622.8  1973.0   604.6  1973.0
GR 604.6  1980.0   594.5  2010.0   594.5  2035.0   596.0  2055.0   600.5  2065.0
GR 606.0  2080.0   606.0  2090.0   620.0  2090.0   620.0  2095.0   606.0  2095.0
GR 598.0  2110.0   594.0  2130.0   601.5  2165.0   602.0  2185.0   600.6  2195.0
GR 606.5  2210.0   620.0  2210.0   620.0  2215.0   606.5  2215.0   606.5  2220.0
GR 596.0  2233.0   596.0  2248.0   597.5  2255.0   596.5  2265.0   600.0  2270.0
GR 602.5  2285.0   601.5  2295.0   598.5  2305.0   600.0  2315.0   606.5  2320.0
GR 606.5  2328.0   620.0  2328.0   620.0  2333.0   606.5  2333.0   605.0  2340.0
GR 600.0  2340.0   598.2  2344.0   598.2  2356.0   600.0  2360.0   602.3  2365.0
GR 602.0  2395.0   599.6  2405.0   599.1  2420.0   599.9  2435.0   607.5  2445.0
GR 620.0  2445.0   620.0  2450.0   607.5  2450.0   603.0  2460.0   602.0  2475.0
GR 599.0  2500.0   595.0  2525.0   596.0  2540.0   604.5  2560.0   604.5  2570.0
GR 622.6  2570.0   622.3  2620.0   621.0  2750.0   620.8  2800.0   622.8  2900.0
SB
X1  42.1     0.0                    24.0    24.0    24.0
```

X2			1.0	620.0	620.3					
X3	10.0							622.8	622.8	
BT	7.0	1900.0	620.8	620.8	1973.0	622.8	622.8	1973.0	622.8	620.0
BT	2570.0	622.8	620.0	2570.0	622.8	622.8	2620.0	622.3	622.3	2750.0
BT	621.0	621.0								
NC										
X1	43.0	79.0	1500.0	2040.0	3400.0	2900.0	3048.0			
GR	611.0	1100.0	610.8	1190.0	611.0	1220.0	611.2	1250.0	611.0	1350.0
GR	610.8	1400.0	611.4	1450.0	611.4	1500.0	611.0	1510.0	605.0	1525.0
GR	601.0	1540.0	601.0	1558.0	601.0	1580.0	601.0	1600.0	600.3	1670.0
GR	600.0	1680.0	600.0	1700.0	599.9	1710.0	599.4	1730.0	599.4	1750.0
GR	599.0	1770.0	599.0	1800.0	599.3	1820.0	599.0	1830.0	599.0	1860.0
GR	598.0	1870.0	598.0	1900.0	597.0	1930.0	597.9	1940.0	597.9	1990.0
GR	598.7	2000.0	599.4	2010.0	599.2	2020.0	601.0	2023.0	602.0	2024.0
GR	603.0	2026.0	604.0	2029.0	604.7	2030.0	606.7	2040.0	604.7	2050.0
GR	604.7	2105.0	606.0	2110.0	607.0	2114.0	609.0	2120.0	610.0	2130.0
GR	611.3	2150.0	612.0	2175.0	612.0	2190.0	612.4	2200.0	613.0	2210.0
GR	613.0	2280.0	612.6	2300.0	612.0	2335.0	612.0	2400.0	611.7	2435.0
GR	611.4	2450.0	610.9	2480.0	610.9	2530.0	611.0	2540.0	611.0	2570.0
GR	610.5	2610.0	610.0	2640.0	610.5	2660.0	611.0	2670.0	612.0	2700.0
GR	612.7	2720.0	614.4	2800.0	616.4	2900.0	617.0	2950.0	615.0	3080.0
GR	616.6	3200.0	617.2	3300.0	618.0	3350.0	617.2	3400.0	622.0	3450.0
GR	622.2	3500.0	623.3	3550.0	622.7	3600.0	624.0	3650.0		
NC										
X1	44.0	43.0	2125.0	2710.0	2800.0	4100.0	3300.0			
GR	647.0	20.0	639.0	50.0	633.0	100.0	629.0	200.0	628.5	250.0
GR	623.0	350.0	621.4	450.0	618.8	500.0	619.0	550.0	615.5	600.0
GR	615.0	700.0	612.0	850.0	613.0	900.0	613.0	1400.0	612.3	1500.0
GR	613.0	1600.0	615.5	1650.0	608.5	1800.5	609.0	1850.0	609.8	1950.0
GR	612.0	2000.0	613.0	2100.0	613.8	2125.0	600.0	2200.0	601.0	2460.0
GR	600.0	2660.0	612.0	2710.0	612.0	2865.0	609.0	2880.0	609.0	3150.0
GR	610.0	3200.0	610.0	3240.0	609.0	3270.0	609.0	3350.0	611.0	3365.0
GR	614.0	3500.0	616.0	3550.0	621.5	3700.0	621.5	3820.0	623.0	3850.0
GR	625.0	3900.0	627.5	3950.0	628.7	4000.0				
NC										
X1	45.0	80.0	2965.0	3570.0	7250.0	7200.0	7400.0			
GR	623.0	0.0	622.8	20.0	618.0	40.0	615.5	100.0	614.8	250.0
GR	614.2	300.0	615.4	350.0	615.0	400.0	615.0	600.0	614.8	640.0
GR	614.2	700.0	612.5	850.0	611.0	863.0	610.0	867.0	611.0	870.0
GR	612.5	900.0	613.0	940.0	613.0	990.0	612.6	1060.0	614.0	1100.0
GR	614.0	1250.0	615.2	1290.0	616.0	1315.0	617.5	1400.0	617.6	1490.0
GR	617.0	1550.0	614.8	1590.0	614.8	1600.0	618.0	1645.0	616.0	1685.0
GR	616.0	1700.0	618.9	1800.0	615.5	1865.0	618.0	1900.0	620.8	1950.0
GR	618.9	2000.0	615.0	2050.0	612.7	2100.0	610.6	2140.0	610.3	2230.0
GR	610.8	2250.0	612.0	2350.0	613.0	2450.0	613.0	2490.0	612.8	2520.0
GR	613.5	2600.0	614.5	2700.0	613.5	2750.0	611.0	2760.0	610.0	2800.0
GR	611.0	2850.0	613.9	2900.0	616.0	2965.0	614.0	2980.0	605.0	2995.0
GR	603.0	3000.0	600.6	3020.0	600.6	3030.0	601.5	3040.0	601.4	3070.0
GR	601.0	3080.0	601.6	3090.0	601.0	3110.0	601.2	3130.0	600.5	3160.0
GR	601.0	3170.0	600.0	3285.0	601.7	3300.0	601.5	3350.0	601.5	3380.0
GR	600.5	3430.0	602.0	3480.0	602.0	3530.0	605.0	3550.0	611.0	3570.0
GR	611.0	3600.0	613.0	3650.0	615.0	3753.0	622.2	3770.0	623.0	3780.0
X1	46.0	63.0	1920.0	2548.0	6900.0	10100.0	8900.0			
GR	646.0	00.0	645.0	10.0	647.0	20.0	617.8	450.0	617.0	500.0
GR	616.0	550.0	615.0	610.0	613.0	700.0	613.0	730.0	612.8	740.0
GR	612.0	800.0	612.0	1020.0	613.5	1100.0	613.0	1160.0	613.0	1210.0
GR	612.8	1220.0	612.8	1310.0	612.0	1320.0	612.0	1370.0	613.0	1400.0
GR	613.0	1470.0	612.0	1500.0	612.0	1610.0	612.8	1650.0	612.2	1660.0
GR	612.2	1790.0	615.5	1850.0	615.0	1890.0	613.5	1920.0	605.7	1930.0
GR	602.7	2080.0	602.7	2240.0	603.0	2250.0	603.0	2340.0	602.7	2350.0
GR	602.7	2370.0	602.0	2380.0	602.0	2410.0	601.0	2430.0	601.5	2440.0
GR	600.0	2460.0	600.5	2470.0	600.5	2480.0	599.4	2500.0	599.4	2520.0
GR	605.0	2540.0	614.0	2548.0	615.0	2570.0	615.0	2730.0	615.9	2740.0
GR	615.9	2850.0	616.0	2860.0	616.0	2900.0	616.5	2910.0	617.0	3000.0
GR	617.0	3020.0	618.0	3050.0	621.0	3080.0				
NC										
X1	47.0	80.0	1180.0	1600.0	7000.0	4900.0	5700.0			
GR	626.0	200.0	623.0	250.0	622.9	300.0	621.1	330.0	621.0	340.0

GR	621.0	440.0	621.5	450.0	621.5	550.0	621.0	560.0	621.0	750.0
GR	619.0	800.0	618.0	850.0	618.0	950.0	617.0	1000.0	616.0	1050.0
GR	615.0	1140.0	615.9	1180.0	613.5	1200.0	610.0	1205.0	605.5	1210.0
GR	604.0	1220.0	603.0	1230.0	602.0	1250.0	601.0	1290.0	600.0	1320.0
GR	600.0	1370.0	601.0	1380.0	601.0	1420.0	602.5	1450.0	602.0	1460.0
GR	604.0	1480.0	604.0	1520.0	605.0	1530.0	605.0	1570.0	610.0	1600.0
GR	609.0	1620.0	612.0	1635.0	612.0	1650.0	608.0	1690.0	608.0	1730.0
GR	612.0	1735.0	613.0	1750.0	615.0	1850.0	614.0	1875.0	612.9	1880.0
GR	611.0	1990.0	611.0	2000.0	611.0	2100.0	609.0	2150.0	610.0	2210.0
GR	610.0	2215.0	612.5	2220.0	611.0	2250.0	611.0	2350.0	612.5	2400.0
GR	613.0	2420.0	613.0	2500.0	612.0	2550.0	613.0	2600.0	613.0	2650.0
GR	614.5	2700.0	613.0	2800.0	613.0	3000.0	614.0	3050.0	613.0	3150.0
GR	616.0	3200.0	616.0	3350.0	614.0	3400.0	613.0	3450.0	613.0	3500.0
GR	615.0	3550.0	617.0	3600.0	618.4	3650.0	618.4	3750.0	617.0	3810.0
GR	619.0	3850.0	620.0	3860.0	620.0	3990.0	620.3	4000.0	621.0	4500.0
NC										
X1	48.0	33.0	2050.0	2530.0	3950.0	4600.0	4350.0			
GR	622.0	100.0	618.0	300.0	618.0	350.0	615.0	470.0	614.0	530.0
GR	614.0	600.0	614.5	602.0	614.0	610.0	614.0	740.0	613.0	770.0
GR	613.0	820.0	616.5	885.0	615.0	920.0	611.0	1050.0	611.0	1400.0
GR	612.0	1450.0	611.0	1500.0	611.0	1620.0	610.0	1640.0	610.0	1670.0
GR	611.0	1700.0	611.0	1850.0	617.7	2050.0	605.7	2080.0	598.9	2240.0
GR	603.0	2370.0	603.0	2420.0	604.0	2450.0	604.0	2480.0	618.6	2530.0
GR	618.6	2600.0	622.0	2670.0	625.0	2685.0				
NC										
X1	48.98	45.0	1500.0	1911.0	56.0	56.0	56.0			
X3	10.0							621.3	621.3	
GR	623.9	1100.0	624.0	1200.0	624.6	1300.0	625.4	1400.0	626.8	1500.0
GR	613.0	1505.0	611.0	1520.0	606.1	1540.0	602.0	1550.0	621.3	1550.0
GR	621.3	1555.0	600.7	1556.0	602.4	1600.0	601.1	1630.0	621.3	1630.0
GR	621.3	1635.0	601.1	1635.0	601.1	1637.0	598.0	1690.0	598.7	1700.0
GR	597.3	171..0	621.3	1710.0	621.3	1715.0	597.3	1715.0	597.8	1750.0
GR	600.3	1770.0	599.0	1790.0	621.3	1790.0	621.3	1795.0	599.0	1795.0
GR	601.8	1800.0	600.0	1830.0	599.2	1839.0	600.0	1850.0	601.8	1860.0
GR	601.9	1870.0	621.3	1870.0	621.3	1875.0	602.0	1875.0	603.0	1880.0
GR	605.0	1893.0	609.0	1910.0	626.8	1910.0	626.0	2000.0	626.0	2040.0
NC										
SB										
X1	49.0	0.0			1.0	1.0	1.0			
X2			1.0	621.3	625.4					
X3								626.8	626.8	
BT	4.0	1500.0	626.8	626.8	1500.0	626.8	621.3	1910.0	626.8	621.3
BT	1910.0	626.8	626.8							
NC										
X1	50.0	28.0	900.0	1400.0	65.0	65.0	65.0			
GR	627.9	170.0	613.0	200.0	612.0	250.0	609.5	300.0	610.0	350.0
GR	613.7	400.0	615.0	450.0	615.0	500.0	613.6	550.0	614.2	600.0
GR	611.8	650.0	613.0	700.0	610.0	730.0	610.0	750.0	615.4	800.0
GR	616.6	830.0	616.6	900.0	606.0	930.0	603.6	1010.0	599.5	1110.0
GR	597.8	1150.0	600.0	1220.0	600.0	1250.0	600.8	1270.0	601.9	1290.0
GR	611.0	1350.0	622.8	1400.0	623.0	1420.0				
NC										
X1	51.0	58.0	1035.0	1560.0	4350.0	5750.0	5050.0			
GR	625.4	100.0	620.5	130.0	615.0	310.0	613.0	350.0	612.0	400.0
GR	613.0	470.0	613.0	600.0	613.5	610.0	613.5	660.0	614.0	670.0
GR	614.0	720.0	615.0	770.0	615.0	820.0	615.7	850.0	618.8	950.0
GR	618.0	1000.0	618.9	1035.0	603.0	1070.0	603.0	1110.0	602.0	1140.0
GR	603.0	1150.0	602.0	1180.0	602.0	1200.0	602.8	1210.0	602.0	1220.0
GR	602.0	1250.0	602.8	1260.0	601.7	1280.0	602.0	1290.0	602.0	1340.0
GR	601.8	1350.0	601.8	1470.0	602.8	1490.0	602.8	1510.0	615.8	1550.0
GR	616.8	1600.0	617.4	1650.0	615.0	1700.0	615.0	1800.0	612.0	1850.0
GR	612.0	1900.0	611.0	1940.0	611.0	2230.0	611.5	2240.0	611.5	2410.0
GR	612.0	2420.0	612.0	2770.0	613.0	2810.0	613.0	2870.0	614.0	2900.0
GR	614.7	2940.0	614.7	3178.0	622.0	3180.0	627.0	3390.0	627.0	3410.0
GR	626.7	3450.0	630.7	3470.0	631.5	3480.0				
X1	52.0	34.0	590.0	950.0	6000.0	6950.0	6050.0			
GR	618.0	100.0	619.0	300.0	619.0	345.0	622.5	385.0	620.5	500.0
GR	618.1	550.0	620.8	690.0	610.8	600.0	610.5	610.0	609.5	620.0

GR	609.3	660.0	609.1	670.0	608.4	700.0	608.0	760.0	607.7	770.0
GR	608.1	790.0	607.8	800.0	607.7	810.0	607.1	820.0	607.2	830.0
GR	607.0	870.0	607.1	880.0	607.2	900.0	610.2	930.0	614.7	940.0
GR	619.9	950.0	619.0	1000.0	619.4	1050.0	619.0	1100.0	623.3	1200.0
GR	622.8	1250.0	624.1	1300.0	625.0	1350.0	623.5	1450.0		
X1	53.0	45.0	550.0	950.0	5100.0	5500.0	5800.0			
GR	619.3	100.0	619.0	150.0	619.7	200.0	620.1	300.0	621.6	350.0
GR	621.7	400.0	622.6	450.0	621.8	500.0	622.5	540.0	623.5	550.0
GR	614.3	580.0	610.6	590.0	610.4	600.0	609.9	610.0	609.4	620.0
GR	608.7	630.0	608.5	660.0	609.2	700.0	608.9	710.0	609.1	720.0
GR	608.7	740.0	608.7	790.0	609.1	800.0	610.0	850.0	609.6	870.0
GR	610.0	890.0	610.6	900.0	610.9	910.0	611.9	920.0	615.1	630.0
GR	622.1	950.0	618.3	980.0	622.7	1040.0	613.7	1070.0	620.5	1090.0
GR	616.5	1120.0	616.3	1150.0	615.7	1200.0	614.9	1250.0	616.4	1280.0
GR	622.0	1310.0	620.8	1340.0						
X1	54.0	42.0	410.0	690.0	5250.0	5950.0	5550.0			
GR	616.5	100.0	617.3	170.0	616.5	200.0	618.0	300.0	620.0	370.0
GR	614.0	389.0	613.5	395.0	612.0	400.0	611.0	402.0	606.0	410.0
GR	605.0	420.0	603.0	430.0	602.3	440.0	602.0	450.0	602.2	460.0
GR	602.1	470.0	602.0	480.0	602.2	490.0	602.0	500.0	601.4	510.0
GR	601.0	520.0	601.0	530.0	600.0	540.0	600.2	550.0	600.0	560.0
GR	599.9	570.0	599.5	580.0	600.0	590.0	600.0	600.0	599.8	610.0
GR	599.5	620.0	599.3	630.0	599.3	640.0	600.3	650.0	601.2	660.0
GR	603.0	670.0	604.8	680.0	606.0	690.0	610.0	700.0	618.0	775.0
GR	619.0	850.0	623.0	875.0						
NC										
X1	54.1	55.0	440.0	970.0	3200.0	3100.0	3800.0			
GR	618.0	100.0	617.4	150.0	617.6	200.0	617.7	250.0	618.9	300.0
GR	616.6	350.0	616.1	400.0	615.7	410.0	614.7	420.0	612.8	430.0
GR	610.6	440.0	609.7	450.0	609.1	460.0	607.3	470.0	605.5	480.0
GR	604.4	490.0	603.5	500.0	602.2	510.0	600.9	520.0	600.1	530.0
GR	600.4	540.0	601.8	550.0	601.1	560.0	602.0	570.0	603.4	580.0
GR	604.2	590.0	604.8	600.0	604.0	700.0	604.0	800.0	604.0	900.0
GR	604.0	910.0	604.0	920.0	604.0	930.0	606.4	940.0	608.2	950.0
GR	608.9	960.0	610.5	970.0	611.2	980.0	611.4	990.0	611.7	1000.0
GR	611.9	1010.0	613.9	1020.0	615.8	1030.0	616.0	1040.0	615.8	1050.0
GR	615.5	1060.0	615.2	1070.0	615.0	1080.0	615.0	1090.0	615.0	1100.0
GR	616.0	1150.0	614.9	1200.0	612.0	1250.0	612.0	1300.0	613.5	1350.0
NC										
X1	54.2	48.0	177.0	592.0	49.0	49.0	49.0			
GR	633.0	100.0	633.5	115.0	624.4	135.0	622.0	138.0	605.5	177.0
GR	602.5	192.0	600.5	207.0	599.8	222.0	599.4	230.0	599.4	234.0
GR	600.4	242.0	601.0	252.0	602.8	272.0	603.5	287.0	604.5	302.0
GR	603.5	312.0	603.5	332.0	603.5	336.0	603.0	347.0	602.8	372.0
GR	603.0	375.0	603.2	377.0	603.0	380.0	603.4	387.0	603.0	392.0
GR	603.2	402.0	603.0	407.0	599.7	415.0	603.2	427.0	603.5	432.0
GR	603.5	435.0	603.0	462.0	602.8	472.0	603.4	484.0	603.5	490.0
GR	603.0	500.0	603.2	507.0	603.0	517.0	603.5	533.0	604.0	537.0
GR	604.0	547.0	605.0	565.0	605.2	579.0	605.5	592.0	611.3	638.0
GR	611.1	663.0	615.9	688.0	614.0	743.0				
NC										
X1	54.3	0.0			1.0	1.0	1.0			
BT	23.0	115.0	633.5	633.5	135.0	632.0	624.4	135.0	632.0	624.4
BT	138.0	632.0	622.0	230.0	632.0	622.0	230.0	632.0	599.4	234.0
BT	632.0	599.4	234.0	632.0	622.0	332.0	632.0	622.0	332.0	632.0
BT	603.5	336.0	632.0	603.5	336.0	632.0	622.0	432.0	632.0	622.0
BT	432.0	632.0	603.5	436.0	632.0	603.5	436.0	632.0	622.0	533.0
BT	632.0	622.0	533.0	632.0	603.5	537.0	632.0	603.5	537.0	632.0
BT	622.0	632.0	632.0	624.4	660.0	633.5	633.5	743.0	614.0	614.0
NC										
X1	54.4	0.0			32.0	32.0	32.0			
X2							1			
NC										
X1	54.5	0.0			1.0	1.0	1.0			
X1	60.0	51.0	390.0	909.0	49.0	49.0	49.0			
GR	616.2	106.0	616.4	208.0	616.6	307.0	617.0	390.0	612.9	404.0
GR	610.7	408.0	606.0	415.0	605.3	424.0	605.0	435.0	604.5	453.0
GR	604.0	462.0	603.7	483.0	603.9	500.0	604.0	510.0	604.0	573.0

GR	603.8	582.0	603.5	603.0	604.0	623.0	604.1	632.0	603.9	650.0
GR	604.0	665.0	604.5	634.0	604.0	700.0	603.8	712.0	604.9	722.0
GR	603.7	733.0	604.1	750.0	603.7	760.0	604.4	781.0	603.1	793.0
GR	603.9	802.0	604.2	812.0	604.8	823.0	604.8	844.0	605.1	854.0
GR	606.7	863.0	610.6	874.0	610.9	878.0	611.3	880.0	612.8	885.0
GR	616.8	909.0	614.2	914.0	615.9	918.0	616.8	924.0	612.0	937.0
GR	616.8	953.0	616.8	966.0	615.4	970.0	614.8	994.0	613.0	1000.0
GR	614.0	1053.0								
X1	61.0	52.0	392.0	773.0	7350.0	6350.0	6700.0			
GR	616.4	105.0	617.1	173.0	616.0	202.0	613.7	255.0	613.8	301.0
GR	615.7	363.0	618.7	392.0	613.0	401.0	611.0	404.0	605.8	410.0
GR	605.4	420.0	605.1	427.0	604.9	438.0	604.2	448.0	603.5	458.0
GR	603.3	465.0	603.1	480.0	602.9	490.5	602.8	500.0	602.6	511.0
GR	602.3	520.0	601.8	530.0	601.3	540.0	601.0	550.0	601.5	560.0
GR	601.9	593.0	601.9	613.0	602.0	633.0	602.8	643.0	603.0	650.0
GR	603.2	661.0	603.9	670.0	603.2	682.0	603.7	690.0	604.0	700.0
GR	605.5	710.0	606.4	720.0	609.0	734.0	611.7	740.0	613.0	762.0
GR	615.0	773.0	615.0	790.0	617.8	805.0	617.8	820.0	614.6	838.0
GR	614.8	852.0	615.6	863.0	615.0	875.0	614.8	933.0	620.0	965.0
GR	618.0	1000.0	615.6	1050.0						
X1	62.0	48.0	403.0	745.0	5255.0	5650.0	6300.0			
GR	617.4	104.0	617.9	134.0	617.3	203.0	617.9	238.0	617.0	273.0
GR	617.0	304.0	618.0	335.0	618.6	369.0	616.8	403.0	611.7	405.0
GR	607.9	407.0	605.0	413.0	602.6	420.0	602.3	432.0	602.3	470.0
GR	602.1	480.0	602.0	487.0	601.9	500.0	601.9	531.0	602.0	543.0
GR	602.2	550.0	602.0	557.0	602.5	587.0	603.0	593.0	604.0	600.0
GR	605.0	610.0	605.5	620.0	605.8	631.0	606.2	641.0	607.0	650.0
GR	607.0	860.0	607.5	671.0	607.9	687.0	607.4	692.0	608.9	700.0
GR	610.4	711.0	610.7	720.0	611.2	732.0	612.9	745.0	614.0	765.0
GR	611.4	797.0	615.0	825.0	615.4	837.0	612.9	867.0	617.1	910.0
GR	615.8	936.0	615.4	950.0	615.6	1050.0				
X1	63.0	60.0	400.0	856.0	4150.0	4450.0	4400.0			
GR	618.5	100.0	619.9	141.0	617.9	156.0	618.0	215.0	620.8	237.0
GR	620.8	245.0	618.1	273.0	621.4	310.0	621.0	362.0	621.4	372.0
GR	620.8	400.0	612.5	404.0	609.8	411.0	606.0	421.0	605.9	431.0
GR	605.0	440.0	604.2	450.0	604.9	460.0	604.9	469.0	604.1	479.0
GR	604.1	500.0	604.1	520.0	604.0	530.0	603.9	540.0	604.0	550.0
GR	604.7	562.0	604.0	572.0	603.9	582.0	603.7	592.0	603.2	600.0
GR	603.7	611.0	604.0	622.0	604.8	632.0	604.6	642.0	605.0	650.0
GR	605.0	660.0	604.2	670.0	604.4	681.0	604.0	690.0	603.9	700.0
GR	603.7	710.0	603.7	720.0	603.0	730.0	603.0	740.0	603.4	750.0
GR	603.9	760.0	604.5	770.0	606.0	780.0	607.0	790.0	608.4	800.0
GR	610.4	811.0	611.9	820.0	612.0	828.0	614.0	856.0	617.0	878.0
GR	616.7	880.0	617.0	900.0	620.2	1004.0	620.7	1064.0	624.9	1091.0
X1	64.0	56.0	400.0	835.0	6550.0	5075.0	6150.0			
GR	617.1	130.0	617.0	202.0	615.9	304.0	617.0	323.0	625.4	360.0
GR	625.4	372.0	615.4	387.0	615.0	400.0	613.0	404.0	609.0	413.0
GR	607.7	421.0	607.7	431.0	606.9	440.0	606.5	450.0	607.0	460.0
GR	607.0	470.0	609.0	482.0	608.8	491.0	609.0	500.0	608.8	510.0
GR	607.7	520.0	607.0	530.0	607.0	542.0	606.9	550.0	606.9	561.0
GR	606.7	580.0	605.9	590.0	605.9	600.0	605.8	611.0	605.7	620.0
GR	605.6	633.0	605.5	643.0	605.3	650.0	605.2	661.0	605.1	670.0
GR	604.8	650.0	605.0	690.0	605.0	710.0	605.0	730.0	605.0	740.0
GR	604.8	750.0	604.9	759.0	605.0	770.0	605.1	781.0	605.8	790.0
GR	606.3	800.0	607.9	810.0	609.8	820.0	613.0	830.0	617.9	835.0
GR	618.6	852.0	617.3	918.0	616.7	955.0	616.9	1029.0	619.9	1051.0
GR	627.9	1153.0								
X1	65.0	44.0	190.0	615.0	3300.0	3900.0	3780.0			
GR	614.0	118.0	616.0	132.0	625.0	168.0	625.5	190.0	619.0	195.0
GR	615.0	200.0	614.0	203.0	609.7	210.0	608.4	220.0	607.7	230.0
GR	607.0	240.0	607.4	250.0	607.8	258.0	607.9	270.0	608.0	280.0
GR	608.0	290.0	607.9	300.0	608.8	310.0	608.0	320.0	608.4	330.0
GR	608.4	350.0	608.7	360.0	608.4	370.0	608.7	392.0	608.5	400.0
GR	607.9	421.0	607.9	442.0	608.0	450.0	608.0	460.0	608.3	471.0
GR	608.7	482.0	608.7	493.0	608.9	500.0	609.0	510.0	609.8	520.0
GR	610.0	530.0	610.4	540.0	611.2	550.0	614.2	558.0	615.9	568.0
GR	617.9	595.0	626.9	615.0	625.9	635.0	617.7	660.0		
X1	66.0	38.0	778.0	1575.0	1950.0	3200.0	2700.0			

GR	633.3	50.0	633.5	500.0	633.5	700.0	629.3	705.0	626.1	730.0
GR	615.0	778.0	604.6	820.0	604.6	835.0	603.2	840.0	603.8	865.0
GR	606.7	925.0	606.4	940.0	604.7	970.0	605.7	985.0	605.2	1005.0
GR	605.8	1025.0	601.8	1105.0	601.8	1128.0	600.0	1148.0	604.5	1160.0
GR	605.8	1248.0	600.0	1252.0	605.0	1300.0	604.8	1305.0	605.0	1350.0
GR	603.4	1385.0	605.5	1395.0	604.2	1405.0	605.7	1430.0	605.4	1470.0
GR	605.8	1505.0	605.1	1510.0	608.9	1548.0	615.2	1575.0	626.3	1630.0
GR	626.7	1670.0	634.0	1670.0	634.0	2050.0				
X1	66.1	76.0	365.0	878.0	49.0	49.0	49.0			
GR	633.5	100.0	634.0	365.0	629.0	400.0	626.0	415.0	621.5	423.0
GR	616.5	430.0	615.0	440.0	613.0	450.0	604.5	460.0	629.5	460.0
GR	629.5	463.0	604.5	463.0	603.0	470.0	603.5	479.0	605.0	490.0
GR	605.8	500.0	606.5	511.0	606.0	520.0	604.0	528.0	604.5	530.0
GR	629.5	530.0	629.5	533.0	605.3	533.0	605.5	540.0	605.0	550.0
GR	605.8	560.0	605.2	570.0	604.0	580.0	602.3	590.0	601.5	600.0
GR	601.5	605.0	629.5	605.0	629.5	608.0	601.5	608.0	601.5	613.0
GR	599.5	620.0	604.0	630.0	604.0	640.0	604.7	650.0	604.0	660.0
GR	605.5	670.0	602.0	675.0	629.5	675.0	629.5	678.0	599.0	678.0
GR	599.3	680.0	602.0	690.0	604.0	700.0	604.5	710.0	604.9	720.0
GR	604.0	730.0	603.0	740.0	605.0	742.0	629.5	742.0	629.5	745.0
GR	605.0	745.0	603.5	751.0	605.2	760.0	605.5	770.0	605.0	780.0
GR	605.2	790.0	605.5	801.0	604.5	805.0	629.5	805.0	629.5	808.0
GR	605.5	808.0	606.0	815.0	608.0	822.0	612.5	830.0	618.0	840.0
GR	621.9	851.0	626.0	860.0	626.5	878.0	629.5	878.0	634.0	935.0
GR	633.0	1075.0								
X1	66.2	0.0			1.0	1.0	1.0			
BT	8.0	100.0	633.5	633.5	365.0	634.0	634.0	400.0	634.0	629.5
BT	400.0	634.0	629.5	878.0	634.0	629.5	878.0	634.0	629.5	935.0
BT	634.0	634.0	1075.0	633.0	633.0					
X1	66.3	0.0			32.0	32.0	32.0			
X2							1			
X1	66.4	0.0			1.0	1.0	1.0			
X1	67.0	49.0	350.0	739.0	49.0	49.0	49.0			
GR	615.2	110.0	615.6	151.0	616.8	250.0	615.5	350.0	614.4	352.0
GR	610.0	360.0	608.9	370.0	607.2	380.0	606.9	390.0	606.6	400.0
GR	606.3	410.0	605.4	420.0	605.1	428.0	605.0	440.0	604.8	450.0
GR	605.0	460.0	605.0	468.0	604.5	480.0	603.9	490.0	603.7	500.0
GR	603.5	510.0	603.3	520.0	603.9	533.0	603.6	542.0	604.0	550.0
GR	604.0	560.0	604.8	570.0	605.0	583.0	605.2	589.0	605.7	600.0
GR	605.6	610.0	605.2	622.0	605.0	632.0	604.5	641.0	605.0	650.0
GR	604.8	659.0	604.5	668.0	604.2	680.0	604.0	591.0	604.4	700.0
GR	606.0	710.0	608.0	720.0	614.0	732.0	615.0	735.0	618.9	739.0
GR	618.0	750.0	616.8	792.0	616.9	838.0	619.0	850.0		
X1	68.0	47.0	368.0	765.0	2160.0	1700.0	1610.0			
GR	615.4	100.0	619.0	133.0	619.1	202.8	620.0	263.0	621.1	283.0
GR	621.4	302.0	622.4	368.0	618.0	402.0	614.8	405.0	610.0	410.0
GR	608.0	420.0	607.9	432.0	607.9	440.0	607.8	450.0	607.5	461.0
GR	607.2	469.0	607.0	480.0	607.0	490.0	606.9	500.0	606.9	510.0
GR	606.5	520.0	606.9	530.0	607.0	540.0	607.0	550.0	606.9	563.0
GR	606.9	576.0	606.7	584.0	606.9	592.0	607.0	600.0	607.0	621.0
GR	607.0	643.0	606.9	651.0	606.9	671.0	606.8	680.0	606.9	700.0
GR	607.0	710.0	607.0	722.0	608.0	732.0	609.9	742.0	611.9	751.0
GR	614.0	764.0	615.0	765.0	616.1	772.0	618.0	802.0	622.0	900.0
GR	623.9	951.0	624.9	1003.0						
X1	69.0	44.0	365.0	750.0	4420.0	4500.0	4160.0			
GR	618.0	100.0	619.8	200.0	620.0	300.0	621.4	365.0	618.4	385.0
GR	616.0	400.0	615.2	403.0	612.0	412.0	609.8	419.0	608.0	430.0
GR	608.0	450.0	608.4	460.0	608.6	470.0	608.0	480.0	608.2	490.0
GR	608.2	500.0	607.9	510.0	607.9	532.0	607.9	550.0	607.6	560.0
GR	607.2	571.0	607.2	592.0	607.0	600.0	606.9	613.0	606.9	634.0
GR	606.9	640.0	606.7	651.0	606.7	662.0	606.9	672.0	606.9	688.0
GR	607.0	700.0	607.9	710.0	608.9	721.0	612.8	733.0	615.0	740.0
GR	620.0	750.0	619.8	763.0	618.9	801.0	617.4	850.0	618.0	873.0
GR	619.8	928.0	620.5	945.0	620.0	1004.0	620.7	1054.0		

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*****************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED  AUG1977
  ERROR CORR -  01,02
  MODIFICATION -  50,51,52,53
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THIS RUN EXECUTED 01/17/79

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C
T1      ADA TOWNSHIP HUD1 62-0104-009
T2      100-YEAR FLOOD
T3      GRAND RIVER,ADA TWP,KENT COUNTY
J1  ICHECK    INQ      NINV     IDIR     STRT     METRIC   HVINS    Q        WSEL     FQ
      0.       4.       0.       0.   0.0          0.0      0.0      0.   626.040   0.0
J2  NPROF     IPLOT    PRFVS    XSECV    XSECH    FN       ALLDC    IBW      CHNIM    ITRACE
    -1.000     0.0     -1.000    0.0      0.0      0.0     -1.000    0.0      0.0     15.000
J3  VARIABLE CODES FOR SUMMARY PRINTOUT
    110.000  150.000    0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0
NC      0.080     0.100     0.030     0.100     0.300     0.0      0.0      0.0      0.0      0.0
QT      4.000  30800.000  44900.000  51400.000  69200.000  0.0      0.0      0.0      0.0      0.0
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CANNON-ADA TOWNSHIP LINE

STARTING ELEVATIONS FROM FIS OF PLAINFIELD TWP

REC INT(YEARS)	FLOW(CFS)	ELEVATION
10	30800	621.46
50	44900	624.70
100	51400	626.04
500	72700	629.61

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X1      1.000    56.000   980.000  1370.000     0.0      0.0      0.0      0.0      0.0      0.0
X3      0.0       0.0      0.0      600.000     0.0   2600.000    0.0      0.0      0.0      0.0
GR    644.800     0.0    644.200     10.000   640.100    30.000  638.000  100.000  633.100  200.000
GR    629.000   300.000  620.800    400.000   617.000   500.000  614.600  600.000  613.700  700.000
GR    614.700   800.000  614.600    900.000   615.100   980.000  611.700  980.000  608.900  990.000
GR    599.900  1010.000  598.200   1020.000   598.200  1040.000  598.900 1070.000  600.700 1090.000
GR    601.000  1100.000  601.000   1110.000   601.700  1130.000  601.600 1140.000  601.900 1170.000
GR    602.500  1190.000  602.500   1200.000   602.800  1210.000  603.000 1220.000  603.500 1230.000
GR    603.700  1240.000  603.700   1250.000   603.900  1260.000  604.200 1270.000  604.700 1280.000
GR    605.200  1300.000  605.700   1310.000   605.700  1320.000  606.200 1330.000  608.900 1350.000
GR    612.700  1360.000  614.300   1370.000   614.300  1400.000  612.600 1425.000  611.700 1500.000
GR    611.500  1600.000  612.600   1620.000   612.800  1700.000  613.200 1800.000  613.000 1900.000
GR    612.500  1960.000  611.300   2000.000   609.900  2100.000  612.500 2500.000  627.000 2700.000
GR    640.000  2780.000    0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
NC      0.100     0.080    0.030     0.0       0.0       0.0       0.0       0.0       0.0       0.0
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CROSS SECTION NO. 2

X1	2.000	33.000	2121.000	2478.000	3150.000	3050.000	3650.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	793.000	0.0	0.0	0.0	0.0	0.0	0.0
GR	670.000	0.0	650.000	100.000	640.000	200.000	630.000	250.000	620.000	450.000
GR	615.800	1850.000	616.700	1919.000	615.800	1952.000	617.000	2050.000	619.800	2121.000
GR	613.600	2137.000	613.100	2144.000	611.800	2150.000	605.800	2160.000	602.800	2180.000
GR	601.700	2200.000	601.700	2250.000	599.500	2340.000	599.800	2350.000	599.500	2400.000
GR	601.100	2420.000	605.600	2450.000	613.500	2466.000	618.500	2478.000	616.100	2500.000
GR	617.600	2532.000	618.400	2593.000	623.900	2608.000	630.000	2766.000	630.000	3066.000
GR	640.000	3516.000	650.000	3766.000	670.000	3816.000	0.0	0.0	0.0	0.0
X1	2.100	0.0	0.0	0.0	2150.000	2150.000	2150.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	1360.000	0.0	4171.000	0.0	0.0	0.0	0.0
NC	0.0	0.0	0.0	0.300	0.500	0.0	0.0	0.0	0.0	0.0
NC	0.090	0.100	0.030	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X1	3.000	66.000	2850.000	3325.000	3100.000	2800.000	3263.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	2838.000	0.0	4303.000	0.0	0.0	0.0	0.0
GR	670.000	0.0	660.000	150.000	660.000	1300.000	670.000	1500.000	660.000	1670.000
GR	650.000	1850.000	640.000	2000.000	630.000	2200.000	616.300	2550.000	617.300	2835.000
GR	613.100	2850.000	611.000	2854.000	606.200	2860.000	605.000	2880.000	605.000	2890.000
GR	604.100	2910.000	603.900	2940.000	604.200	2960.000	604.200	3000.000	604.100	3020.000
GR	603.600	3050.000	604.000	3090.000	603.900	3120.000	604.200	3130.000	604.100	3150.000
GR	603.700	3160.000	604.500	3170.000	604.100	3180.000	604.300	3190.000	604.700	3200.000
GR	604.100	3210.000	604.300	3220.000	604.900	3230.000	603.600	3240.000	604.700	3260.000
GR	604.900	3270.000	605.400	3300.000	606.900	3310.000	611.400	3325.000	612.900	3330.000
GR	616.600	3355.000	614.000	3360.000	615.600	3365.000	616.700	3370.000	612.000	3384.000
GR	616.700	3400.000	617.000	3407.000	616.900	3414.000	615.300	3417.000	614.700	3442.000
GR	613.400	3450.000	613.900	3510.000	620.000	4625.000	630.000	4875.000	640.000	4925.000
GR	650.000	4975.000	660.000	5050.000	670.000	5130.000	670.000	5330.000	660.000	5530.000
GR	650.000	5680.000	640.000	6330.000	640.000	7030.000	650.000	7430.000	660.000	7730.000
GR	670.000	7980.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

1 FT DOWNSTREAM OF KNAPP ROAD BRIDGE

X1	3.100	36.000	1300.000	1851.000	49.000	49.000	49.000	0.930	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	2849.000	0.0	630.000	620.000	0.0
GR	660.000	0.0	650.000	200.000	640.000	430.000	630.000	600.000	633.000	1300.000
GR	624.200	1300.000	624.200	1304.000	605.600	1350.000	603.100	1370.000	601.900	1400.000
GR	599.300	1413.000	599.500	1420.000	599.500	1420.000	599.000	1425.000	603.100	1430.000
GR	604.600	1490.000	604.100	1520.000	602.000	1525.000	603.000	1530.000	604.700	1630.000
GR	602.000	1635.000	603.000	1640.000	605.100	1650.000	605.100	1670.000	604.700	1680.000
GR	605.300	1710.000	605.000	1750.000	605.000	1755.000	605.500	1780.000	608.000	1810.000
GR	623.700	1846.000	624.100	1851.000	626.700	1851.000	620.000	2100.000	630.000	3150.000
GR	640.000	3550.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NH	3.000	0.100	1300.000	0.015	1851.000	0.100	3550.000	0.0	0.0	0.0
X1	3.110	0.0	0.0	0.0	1.000	1.000	1.000	0.930	0.0	0.0
X2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.930	0.0
BT	25.000	0.0	660.000	0.0	200.000	650.000	0.0	430.000	640.000	0.0
BT	600.000	630.000	0.0	1300.000	633.000	626.700	1420.000	633.700	626.700	1420.000
BT	633.700	599.500	1425.000	633.700	599.000	1425.000	633.700	626.700	1525.000	634.700
BT	626.700	1525.000	636.700	602.000	1530.000	634.700	603.000	1530.000	634.700	626.700
BT	1635.000	634.700	626.700	1635.000	634.700	602.000	1640.000	634.700	603.000	1640.000
BT	634.700	626.700	1750.000	634.700	626.700	1750.000	634.700	605.000	1755.000	634.700
BT	605.000	1755.000	634.700	626.700	1851.000	633.900	626.700	2100.000	620.000	0.0
BT	3150.000	630.000	0.0	3550.000	640.000	0.0	0.0	0.0	0.0	0.0
X1	3.190	0.0	0.0	0.0	44.000	44.000	44.000	0.0	0.0	0.0
X2	0.0	0.0	0.0	0.0	0.0	0.0	1.000	0.0	0.0	0.0

1 FT UPSTREAM OF KNAPP ROAD BRIDGE

X1	3.200	0.0	0.0	0.0	1.000	1.000	1.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	2651.000	0.	630.000	620.000	0.0
NC	0.080	0.100	0.030	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X1	4.000	66.000	2850.000	3325.000	49.000	49.000	49.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	2600.000	0.0	4342.000	0.0	0.0	0.0	0.0
GR	670.000	0.0	660.000	150.000	660.000	1300.000	670.000	1500.000	660.000	1670.000
GR	650.000	1850.000	640.000	2000.000	630.000	2200.000	616.300	2550.000	617.300	2835.000
GR	613.100	2850.000	611.000	2854.000	606.200	2860.000	605.000	2880.000	605.000	2890.000
GR	604.100	2910.000	603.900	2940.000	604.200	2960.000	604.200	3000.000	604.100	3020.000
GR	603.600	3050.000	604.000	3090.000	603.900	3120.000	604.200	3130.000	604.100	3150.000
GR	603.700	3160.000	604.500	3170.000	604.100	3180.000	604.300	3190.000	604.700	3200.000
GR	604.100	3210.000	604.300	3220.000	604.900	3230.000	603.600	3240.000	604.700	3260.000
GR	604.900	3270.000	605.400	3300.000	606.900	3310.000	611.400	3325.000	612.900	3330.000
GR	616.600	3355.000	614.000	3360.000	615.600	3365.000	616.700	3370.000	612.000	3384.000
GR	616.700	3400.000	617.000	3407.000	616.900	3414.000	615.300	3417.000	614.700	3442.000
GR	613.400	3450.000	613.900	3510.000	620.000	4625.000	630.000	4875.000	640.000	4925.000
GR	650.000	4975.000	660.000	5050.000	670.000	5130.000	670.000	5330.000	660.000	5530.000
GR	650.000	5680.000	640.000	6330.000	640.000	7030.000	650.000	7430.000	660.000	7730.000
GR	670.000	7980.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X1	4.100	0.0	0.0	0.0	500.000	500.000	500.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	2300.000	0.0	3875.000	0.0	0.0	0.0	0.0
NC	0.100	0.100	0.030	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.0	0.0	0.0	0.100	0.300	0.0	0.0	0.0	0.0	0.0

CROSS SECTION NO. 5

X1	5.000	47.000	2050.000	2453.000	6250.000	5500.000	6398.000	0.0	0.0	0.0
GR	680.000	0.0	650.000	50.000	640.000	100.000	630.000	250.000	620.000	800.000
GR	616.500	1750.000	617.300	1821.000	616.100	1850.000	613.800	1902.000	613.900	1950.000
GR	615.900	2011.000	618.800	2039.000	613.700	2050.000	611.700	2051.000	606.600	2060.000
GR	601.600	2190.000	602.400	2260.000	604.200	2320.000	603.900	2330.000	604.200	2340.000
GR	604.800	2350.000	607.000	2370.000	611.700	2388.000	613.100	2410.000	614.700	2420.000
GR	614.600	2436.000	617.600	2453.000	617.600	2468.000	614.000	2489.000	614.300	2500.000
GR	615.500	2511.000	614.600	2524.000	614.300	2583.000	619.600	2616.000	615.400	2699.000
GR	620.000	3300.000	630.000	3450.000	640.000	3650.000	650.000	4050.000	640.000	4750.000
GR	640.000	4950.000	650.000	5750.000	650.000	7050.000	660.000	7250.000	660.000	7950.000
GR	670.000	8750.000	680.000	9450.000	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.110	0.110	0.033	0.0	0.0	0.0	0.0	0.0	0.0	0.0

CROSS SECTION NO. 6

X1	6.000	46.000	2900.000	3242.000	5500.000	4500.000	6335.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	1300.000	0.0	4751.000	0.0	0.0	0.0	0.0
GR	680.000	0.0	660.000	150.000	650.000	250.000	640.000	400.000	630.000	850.000
GR	620.000	2500.000	617.700	2600.000	618.200	2630.000	617.700	2700.000	618.200	2733.000
GR	617.200	2770.000	617.100	2800.000	618.200	2831.000	618.600	2865.000	616.700	2900.000
GR	607.600	2905.000	605.300	2910.000	603.100	2920.000	602.600	2990.000	602.300	3030.000
GR	602.500	3040.000	602.400	3070.000	606.200	3120.000	606.300	3130.000	607.500	3150.000
GR	608.400	3160.000	607.900	3190.000	610.800	3210.000	611.600	3230.000	613.200	3242.000
GR	613.900	3265.000	611.500	3296.000	614.900	3323.000	615.300	3335.000	613.100	3362.000
GR	617.400	3410.000	615.500	3436.000	615.600	3550.000	620.000	4450.000	630.000	4900.000
GR	640.000	4950.000	650.000	4975.000	650.000	7700.000	660.000	7850.000	670.000	7925.000
GR	680.000	8300.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.090	0.100	0.030	0.0	0.0	0.0	0.0	0.0	0.0	0.0

CROSS SECTION NO. 7

X1	7.000	47.000	3650.000	4125.000	3800.000	4100.000	4380.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	1300.000	0.0	4500.000	0.0	0.0	0.0	0.0
GR	680.000	0.0	650.000	200.000	640.000	500.000	630.000	950.000	620.000	2800.000

GR	618.500	3350.000	619.700	3389.000	618.000	3405.000	618.200	3463.000	620.700	3480.000
GR	620.800	3495.000	618.600	3570.000	621.600	3575.000	621.000	3610.000	621.600	3620.000
GR	620.000	3650.000	612.900	3654.000	609.600	3660.000	606.100	3670.000	605.300	3690.000
GR	604.500	3700.000	605.000	3710.000	604.900	3720.000	604.500	3730.000	604.500	3760.000
GR	604.200	3800.000	604.700	3810.000	603.500	3850.000	604.600	3880.000	604.900	3910.000
GR	604.500	3940.000	603.900	3970.000	603.200	3990.000	604.800	4020.000	613.000	4077.000
GR	614.000	4107.000	617.600	4125.000	617.000	4128.000	617.400	4150.000	620.500	4250.000
GR	620.000	4311.000	624.900	4340.000	630.000	4675.000	640.000	5275.000	640.000	6425.000
GR	650.000	6625.000	680.000	6755.000						
NC	0.100	0.100	0.033	0.0	0.0	0.0	0.0	0.0	0.0	0.0
					0.0	0.0	0.0	0.0	0.0	0.0

CROSS SECTION NO. 8

X1	8.000	51.000	3134.000	3583.000	6400.000	5000.000	6180.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	1879.000	0.0	0.0	0.0	0.0	0.0	0.0
GR	633.000	894.000	632.650	924.000	632.100	994.000	629.700	1054.000	629.000	1154.000
GR	628.000	1234.000	631.000	1254.000	630.700	1584.000	628.000	1834.000	617.000	1854.000
GR	616.000	2084.000	615.000	2684.000	612.700	2834.000	612.400	2924.000	614.600	3034.000
GR	625.000	3094.000	625.700	3106.000	625.700	3106.000	625.700	3106.000	625.700	3106.000
GR	625.700	3118.000	615.800	3134.000	615.600	3150.000	609.400	3160.000	608.000	3170.000
GR	607.900	3180.000	606.800	3200.000	607.400	3210.000	607.400	3220.000	609.600	3230.000
GR	609.100	3240.000	609.600	3250.000	607.800	3280.000	605.100	3440.000	605.200	3490.000
GR	604.700	3500.000	605.100	3520.000	606.000	3540.000	608.300	3560.000	610.000	3570.000
GR	613.700	3581.000	618.500	3583.000	619.000	3600.000	617.200	3765.000	617.400	3776.000
GR	619.900	3800.000	628.000	3900.000	640.000	4250.000	660.000	4350.000	680.000	4550.000
GR	700.000	4700.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

X1	8.100	46.000	3134.000	3583.000	1100.000	1500.000	1250.000	0.0	0.0	0.0
GR	640.000	1984.000	628.800	1984.000	628.900	2054.000	628.000	2084.000	615.400	2134.000
GR	616.000	2254.000	616.900	2554.000	615.400	2654.000	613.300	2764.000	613.100	2864.000
GR	613.600	2974.000	616.200	3054.000	626.000	3114.000	626.000	3114.000	626.000	3114.000
GR	625.700	3118.000	615.800	3134.000	615.600	3150.000	609.400	3160.000	608.000	3170.000
GR	607.900	3180.000	606.800	3200.000	607.400	3210.000	607.400	3220.000	609.600	3230.000
GR	609.100	3240.000	609.600	3250.000	607.800	3280.000	605.100	3440.000	605.200	3490.000
GR	604.700	3500.000	605.100	3520.000	606.000	3540.000	608.300	3560.000	610.000	3570.000
GR	613.700	3581.000	618.500	3583.000	619.000	3600.000	617.200	3765.000	617.400	3776.000
GR	619.900	3800.000	628.000	3900.000	640.000	4250.000	660.000	4350.000	680.000	4550.000
GR	700.000	4700.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

X1	8.900	0.0	0.0	0.0	1200.000	1200.000	1200.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	2456.000	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.100	0.100	0.033	0.0	0.0	0.0	0.0	0.0	0.0	0.0

CROSS SECTION NO. 9

X1	9.000	33.000	3600.000	3960.000	720.000	720.000	720.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	3100.000	0.0	0.0	0.0	0.0	0.0	0.0
GR	700.000	0.0	680.000	350.000	660.000	650.000	640.000	1125.000	620.000	3440.000
GR	614.800	3518.000	616.800	3531.000	625.200	3564.000	625.700	3587.000	619.300	3594.000
GR	616.300	3600.000	609.900	3610.000	607.700	3640.000	608.900	3690.000	608.500	3700.000
GR	609.100	3710.000	608.900	3810.000	608.600	3820.000	608.800	3860.000	609.100	3890.000
GR	610.800	3940.000	611.600	3950.000	615.300	3960.000	615.300	3967.000	618.400	3993.000
GR	627.200	4013.000	626.000	4031.000	618.100	4058.000	620.000	4065.000	640.000	4485.000
GR	660.000	5010.000	680.000	5160.000	700.000	5335.000	0.0	0.0	0.0	0.0
NC	0.0	0.0	0.0	0.300	0.500	0.0	0.0	0.0	0.0	0.0
NC	0.100	0.100	0.030	0.0	0.0	0.0	0.0	0.0	0.0	0.0

X1	9.900	38.000	2500.000	2884.000	1415.000	1415.000	1415.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	2134.000	0.0	3250.000	0.0	0.0	0.0	0.0
GR	700.000	0.0	680.000	100.000	660.000	1250.000	640.000	1775.000	620.000	2100.000
GR	615.700	2260.000	617.200	2400.000	615.900	2500.000	614.400	2502.000	610.200	2510.000
GR	607.500	2530.000	606.900	2550.000	606.300	2560.000	605.300	2570.000	604.800	2600.000
GR	605.200	2620.000	604.100	2650.000	603.700	2670.000	604.000	2680.000	603.800	2690.000

GR	604.300	2710.000	605.800	2750.000	605.400	2780.000	604.700	2790.000	605.300	2800.000
GR	604.400	2840.000	604.700	2850.000	606.200	2860.000	608.500	2870.000	614.500	2880.000
GR	619.200	2884.000	616.900	2940.000	617.000	2985.000	619.300	2998.000	640.000	3310.000
GR	660.000	3535.000	680.000	3785.000	700.000	3885.000	0.0	0.0	0.0	0.0
X1	10.000	0.0	0.0	0.0	1415.000	1415.000	1415.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	2488.000	0.0	2897.000	0.0	0.0	0.0	0.0

DOWNSTREAM M-21 HIGHWAY BRIDGE

X1	1.100	40.000	4350.000	4830.000	50.000	50.000	50.000	0.838	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	631.500	631.500	0.0
GR	640.000	0.0	630.000	900.000	620.000	3800.000	620.000	4350.000	620.000	4375.000
GR	604.000	4412.000	604.000	4415.000	603.000	4420.000	603.000	4430.000	606.500	4460.000
GR	606.000	4470.000	604.500	4480.000	605.500	4483.000	605.000	4500.000	606.000	4510.000
GR	605.500	4520.000	602.000	4555.000	602.000	4558.000	602.000	4565.000	600.000	4570.000
GR	604.500	4580.000	605.000	4600.000	604.500	4612.000	606.000	4620.000	600.000	4625.000
GR	600.000	4628.000	605.000	4650.000	605.000	4675.000	603.500	4690.000	605.500	4695.000
GR	605.500	4698.000	604.500	4700.000	605.800	4710.000	606.000	4755.000	606.000	4758.000
GR	609.000	4770.000	620.000	4795.000	620.000	4830.000	630.000	5000.000	640.000	5140.000
SB	0.900	1.500	2.800	0.0	300.000	18.000	8450.000	2.500	604.700	604.700

UPSTREAM M-21 HIGHWAY BRIDGE

X1	10.200	0.0	0.0	0.0	34.000	34.000	34.000	0.0	0.0	0.0
X2	0.0	0.0	1.000	629.200	633.900	0.0	0.0	0.0	0.838	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	633.900	633.900	0.0
BT	7.000	0.0	640.000	640.000	900.000	633.900	633.900	4350.000	633.900	633.900
BT	4350.000	633.900	629.200	4830.000	633.900	629.200	4830.000	633.900	633.900	5140.000
BT	640.000	640.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X1	11.000	38.000	2500.000	2884.000	50.000	50.000	50.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	2450.000	0.0	2934.000	0.0	0.0	0.0	0.0
GR	700.000	0.0	680.000	100.000	660.000	1250.000	640.000	1775.000	620.000	2100.000
GR	615.700	2260.000	617.200	2400.000	615.900	2500.000	614.400	2502.000	610.200	2510.000
GR	607.500	2530.000	606.900	2550.000	606.300	2560.000	605.300	2570.000	604.800	2600.000
GR	605.200	2620.000	604.100	2650.000	603.700	2670.000	604.000	2680.000	603.800	2690.000
GR	604.300	2710.000	605.800	2750.000	605.400	2780.000	604.700	2790.000	605.300	2800.000
GR	604.400	2840.000	604.700	2850.000	606.200	2860.000	608.500	2870.000	614.500	2880.000
GR	619.200	2884.000	616.900	2940.000	617.000	2985.000	619.300	2998.000	640.000	3310.000
GR	660.000	3535.000	680.000	3785.000	700.000	3885.000	0.0	0.0	0.0	0.0
QT	4.000	30300.000	44100.000	50500.000	67900.000	0.0	0.0	0.0	0.0	0.0
X1	11.100	0.0	0.0	0.0	243.000	243.000	243.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	2207.000	0.0	3177.000	0.0	0.0	0.0	0.0

CONFLUENCE THORNAPPLE RIVER

X1	11.500	0.0	0.0	0.0	243.000	243.000	243.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	1964.000	0.0	0.0	0.0	0.0	0.0	0.0
QT	4.000	25000.000	36300.000	41600.000	56000.000	0.0	0.0	0.0	0.0	0.0
X1	11.700	0.0	0.0	0.0	182.000	182.000	182.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	1782.000	0.0	0.0	0.0	0.0	0.0	0.0
X1	11.900	38.000	5250.000	5611.000	182.000	182.000	182.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	4350.000	0.0	0.0	0.0	0.0	0.0	0.0
GR	700.000	0.0	680.000	425.000	660.000	1250.000	640.000	2400.000	630.000	3775.000
GR	615.900	4950.000	619.400	4980.000	619.400	5050.000	620.000	5110.000	621.200	5130.000
GR	622.500	5240.000	618.300	5250.000	614.800	5252.000	610.300	5260.000	608.200	5270.000

GR	607.200	5360.000	606.700	5370.000	607.000	5380.000	607.400	5390.000	606.900	5410.000
GR	606.700	5430.000	607.000	5450.000	607.300	5520.000	607.000	5530.000	607.700	5560.000
GR	608.100	5570.000	610.200	5590.000	614.400	5610.000	615.500	5611.000	616.900	5620.000
GR	618.800	5650.000	622.600	5750.000	623.900	5800.000	624.500	5850.000	640.000	6136.000
NC	0.0	0.0	0.0	0.100	0.300	0.0	0.0	0.0	0.0	0.0
								0.0	0.0	0.0

CROSS SECTION NO. 12

X1	12.000	0.0	0.0	0.0	146.000	146.000	146.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	4204.000	0.0	0.0	0.0	0.0	0.0	0.0

CASCADE-ADA TOWNSHIP LINE

X1	13.000	34.000	2300.000	2647.000	4870.000	4870.000	4870.000	0.0	0.0	0.0
GR	700.000	0.0	680.000	100.000	660.000	200.000	640.000	670.000	618.700	2000.000
GR	619.800	2100.000	619.900	2200.000	621.900	2266.000	616.600	2300.000	615.400	2301.000
GR	612.200	2310.000	609.800	2320.000	608.300	2330.000	608.200	2350.000	608.600	2360.000
GR	608.700	2370.000	608.300	2380.000	608.600	2400.000	608.200	2450.000	607.000	2560.000
GR	607.500	2600.000	609.500	2620.000	620.200	2647.000	618.000	2750.000	618.800	2770.000
GR	619.800	2825.000	620.800	2840.000	620.400	2900.000	620.800	2950.000	640.000	3900.000
GR	660.000	4175.000	680.000	4225.000	680.000	4550.000	700.000	4650.000	0.0	0.0
FJ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

****
HEC2 RELEASE DATED NOV 76 UPDATED AUG1977
ERROR CORR - 01.02
MODIFICATION - 50.51.52.53
****

THIS RUN EXECUTED 01/17/79

NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

GRAND RIVER.ADA TWP.KENT

SUMMARY PRINTOUT TABLE 110

SECNO	CWSEL	DIFKWS	EG	TOPWID	QLOB	QCH	QROB	PERENC	STENCL	STCHL	STCHR	STENCR
-1.000	626.04	0.0	626.19	2000.00	3928.56	33617.50	13853.93	2000.00	600.00	980.00	1370.00	2600.00
-2.000	626.34	0.0	626.65	1878.18	9741.43	40579.52	1079.04	-793.00	793.00	2121.00	2478.00	3816.00
2.100	626.66	0.0	627.02	1319.42	6845.74	43349.79	1204.45	2811.00	1360.00	2121.00	2478.00	4171.00
-3.000	627.27	0.0	627.48	1465.00	86.19	42800.59	8513.21	1465.00	2838.00	2850.00	3325.00	4303.00
3.100	627.22	0.0	627.54	1440.57	0.0	49876.93	1523.07	2849.00	0.00	1209.00	1721.43	2649.57
3.110	627.14	0.0	627.62	1441.33	0.0	49836.10	1563.87	0.0	0.0	1209.00	1721.43	0.0
3.190	627.15	0.0	627.63	1442.02	0.0	49832.52	1567.45	0.0	0.0	1209.00	1721.43	0.0
-3.200	627.35	0.0	627.68	1442.00	0.0	50592.37	807.63	2651.00	0.00	1209.00	1721.43	2651.00
4.000	627.53	0.0	627.72	1542.00	433.15	42201.87	8764.96	1542.00	2800.00	2850.00	3325.00	4342.00
4.100	627.58	0.0	627.77	1575.00	3846.55	42098.64	5454.80	1575.00	2300.00	2850.00	3325.00	3875.00
-5.000	628.21	0.0	628.36	3074.48	9958.48	34613.63	6827.88	0.0	0.0	2050.00	2453.00	0.0
-6.000	628.84	0.0	629.01	3451.00	6071.56	33159.65	12168.78	3451.00	1300.00	2900.00	3242.00	4751.00
-7.000	629.29	0.0	629.45	3200.00	9562.09	40367.23	1470.67	3200.00	1300.00	3650.00	4125.00	4500.00
-8.000	629.88	0.0	630.00	2075.83	15111.88	34156.26	2131.85	-1879.00	1879.00	3134.00	3583.00	4700.00
8.100	629.98	0.0	630.12	1973.95	12911.70	36206.64	2281.65	0.0	0.0	3134.00	3583.00	0.0
8.900	630.08	0.0	630.26	1504.93	9507.12	39388.05	2504.82	-2456.00	2456.00	3134.00	3583.00	4700.01
-9.000	630.01	0.0	630.48	1175.18	5309.96	44196.44	1893.59	-3100.00	3100.00	3600.00	3960.00	5335.00
9.900	630.49	0.0	630.80	1032.73	4753.80	44786.42	1859.77	1116.00	2134.00	2500.00	2884.00	3250.00
10.000	630.63	0.0	631.07	409.00	118.37	51184.78	96.84	409.00	2488.00	2500.00	2884.00	2897.00
10.100	630.62	0.0	631.10	402.22	0.0	51399.98	0.0	0.0	0.0	3645.30	4047.54	0.0

SECNO	CWSEL	DIFKWS	EG	TOPWID	QLOB	QCH	QROB	PERENC	STENCL	STCHL	STCHR	STENCR
-10.200	631.02	0.0	631.48	402.22	0.0	51399.99	0.0	0.0	0.0	3645.30	4047.54	0.0
11.000	631.11	0.0	631.51	484.00	688.62	50153.21	548.16	484.00	2450.00	2500.00	2884.00	2934.00
11.100	631.29	0.0	631.58	970.00	4048.56	44466.67	1984.76	970.00	2207.00	2500.00	2884.00	3177.00
11.500	631.36	0.0	631.61	1215.76	5703.88	42875.02	1921.09	-1964.00	1964.00	2500.00	2884.00	3885.01
11.700	631.48	0.0	631.65	1268.24	4701.71	35299.93	1598.36	-1782.00	1782.00	2500.00	2884.00	3885.01
-11.900	631.49	0.0	631.67	1629.14	7576.42	32272.95	1750.62	-4350.00	4350.00	5250.00	5611.00	6600.00
12.000	631.51	0.0	631.68	1775.28	7998.70	31871.14	1730.15	-4204.00	4204.00	5250.00	5611.00	6600.01
13.000	631.95	0.0	632.13	2327.70	5639.17	31655.64	4305.18	0.0	0.0	2300.00	2647.00	0.0

GRAND RIVER,ADA TWP.,KENT
SUMMARY PRINTOUT TABLE 150

SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10K*S	VCH	AREA	.01K
1.000	0.0	0.0	0.0	598.20	51400.00	626.04	611.27	626.19	0.91	3.77	30265.54	53853.00
2.000	3650.00	0.0	0.0	599.50	51400.00	626.34	611.12	626.65	1.58	4.96	21376.23	40906.42
2.100	2150.00	0.0	0.0	599.50	51400.00	626.66	611.16	627.02	1.72	5.23	17134.68	39182.49
3.000	3263.00	0.0	0.0	603.60	51400.00	627.27	611.68	627.48	1.01	3.97	22169.41	51107.67
3.100	49.00	0.0	0.0	599.00	51400.00	627.22	611.65	627.54	1.54	4.60	14277.60	41385.50
3.110	1.00	620.00	626.70	599.00	51400.00	627.14	612.91	627.62	1.84	5.65	12129.84	37841.61
3.190	44.00	620.00	626.70	599.00	51400.00	627.15	612.91	627.63	1.84	5.65	12135.53	37844.25
3.200	1.00	0.0	0.0	599.00	51400.00	627.35	611.65	627.68	0.39	4.64	14457.66	82391.87
4.000	49.00	0.0	0.0	603.60	51400.00	627.53	611.71	627.72	0.95	3.87	23291.41	52803.38
4.100	500.00	0.0	0.0	603.60	51400.00	627.58	611.69	627.77	0.94	3.86	22802.02	53090.98
5.000	6398.00	0.0	0.0	601.60	51400.00	628.21	613.11	628.36	0.95	3.82	33925.70	52837.55
6.000	6335.00	0.0	0.0	602.30	51400.00	628.84	614.25	629.01	1.28	4.13	34481.23	45397.15
7.000	4380.00	0.0	0.0	603.20	51400.00	629.29	612.87	629.45	0.86	3.68	29820.96	55495.74
8.000	6180.00	0.0	0.0	604.70	51400.00	629.88	614.76	630.00	0.90	3.38	31291.84	54063.12
8.100	1250.00	0.0	0.0	604.70	51400.00	629.98	614.87	630.12	1.00	3.57	28209.23	51406.76
8.900	1200.00	0.0	0.0	604.70	51400.00	630.08	614.78	630.26	1.17	3.86	23344.40	47611.43
9.000	720.00	0.0	0.0	607.70	51400.00	630.01	617.88	630.48	3.06	5.92	14047.21	29395.43
9.900	1415.00	0.0	0.0	603.70	51400.00	630.49	613.87	630.80	1.29	4.72	16910.96	45282.14
10.000	1415.00	0.0	0.0	603.70	51400.00	630.63	613.88	631.07	1.65	5.37	9867.71	39981.76
10.100	50.00	0.0	0.0	600.00	51400.00	630.62	614.09	631.10	2.02	5.55	9264.81	36140.60
10.200	34.00	633.90	629.20	600.00	51400.00	631.02	0.0	631.48	1.91	5.45	9422.74	37162.59
11.000	50.00	0.0	0.0	603.70	51400.00	631.11	613.88	631.51	1.49	5.16	11113.34	42107.68
11.100	243.00	0.0	0.0	603.70	50500.00	631.29	613.77	631.58	1.14	4.54	16778.30	47250.80
11.500	243.00	0.0	0.0	603.70	50500.00	631.36	613.77	631.61	1.05	4.37	19187.09	49214.88
11.700	182.00	0.0	0.0	603.70	41600.00	631.48	612.75	631.65	0.70	3.58	19417.12	49640.66
11.900	182.00	0.0	0.0	606.70	41600.00	631.49	615.31	631.67	0.88	3.79	21927.30	44312.90
12.000	146.00	0.0	0.0	606.70	41600.00	631.51	615.31	631.68	0.86	3.74	23038.26	44894.04

SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10K*S	VCH	AREA	.01K
13.000	4870.00	0.0	0.0	607.00	41600.00	631.95	616.27	632.13	0.97	3.94	23923.05	42200.24

GRAND RIVER.ADA TWP.KENT
SUMMARY PRINTOUT TABLE 150

SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
1.000	51400.00	626.04	0.0	0.0	0.0	2000.00	0.0
2.000	51400.00	626.34	0.0	0.30	0.0	1878.18	3650.00
2.100	51400.00	626.66	0.0	0.31	0.0	1319.42	2150.00
3.000	51400.00	627.27	0.0	0.62	0.0	1465.00	3263.00
3.100	51400.00	627.22	0.0	-0.05	0.0	1440.57	49.00
3.110	51400.00	627.14	0.0	-0.08	0.0	1441.33	1.00
3.190	51400.00	627.15	0.0	0.01	0.0	1442.02	44.00
3.200	51400.00	627.35	0.0	0.20	0.0	1442.00	1.00
4.000	51400.00	627.53	0.0	0.18	0.0	1542.00	49.00
4.100	51400.00	627.58	0.0	0.05	0.0	1575.00	500.00
5.000	51400.00	628.21	0.0	0.63	0.0	3074.48	6398.00
6.000	51400.00	628.84	0.0	0.63	0.0	3451.00	6335.00
7.000	51400.00	629.29	0.0	0.45	0.0	3200.00	4380.00
8.000	51400.00	629.88	0.0	0.59	0.0	2075.83	6180.00
8.100	51400.00	629.98	0.0	0.10	0.0	1973.95	1250.00
8.900	51400.00	630.08	0.0	0.10	0.0	1504.93	1200.00
9.000	51400.00	630.01	0.0	-0.07	0.0	1175.18	720.00
9.900	51400.00	630.49	0.0	0.49	0.0	1032.73	1415.00
10.000	51400.00	630.63	0.0	0.13	0.0	409.00	1415.00
10.100	51400.00	630.62	0.0	-0.01	0.0	402.22	50.00
10.200	51400.00	631.02	0.0	0.40	0.0	402.22	34.00
11.000	51400.00	631.11	0.0	0.08	0.0	484.00	50.00
11.100	50500.00	631.29	0.0	0.19	0.0	970.00	243.00
11.500	50500.00	631.36	0.0	0.07	0.0	1215.76	243.00
11.700	41600.00	631.48	0.0	0.12	0.0	1268.24	182.00
11.900	41600.00	631.49	0.0	0.01	0.0	1629.14	182.00
12.000	41600.00	631.51	0.0	0.02	0.0	1775.28	146.00

SECNO	G	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
13.000	41600.00	631.95	0.0	0.43	0.0	2327.70	4870.00

SUMMARY OF ERRORS.

THIS RUN EXECUTED 01/26/79

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*****************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED  AUG1977
  ERROR CORR -  01.02
  MODIFICATION -  50.51.52.53
*****************************************************

T1      ADA TOWNSHIP HUD1 62-0104-009
T2      10-YEAR FLOOD
T3      GRAND RIVER, KENT COUNTY, MICHIGAN.

J1  ICHECK    INQ      NINV      DIR      STRT      METRIC    HVINS     Q         WSEL      EQ
       0.       2.        0.        0.  0.0          0.0       0.0       0.   626.660.    0.0
J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE
     1.000     0.0      -1.000     0.0       0.0       0.0       0.0       0.0       0.0       0.0
J5  LPRNT     NUMSEC                  ********REQUESTED SECTION NUMBERS********
    -10.000   -10.000     0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
QT      4.000  25000.000  36300.000  41600.000  56000.000     0.0       0.0       0.0       0.0       0.0
NC      0.100      0.100      0.030      0.100      0.300     0.0       0.0       0.0       0.0       0.0

X1     13.000     34.000   2300.000   2647.000      0.0       0.0       0.0       0.0       0.0       0.0
GR    700.000      0.0      680.000    100.000    660.000    200.000    640.000    630.000    618.700   2000.000
GR    619.800   2100.000    619.900   2200.000    621.900   2266.000    616.600   2300.000    615.400   2301.000
GR    612.200   2310.000    609.800   2320.000    608.300   2330.000    608.200   2350.000    608.600   2360.000
GR    608.700   2370.000    608.300   2380.000    608.600   2400.000    608.200   2450.000    607.000   2560.000
GR    607.500   2600.000    609.500   2620.000    620.200   2647.000    618.000   2750.000    618.800   2770.000
GR    619.800   2825.000    620.800   2840.000    620.400   2900.000    620.800   2950.000    640.000   3900.000
GR    660.000   4175.000    680.000   4225.000    680.000   4550.000    700.000   4650.000      0.0       0.0

X1     14.000     41.000   2590.000   2950.000   5175.000   5175.000   5175.000      0.0       0.0       0.0
GR    640.000   1680.000    640.000   1680.000    640.000   1680.000    640.000   1680.000    640.000   1680.000
GR    618.000   2100.000    619.000   2300.000    619.000   2345.000    622.500   2385.000    620.500   2500.000
GR    618.100   2550.000    620.800   2590.000    610.800   2600.000    610.500   2610.000    609.500   2620.000
GR    609.300   2660.000    609.100   2670.000    608.400   2700.000    608.000   2760.000    607.700   2770.000
GR    608.100   2790.000    607.800   2800.000    607.700   2810.000    607.100   2820.000    607.200   2830.000
GR    607.000   2870.000    607.100   2880.000    607.200   2900.000    610.200   2930.000    614.700   2940.000
GR    619.900   2950.000    619.000   3000.000    619.400   3050.000    619.000   3100.000    623.300   3200.000
GR    622.800   3250.000    624.100   3300.000    625.000   3350.000    623.500   3450.000    630.000   4000.000
GR    640.000   4780.000      0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0

X1     15.000     49.000   2550.000   2950.000   5700.000   5700.000   5700.000      0.0       0.0       0.0
GR    640.000    900.000    630.000   2050.000    630.000   2050.000    630.000   2050.000    630.000   2050.000
GR    619.300   2100.000    619.000   2150.000    619.700   2200.000    620.100   2300.000    621.600   2350.000
GR    621.700   2400.000    622.600   2450.000    621.800   2500.000    622.500   2540.000    623.500   2550.000
GR    614.300   2580.000    610.600   2590.000    610.400   2600.000    609.900   2610.000    609.400   2620.000
GR    608.700   2630.000    608.500   2660.000    609.200   2700.000    608.900   2710.000    609.100   2720.000
GR    608.700   2740.000    608.700   2790.000    609.100   2800.000    610.000   2850.000    609.600   2870.000
GR    610.000   2890.000    610.600   2900.000    610.900   2910.000    611.900   2920.000    615.100   2930.000
GR    622.100   2950.000    618.300   2980.000    622.700   3040.000    613.700   3070.000    620.500   3090.000
GR    616.500   3120.000    616.300   3150.000    615.700   3200.000    614.900   3250.000    616.400   3280.000
GR    622.000   3310.000    620.800   3340.000    630.000   3500.000    640.000   4150.000      0.0       0.0
EJ      0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
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*****************************************************
 HEC2 RELEASE DATED NOV 76 UPDATED  AUG1977
 ERROR CORR -  01.02
 MODIFICATION -  50.51.52.53
*****************************************************
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THIS RUN EXECUTED 01/26/79

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T1      ADA TOWNSHIP HUD1 62-0104-009
T2      50-YEAR FLOOD
T3      GRAND RIVER. KENT COUNTY. MICHIGAN.
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J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
	0.	3.	0.	0.	0.0	0.0	0.0	0.	630.390	0.0

J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	2.000	0.0	-1.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0

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*****************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED  AUG1977
  ERROR CORR -  01.02
  MODIFICATION -  50,51,52,53
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THIS RUN EXECUTED 01/26/79

```
T1      ADA TOWNSHIP HUD1 62-0104-009
T2      100-YEAR FLOOD
T3      GRAND RIVER, KENT COUNTY, MICHIGAN.
```

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
	0.	4.	0.	0.	0.0	0.0	0.0	0.	631.950	0.0

J2	NPROF	IPLOT	PREVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	3.000	0.0	-1.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0

THIS RUN EXECUTED 01/26/79

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**********************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED  AUG1977
  ERROR CORR -  01.02
  MODIFICATION -  50,51,52,53
**********************************************************

T1      ADA TOWNSHIP HUDI 62-0104-009
T2      500-YEAR FLOOD
T3      GRAND RIVER, KENT COUNTY, MICHIGAN.
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J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
	0.	5.	0.	0.	0.0	0.0	0.0	0.	636.130	0.0
J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	15.000	0.0	-1.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0

THIS RUN EXECUTED 01/26/79

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**********************************************
 HEC2 RELEASE DATED NOV 76 UPDATED  AUG1977
 ERROR CORR -  01.02
 MODIFICATION -  50,51,52,53
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NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

GRAND RIVER, KENT COUNTY

SUMMARY PRINTOUT TABLE 150

SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	IOK*S	VCH	AREA	.01K
13.000	0.0	0.0	0.0	607.00	25000.00	626.66	0.0	626.82	1.07	3.49	13196.24	24118.36
13.000	0.0	0.0	0.0	607.00	36300.00	630.39	0.0	630.57	1.00	3.82	20433.66	36251.45
13.000	0.0	0.0	0.0	607.00	41600.00	631.95	0.0	632.13	0.97	3.94	23950.90	42248.32
13.000	0.0	0.0	0.0	607.00	56000.00	636.13	0.0	636.31	0.84	4.09	34663.83	61170.02
14.000	5175.00	0.0	0.0	607.00	25000.00	627.19	0.0	627.33	0.90	3.22	14329.19	26405.29
14.000	5175.00	0.0	0.0	607.00	36300.00	630.90	0.0	631.05	0.85	3.55	21355.21	39393.63
14.000	5175.00	0.0	0.0	607.00	41600.00	632.44	0.0	632.60	0.82	3.65	25405.52	45847.57
14.000	5175.00	0.0	0.0	607.00	56000.00	636.56	0.0	636.72	0.72	3.81	35960.02	65858.44
15.000	5700.00	0.0	0.0	608.50	25000.00	627.72	0.0	627.84	0.88	3.05	14275.83	26681.60
15.000	5700.00	0.0	0.0	608.50	36300.00	631.39	0.0	631.54	0.86	3.44	19716.38	39193.79
15.000	5700.00	0.0	0.0	608.50	41600.00	632.92	0.0	633.07	0.85	3.58	22528.13	45199.17
15.000	5700.00	0.0	0.0	608.50	56000.00	636.98	0.0	637.14	0.77	3.81	32030.41	63866.27

GRAND RIVER, KENT COUNTY

SUMMARY PRINTOUT TABLE 150

SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
13.000	25000.00	626.66	0.0	0.0	0.0	1736.97	0.0
13.000	36300.00	630.39	3.73	0.0	0.0	2154.43	0.0
13.000	41600.00	631.95	1.56	0.0	0.0	2329.03	0.0
13.000	56000.00	636.13	4.18	0.0	0.0	2796.85	0.0
14.000	25000.00	627.19	0.0	0.53	0.0	1838.12	5175.00
14.000	36300.00	630.90	3.70	0.51	0.0	2216.70	5175.00
14.000	41600.00	632.44	1.55	0.49	0.0	2367.10	5175.00
14.000	56000.00	636.56	4.12	0.43	0.0	2766.34	5175.00
15.000	25000.00	627.72	0.0	0.52	0.0	1399.67	5700.00
15.000	36300.00	631.39	3.67	0.49	0.0	1700.31	5700.00
15.000	41600.00	632.92	1.53	0.48	0.0	1975.67	5700.00
15.000	56000.00	636.98	4.06	0.42	0.0	2706.30	5700.00

SUMMARY OF ERRORS

THIS RUN EXECUTED 01/17/79

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**********************************************
  HEC2 RELEASE DATED NOV 76 UPDATED  AUG1977
  ERROR CORR -  01.02
  MODIFICATION -  50.51.52.53
**********************************************

C
T1      ADA TOWNSHIP HUD1 62-0104-009
T2      10-YEAR FLOOD
T3      GRAND RIVER, KENT COUNTY, MICHIGAN.

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ
        0.       2.        0.        0.  0.0           0.0       0.0       0.    621.460     0.0
J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE
    1.000       0.0    -1.000       0.0       0.0       0.0       0.0       0.0       0.0       0.0
J3  VARIABLE CODES FOR SUMMARY PRINTOUT
    150.000   201.000       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
J5  LPRNT     NUMSEC                                 *********REQUESTED SECTION NUMBERS*********
    -10.000   -10.000       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
NC      0.080     0.100     0.030     0.100     0.300       0.0       0.0       0.0       0.0       0.0
OT      4.000 30800.000 44900.000 51400.000 69200.000       0.0       0.0       0.0       0.0       0.0

                CANNON-ADA TOWNSHIP LINE
                STARTING ELEVATIONS FROM FIS OF PLAINFIELD TWP
                REC INT(YEARS)  FLOW(CFS)  ELEVATION
                10              30800      621.46
                50              44900      624.70
                100             51400      626.04
                500             72700      629.61

X1      1.000    56.000   980.000  1370.000       0.0       0.0       0.0       0.0       0.0       0.0
X3        0.0       0.0       0.0   600.000       0.0  2600.000       0.0       0.0       0.0       0.0
GR    644.800       0.0   644.200    10.000   640.100    30.000   638.000   100.000   633.100   200.000
GR    629.000   300.000   620.800   400.000   617.000   500.000   614.600   600.000   613.700   700.000
GR    614.700   800.000   614.600   900.000   615.100   980.000   611.700   980.000   608.900   990.000
GR    599.900  1010.000   598.200  1020.000   598.200  1040.000   598.900  1070.000   600.700  1090.000
GR    601.000  1100.000   601.000  1110.000   601.700  1130.000   601.600  1140.000   601.900  1170.000
GR    602.500  1190.000   602.500  1200.000   602.800  1210.000   603.000  1220.000   603.500  1230.000
GR    603.700  1240.000   603.700  1250.000   603.900  1260.000   604.200  1270.000   604.700  1280.000
GR    605.200  1300.000   605.700  1310.000   605.700  1330.000   606.200  1330.000   608.900  1350.000
GR    612.700  1360.000   614.300  1370.000   614.300  1400.000   612.600  1425.000   611.700  1500.000
GR    611.500  1600.000   612.600  1620.000   612.800  1700.000   613.200  1800.000   613.000  1900.000
GR    612.500  1960.000   611.300  2000.000   609.900  2100.000   612.500  2500.000   627.000  2700.000
GR    640.000  2780.000       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
NC      0.100     0.080     0.030       0.0       0.0       0.0       0.0       0.0       0.0       0.0
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CROSS SECTION NO. 2

X1	2.000	33.000	2121.000	2478.000	3150.000	3050.000	3650.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	793.000	0.0	0.0	0.0	0.0	0.0	0.0
GR	670.000	0.0	650.000	100.000	640.000	200.000	630.000	250.000	620.000	450.000
GR	615.800	1850.000	616.700	1919.000	615.800	1952.000	617.000	2050.000	619.800	2121.000
GR	613.600	2137.000	613.100	2144.000	611.800	2150.000	605.800	2160.000	602.800	2180.000
GR	601.700	2200.000	601.700	2250.000	599.500	2340.000	599.800	2350.000	599.500	2400.000
GR	601.100	2420.000	605.600	2450.000	613.500	2466.000	618.500	2478.000	616.100	2500.000
GR	617.600	2532.000	618.400	2593.000	623.900	2608.000	630.000	2766.000	630.000	3066.000
GR	640.000	3516.000	650.000	3766.000	670.000	3816.000	0.0	0.0	0.0	0.0
X1	2.100	0.0	0.0	0.0	2150.000	2150.000	2150.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	1360.000	0.0	4171.000	0.0	0.0	0.0	0.0
NC	0.0	0.0	0.0	0.300	0.500	0.0	0.0	0.0	0.0	0.0
NC	0.090	0.100	0.030	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X1	3.000	66.000	2850.000	3325.000	3100.000	2800.000	3263.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	2838.000	0.0	4303.000	0.0	0.0	0.0	0.0
GR	670.000	0.0	660.000	150.000	660.000	1300.000	670.000	1500.000	660.000	1670.000
GR	650.000	1850.000	640.000	2000.000	630.000	2200.000	616.300	2550.000	617.300	2835.000
GR	613.100	2850.000	611.000	2854.000	606.200	2860.000	605.000	2880.000	605.000	2890.000
GR	604.100	2910.000	603.900	2940.000	604.200	2960.000	604.200	3000.000	604.100	3020.000
GR	603.600	3050.000	604.000	3090.000	603.900	3120.000	604.200	3130.000	604.100	3150.000
GR	603.700	3160.000	604.500	3170.000	604.100	3180.000	604.300	3190.000	604.700	3200.000
GR	604.100	3210.000	604.300	3220.000	604.900	3230.000	603.600	3240.000	604.700	3260.000
GR	604.900	3270.000	605.400	3300.000	606.900	3310.000	611.400	3325.000	612.900	3330.000
GR	616.600	3355.000	614.000	3360.000	615.600	3365.000	616.700	3370.000	612.000	3384.000
GR	616.700	3400.000	617.000	3407.000	616.900	3414.000	615.300	3417.000	614.700	3442.000
GR	613.400	3450.000	613.900	3510.000	620.000	4625.000	630.000	4875.000	640.000	4925.000
GR	650.000	4975.000	660.000	5050.000	670.000	5130.000	670.000	5330.000	660.000	5530.000
GR	650.000	5680.000	640.000	6330.000	640.000	7030.000	650.000	7430.000	660.000	7730.000
GR	670.000	7980.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

1 FT DOWNSTREAM OF KNAPP ROAD BRIDGE

X1	3.100	36.000	1300.000	1851.000	49.000	49.000	49.000	0.930	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	2849.000	0.0	630.000	620.000	0.0
GR	660.000	0.0	650.000	200.000	640.000	430.000	630.000	600.000	633.000	1300.000
GR	624.200	1300.000	624.200	1304.000	605.600	1350.000	603.100	1370.000	601.900	1400.000
GR	599.300	1413.000	599.500	1420.000	599.500	1420.000	599.000	1425.000	603.100	1430.000
GR	604.600	1490.000	604.100	1520.000	602.000	1525.000	603.000	1530.000	604.700	1630.000
GR	602.000	1635.000	603.000	1640.000	605.100	1650.000	605.100	1670.000	604.700	1680.000
GR	605.300	1710.000	605.000	1750.000	605.000	1755.000	605.500	1780.000	608.000	1810.000
GR	623.700	1846.000	624.100	1851.000	626.700	1851.000	620.000	2100.000	630.000	3150.000
GR	640.000	3550.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NH	3.000	0.100	1300.000	0.015	1851.000	0.100	3550.000	0.0	0.0	0.0
X1	3.110	0.0	0.0	0.0	1.000	1.000	1.000	0.930	0.0	0.0
X2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.930	0.0
BT	25.000	0.0	660.000	0.0	200.000	650.000	0.0	430.000	640.000	0.0
BT	600.000	630.000	0.0	1300.000	633.000	626.700	1420.000	633.700	626.700	1420.000
BT	633.700	599.500	1425.000	633.700	599.000	1425.000	633.700	626.700	1525.000	634.700
BT	626.700	1525.000	634.700	602.000	1530.000	634.700	603.000	1530.000	634.700	626.700
BT	1635.000	634.700	626.700	1635.000	634.700	602.000	1640.000	634.700	603.000	1640.000
BT	634.700	626.700	1750.000	634.700	626.700	1750.000	634.700	605.000	1755.000	634.700
BT	605.000	1755.000	634.700	626.700	1851.000	633.900	626.700	2100.000	620.000	0.0
BT	3150.000	630.000	0.0	3550.000	640.000	0.0	0.0	0.0	0.0	0.0
X1	3.190	0.0	0.0	0.0	44.000	44.000	44.000	0.0	0.0	0.0
X2	0.0	0.0	0.0	0.0	0.0	0.0	1.000	0.0	0.0	0.0

1 FT UPSTREAM OF KNAPP ROAD BRIDGE

X1	3.200	0.0	0.0	0.0	1.000	1.000	1.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	2651.000	0.0	630.000	620.000	0.0
NC	0.080	0.100	-0.030	0.0	0.0	0.0	0.0	0.0	0.0	0.0

X1	4.000	66.000	2850.000	3325.000	49.000	49.000	49.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	2800.000	0.0	4342.000	0.0	0.0	0.0	0.0
GR	670.000	0.0	660.000	150.000	660.000	1300.000	670.000	1500.000	660.000	1670.000
GR	650.000	1850.000	640.000	2000.000	630.000	2200.000	616.300	2550.000	617.300	2835.000
GR	613.100	2850.000	611.000	2854.000	606.200	2860.000	605.000	2880.000	605.000	2890.000
GR	604.100	2910.000	603.900	2940.000	604.200	2960.000	604.200	3000.000	604.100	3020.000
GR	603.600	3050.000	604.000	3090.000	603.900	3120.000	604.200	3130.000	604.100	3150.000
GR	603.700	3160.000	604.500	3170.000	604.100	3180.000	604.300	3190.000	604.700	3200.000
GR	604.100	3210.000	604.300	3220.000	604.900	3230.000	603.600	3240.000	604.700	3260.000
GR	604.900	3270.000	605.400	3300.000	606.900	3310.000	611.400	3325.000	612.900	3330.000
GR	616.600	3355.000	614.000	3360.000	615.600	3365.000	616.700	3370.000	612.000	3384.000
GR	616.700	3400.000	617.000	3407.000	616.900	3414.000	615.300	3417.000	614.700	3442.000
GR	613.400	3450.000	613.900	3510.000	620.000	4625.000	630.000	4875.000	640.000	4925.000
GR	650.000	4975.000	660.000	5050.000	670.000	5130.000	670.000	5330.000	660.000	5530.000
GR	650.000	5680.000	640.000	6330.000	640.000	7030.000	650.000	7430.000	660.000	7730.000
GR	670.000	7980.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

X1	4.100	0.0	0.0	0.0	500.000	500.000	500.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	2300.000	0.0	3875.000	0.0	0.0	0.0	0.0
NC	0.100	0.100	0.030	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.0	0.0	0.0	0.100	0.300	0.0	0.0	0.0	0.0	0.0

CROSS SECTION NO. 5

X1	5.000	47.000	2050.000	2453.000	6250.000	5500.000	6398.000	0.0	0.0	0.0
GR	680.000	0.0	650.000	50.000	640.000	100.000	630.000	250.000	620.000	800.000
GR	616.500	1750.000	617.300	1821.000	616.100	1850.000	613.800	1902.000	613.900	1950.000
GR	615.900	2011.000	618.800	2039.000	613.700	2050.000	611.700	2051.000	606.600	2060.000
GR	601.600	2190.000	602.400	2260.000	604.200	2320.000	603.900	2330.000	604.200	2340.000
GR	604.800	2350.000	607.000	2370.000	611.700	2388.000	613.100	2410.000	614.700	2420.000
GR	614.600	2436.000	617.600	2453.000	617.600	2468.000	614.000	2489.000	614.300	2500.000
GR	615.500	2511.000	614.600	2524.000	614.300	2583.000	619.600	2616.000	615.400	2699.000
GR	620.000	3300.000	630.000	3450.000	640.000	3650.000	650.000	4050.000	640.000	4750.000
GR	640.000	4950.000	650.000	5750.000	650.000	7050.000	660.000	7250.000	660.000	7950.000
GR	670.000	8750.000	680.000	9450.000	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.110	0.110	0.033	0.0	0.0	0.0	0.0	0.0	0.0	0.0

CROSS SECTION NO. 6

X1	6.000	46.000	2900.000	3242.000	5500.000	4500.000	6335.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	1300.000	0.0	4751.000	0.0	0.0	0.0	0.0
GR	680.000	0.0	660.000	150.000	650.000	250.000	640.000	400.000	630.000	850.000
GR	620.000	2500.000	617.700	2600.000	618.200	2630.000	617.700	2700.000	618.200	2733.000
GR	617.200	2770.000	617.100	2800.000	618.200	2831.000	618.600	2865.000	616.700	2900.000
GR	607.600	2905.000	605.300	2910.000	603.100	2920.000	602.600	2990.000	602.300	3030.000
GR	602.500	3040.000	602.400	3070.000	606.200	3120.000	606.300	3130.000	607.500	3150.000
GR	608.400	3160.000	607.900	3190.000	610.800	3210.000	611.600	3230.000	613.200	3242.000
GR	613.900	3265.000	611.500	3296.000	614.900	3323.000	615.300	3335.000	613.100	3362.000
GR	617.400	3410.000	615.500	3436.000	615.600	3550.000	620.000	4450.000	630.000	4900.000
GR	640.000	4950.000	650.000	4975.000	650.000	7700.000	660.000	7850.000	670.000	7925.000
GR	680.000	8300.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.090	0.100	0.030	0.0	0.0	0.0	0.0	0.0	0.0	0.0

CROSS SECTION NO. 7

X1	7.000	47.000	3650.000	4125.000	3800.000	4100.000	4380.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	1300.000	0.0	4500.000	0.0	0.0	0.0	0.0
GR	680.000	0.0	650.000	200.000	640.000	500.000	630.000	950.000	620.000	2800.000
GR	618.500	3350.000	619.700	3389.000	618.000	3405.000	618.200	3463.000	620.700	3480.000
GR	620.800	3495.000	618.600	3570.000	621.600	3575.000	621.000	3610.000	621.600	3620.000
GR	620.000	3650.000	612.900	3654.000	609.600	3660.000	606.100	3670.000	605.300	3690.000
GR	604.500	3700.000	605.000	3710.000	604.900	3720.000	604.500	3730.000	604.500	3760.000
GR	604.200	3800.000	604.700	3810.000	603.500	3850.000	604.600	3880.000	604.900	3910.000
GR	604.500	3940.000	603.900	3970.000	603.200	3990.000	604.800	4020.000	613.000	4077.000
GR	614.000	4107.000	617.600	4125.000	617.000	4128.000	617.400	4150.000	620.500	4250.000
GR	620.000	4311.000	624.900	4340.000	630.000	4675.000	640.000	5275.000	640.000	6425.000
GR	650.000	6625.000	680.000	6755.000	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.100	0.100	0.033	0.0	0.0	0.0	0.0	0.0	0.0	0.0

CROSS SECTION NO. 8

X1	8.000	51.000	3134.000	3583.000	6400.000	5000.000	6180.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	1879.000	0.0	0.0	0.0	0.0	0.0	0.0
GR	633.000	894.000	632.650	924.000	632.100	994.000	629.700	1054.000	629.000	1154.000
GR	628.000	1234.000	631.000	1254.000	630.700	1584.000	628.000	1834.000	617.000	1854.000
GR	616.000	2084.000	615.000	2684.000	612.700	2834.000	612.400	2924.000	614.600	3034.000
GR	625.000	3094.000	625.700	3106.000	625.700	3106.000	625.700	3106.000	625.700	3106.000
GR	625.700	3118.000	615.800	3134.000	615.600	3150.000	609.400	3160.000	608.000	3170.000
GR	607.900	3180.000	606.800	3200.000	607.400	3210.000	607.400	3220.000	609.600	3230.000
GR	609.100	3240.000	609.600	3250.000	607.800	3280.000	605.100	3440.000	605.200	3490.000
GR	604.700	3500.000	605.100	3520.000	606.000	3540.000	608.300	3560.000	610.000	3570.000
GR	613.700	3581.000	618.500	3583.000	619.000	3600.000	617.200	3765.000	617.400	3776.000
GR	619.900	3800.000	628.000	3900.000	640.000	4250.000	660.000	4350.000	680.000	4550.000
GR	700.000	4700.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

X1	8.100	46.000	3134.000	3583.000	1100.000	1500.000	1250.000	0.0	0.0	0.0
GR	640.000	1984.000	628.800	1984.000	628.900	2054.000	628.000	2084.000	615.400	2134.000
GR	616.000	2254.000	616.900	2554.000	615.400	2654.000	613.300	2764.000	613.100	2864.000
GR	613.600	2974.000	616.200	3054.000	626.000	3114.000	626.000	3114.000	626.000	3114.000
GR	625.700	3118.000	615.800	3134.000	615.600	3150.000	609.400	3160.000	608.000	3170.000
GR	607.900	3180.000	606.800	3200.000	607.400	3210.000	607.400	3220.000	609.600	3230.000
GR	609.100	3240.000	609.600	3250.000	607.800	3280.000	605.100	3440.000	605.200	3490.000
GR	604.700	3500.000	605.100	3520.000	606.000	3540.000	608.300	3560.000	610.000	3570.000
GR	613.700	3581.000	618.500	3583.000	619.000	3600.000	617.200	3765.000	617.400	3776.000
GR	619.900	3800.000	628.000	3900.000	640.000	4250.000	660.000	4350.000	680.000	4550.000
GR	700.000	4700.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

X1	8.900	0.0	0.0	0.0	1200.000	1200.000	1200.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	2456.000	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.100	0.100	0.033	0.0	0.0	0.0	0.0	0.0	0.0	0.0

CROSS SECTION NO. 9

X1	9.000	33.000	3600.000	3980.000	720.000	720.000	720.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	3100.000	0.0	0.0	0.0	0.0	0.0	0.0
GR	700.000	0.0	680.000	350.000	660.000	650.000	640.000	1125.000	620.000	3440.000
GR	614.800	3518.000	616.800	3531.000	625.200	3564.000	625.700	3587.000	619.300	3594.000
GR	616.300	3600.000	609.900	3610.000	607.700	3640.000	608.900	3690.000	608.500	3700.000
GR	609.100	3710.000	608.900	3810.000	608.600	3820.000	608.800	3860.000	609.100	3890.000
GR	610.800	3940.000	611.600	3950.000	615.300	3960.000	616.300	3967.000	618.400	3993.000
GR	627.200	4013.000	626.000	4031.000	618.100	4058.000	620.000	4065.000	640.000	4485.000
GR	660.000	5010.000	680.000	5160.000	700.000	5335.000	0.0	0.0	0.0	0.0
NC	0.0	0.0	0.0	0.300	0.500	0.0	0.0	0.0	0.0	0.0
NC	0.100	0.100	0.030	0.0	0.0	0.0	0.0	0.0	0.0	0.0

X1	9.900	38.000	2500.000	2884.000	1415.000	1415.000	1415.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	2134.000	0.0	3250.000	0.0	0.0	0.0	0.0
GR	700.000	0.0	680.000	100.000	660.000	1250.000	640.000	1775.000	620.000	2100.000

GR	615.700	2260.000	617.200	2400.000	615.900	2500.000	614.400	2502.000	610.200	2510.000
GR	607.500	2530.000	606.900	2550.000	606.300	2560.000	605.300	2570.000	604.800	2600.000
GR	605.200	2620.000	604.100	2650.000	603.700	2670.000	604.000	2680.000	603.800	2690.000
GR	604.300	2710.000	605.800	2750.000	605.400	2780.000	604.700	2790.000	605.300	2800.000
GR	604.400	2840.000	604.700	2850.000	606.200	2860.000	608.500	2870.000	614.500	2880.000
GR	619.200	2884.000	616.900	2940.000	617.000	2985.000	619.300	2998.000	640.000	3310.000
GR	660.000	3535.000	680.000	3785.000	700.000	3885.000	0.0	0.0	0.0	0.0
X1	10.000	0.0	0.0	0.0	1415.000	1415.000	1415.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	2488.000	0.0	2897.000	0.0	0.0	0.0	0.0

DOWNSTREAM M-21 HIGHWAY BRIDGE

X1	10.100	40.000	4350.000	4830.000	50.000	50.000	50.000	0.838	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	631.500	631.500	0.0
GR	640.000	0.0	630.000	900.000	620.000	3800.000	620.000	4350.000	620.000	4375.000
GR	604.000	4412.000	604.000	4415.000	603.000	4420.000	603.000	4430.000	606.500	4460.000
GR	606.000	4470.000	604.500	4480.000	605.500	4483.000	605.000	4500.000	606.000	4510.000
GR	605.500	4520.000	602.000	4555.000	602.000	4558.000	602.000	4565.000	600.000	4570.000
GR	604.500	4580.000	605.000	4600.000	604.500	4612.000	606.000	4620.000	600.000	4625.000
GR	600.000	4628.000	605.000	4650.000	605.000	4675.000	603.500	4690.000	605.500	4695.000
GR	605.500	4698.000	604.500	4700.000	605.800	4710.000	606.000	4755.000	606.000	4758.000
GR	609.000	4770.000	620.000	4795.000	620.000	4830.000	630.000	5000.000	640.000	5140.000
SB	0.900	1.500	2.800	0.0	300.000	18.000	8450.000	2.500	604.700	604.700

UPSTREAM M-21 HIGHWAY BRIDGE

X1	10.200	0.0	0.0	0.0	34.000	34.000	34.000	0.0	0.0	0.0
X2	0.0	0.0	1.000	629.200	633.900	0.0	0.0	0.0	0.838	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	633.900	633.900	0.0
BT	7.000	0.0	640.000	640.000	900.000	633.900	633.900	4350.000	633.900	633.900
BT	4350.000	633.900	629.200	4830.000	633.900	629.200	4830.000	633.900	633.900	5140.000
BT	640.000	640.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X1	11.000	38.000	2500.000	2884.000	50.000	50.000	50.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	2450.000	0.0	2934.000	0.0	0.0	0.0	0.0
GR	700.000	0.0	680.000	100.000	660.000	1250.000	640.000	1775.000	620.000	2100.000
GR	615.700	2260.000	617.200	2400.000	615.900	2500.000	614.400	2502.000	610.200	2510.000
GR	607.500	2530.000	606.900	2550.000	606.300	2560.000	605.300	2570.000	604.800	2600.000
GR	605.200	2620.000	604.100	2650.000	603.700	2670.000	604.000	2680.000	603.800	2690.000
GR	604.300	2710.000	605.800	2750.000	605.400	2780.000	604.700	2790.000	605.300	2800.000
GR	604.400	2840.000	604.700	2850.000	606.200	2860.000	608.500	2870.000	614.500	2880.000
GR	619.200	2884.000	616.900	2940.000	617.000	2985.000	619.300	2998.000	640.000	3310.000
GR	660.000	3535.000	680.000	3785.000	700.000	3885.000	0.0	0.0	0.0	0.0
QT	4.000	30300.000	44100.000	50500.000	67900.000	0.0	0.0	0.0	0.0	0.0
X1	11.100	0.0	0.0	0.0	243.000	243.000	243.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	2207.000	0.0	3177.000	0.0	0.0	0.0	0.0

CONFLUENCE THORNAPPLE RIVER

X1	11.500	0.0	0.0	0.0	243.000	243.000	243.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	1964.000	0.0	0.0	0.0	0.0	0.0	0.0
QT	4.000	25000.000	36300.000	41600.000	56000.000	0.0	0.0	0.0	0.0	0.0
X1	11.700	0.0	0.0	0.0	182.000	182.000	182.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	1782.000	0.0	0.0	0.0	0.0	0.0	0.0
X1	11.900	38.000	5250.000	5611.000	182.000	182.000	182.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	4350.000	0.0	0.0	0.0	0.0	0.0	0.0

GR	700.000	0.0	680.000	425.000	660.000	1250.000	640.000	2400.000	630.000	3775.000
GR	615.900	4950.000	619.400	4980.000	619.400	5050.000	620.000	5110.000	621.200	5130.000
GR	622.500	5240.000	618.300	5250.000	614.800	5252.000	610.300	5260.000	608.200	5270.000
GR	607.200	5360.000	606.700	5370.000	607.000	5380.000	607.400	5390.000	606.900	5410.000
GR	606.700	5430.000	607.000	5450.000	607.300	5520.000	607.000	5530.000	607.700	5560.000
GR	608.100	5570.000	610.200	5590.000	614.400	5610.000	615.500	5611.000	616.900	5620.000
GR	618.800	5650.000	622.600	5750.000	623.900	5800.000	624.500	5850.000	640.000	6136.000
GR	660.000	6400.000	680.000	6510.000	700.000	6600.000	0.0	0.0	0.0	0.0
NC	0.0	0.0	0.0	0.100	0.300	0.0	0.0	0.0	0.0	0.0

CROSS SECTION NO. 12

X1	12.000	0.0	0.0	0.0	146.000	146.000	146.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	4204.000	0.0	0.0	0.0	0.0	0.0	0.0

CASCADE-ADA TOWNSHIP LINE

X1	13.000	34.000	23 0.000	2647.000	4870.000	4870.000	4870.000	0.0	0.0	0.0
GR	700.000	0.0	680.000	100.000	660.000	200.000	640.000	670.000	618.700	2000.000
GR	619.800	2100.000	619.900	2200.000	621.900	2266.000	616.600	2300.000	615.400	2301.000
GR	612.200	2310.000	609.800	2320.000	608.300	2330.000	608.200	2350.000	608.600	2360.000
GR	608.700	2370.000	608.300	2380.000	608.600	2400.000	608.200	2450.000	607.000	2560.000
GR	607.500	2600.000	609.500	2620.000	620.200	2647.000	618.000	2750.000	618.800	2770.000
GR	619.800	2825.000	620.800	2840.000	620.400	2900.000	620.800	2950.000	640.000	3900.000
GR	660.000	4175.000	680.000	4225.000	680.000	4550.000	700.000	4650.000	0.0	0.0
EJ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

THIS RUN EXECUTED 01/17/79

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**********************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED  AUG1977
  ERROR CORR -  01.02
  MODIFICATION -  50.51.52.53
**********************************************************

T1      ADA TOWNSHIP HUD1 62-0104-009
T2      50-YEAR FLOOD
T3      GRAND RIVER, KENT COUNTY, MICHIGAN.
J1  ICHECK    INQ      NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ
       .0.      3.        0.        .0.  0.0          0.0       0.0        0.    624.700     0.0
J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE
     2.000      0.0    -1.000       0.0       0.0       0.0       0.0       0.0       0.0       0.0
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THIS RUN EXECUTED 01/17/79

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*****************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED  AUG1977
  ERROR CORR -  01,02
  MODIFICATION -  50,51,52,53
*****************************************************

T1       ADA TOWNSHIP HUD1 62-0104-009
T2       100-YEAR FLOOD
T3       GRAND RIVER, KENT COUNTY, MICHIGAN.
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J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
	0.	4.	0.	0.	0.0	0.0	0.0	0.	626.040	0.0

J2	NPROF	IPLOT	PREVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	3.000	0.0	-1.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0

THIS RUN EXECUTED 01/17/79

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**********************************************
  HEC2 RELEASE DATED NOV 76 UPDATED  AUG1977
  ERROR CORR -  01.02
  MODIFICATION -  50.51.52.53
**********************************************

T1      ADA TOWNSHIP HUD1 62-0104-009
T2      500-YEAR FLOOD
T3      GRAND RIVER, KENT COUNTY, MICHIGAN.
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J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
	0.	5.	0.	0.	0.0	0.0	0.0	0.	629.610	0.0

J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	15.000	0.0	-1.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0

THIS RUN EXECUTED 01/17/79

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**********************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED  AUG1977
  ERROR CORR -  01.02
  MODIFICATION -  50.51.52.53
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NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

GRAND RIVER, KENT COUNTY

SUMMARY PRINTOUT TABLE 150

SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10K*S	VCH	AREA	.01K
1.000	0.0	0.0	0.0	598.20	30800.00	621.46	0.0	621.57	0.84	3.12	21105.39	33538.16
1.000	0.0	0.0	0.0	598.20	44900.00	624.70	0.0	624.84	0.89	3.58	27585.38	47474.51
1.000	0.0	0.0	0.0	598.20	51400.00	626.04	0.0	626.19	0.91	3.77	30265.54	53853.00
1.000	0.0	0.0	0.0	598.20	69200.00	629.61	0.0	629.78	0.91	4.15	37405.68	72488.75
2.000	3650.00	0.0	0.0	599.50	30800.00	621.76	0.0	622.00	1.53	4.21	12992.15	24921.54
2.000	3650.00	0.0	0.0	599.50	44900.00	625.00	0.0	625.29	1.58	4.76	18872.22	35767.79
2.000	3650.00	0.0	0.0	599.50	51400.00	626.34	0.0	626.65	1.58	4.96	21376.23	40906.42
2.000	3650.00	0.0	0.0	599.50	69200.00	629.90	0.0	630.23	1.51	5.35	28246.52	56257.14
2.100	2150.00	0.0	0.0	599.50	30800.00	622.08	0.0	622.33	1.51	4.23	11327.86	25092.22
2.100	2150.00	0.0	0.0	599.50	44900.00	625.32	0.0	625.65	1.67	4.95	15395.45	34742.49
2.100	2150.00	0.0	0.0	599.50	51400.00	626.66	0.0	627.02	1.72	5.23	17134.68	39182.49
2.100	2150.00	0.0	0.0	599.50	69200.00	630.18	0.0	630.61	1.76	5.80	22005.13	52205.04
3.000	3263.00	0.0	0.0	603.60	30800.00	622.59	0.0	622.73	0.89	3.20	15312.27	32563.07
3.000	3263.00	0.0	0.0	603.60	44900.00	625.91	0.0	626.10	0.98	3.76	20174.37	45328.78
3.000	3263.00	0.0	0.0	603.60	51400.00	627.27	0.0	627.48	1.01	3.97	22169.41	51107.67
3.000	3263.00	0.0	0.0	603.60	69200.00	630.84	0.0	631.09	1.05	4.46	27387.75	67618.62
3.100	49.00	0.0	0.0	599.00	30800.00	622.57	0.0	622.77	1.26	3.63	8901.26	27416.02
3.100	49.00	0.0	0.0	599.00	44900.00	625.87	0.0	626.15	1.49	4.34	12415.37	36753.01
3.100	49.00	0.0	0.0	599.00	51400.00	627.22	0.0	627.54	1.54	4.60	14277.60	41385.50
3.100	49.00	0.0	0.0	599.00	69200.00	630.78	0.0	631.15	1.55	5.10	19469.74	55557.49
3.110	1.00	620.00	626.70	599.00	30800.00	622.52	0.0	622.82	0.60	4.39	7418.64	39906.39
3.110	1.00	620.00	626.70	599.00	44900.00	625.80	0.0	626.22	0.70	5.27	10639.80	53563.96
3.110	1.00	620.00	626.70	599.00	51400.00	627.14	0.0	627.62	1.84	5.65	12129.84	37841.61
3.110	1.00	620.00	626.70	599.00	69200.00	630.59	0.0	631.34	3.04	7.24	15546.68	39720.74
3.190	44.00	620.00	626.70	599.00	30800.00	622.52	0.0	622.82	0.60	4.39	7421.77	39922.43
3.190	44.00	620.00	626.70	599.00	44900.00	625.80	0.0	626.23	0.70	5.27	10645.70	53587.42
3.190	44.00	620.00	626.70	599.00	51400.00	627.15	0.0	627.63	1.84	5.65	12135.53	37844.25
3.190	44.00	620.00	626.70	599.00	69200.00	630.60	0.0	631.35	3.03	7.24	15559.05	39729.10
3.200	1.00	0.0	0.0	599.00	30800.00	622.65	0.0	622.85	0.31	3.62	8968.85	55164.81
3.200	1.00	0.0	0.0	599.00	44900.00	625.97	0.0	626.27	0.37	4.36	12553.59	73477.25
3.200	1.00	0.0	0.0	599.00	51400.00	627.35	0.0	627.68	0.39	4.64	14457.66	82391.87
3.200	1.00	0.0	0.0	599.00	69200.00	631.05	0.0	631.46	0.40	5.21	19928.86	109493.81

SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	IOK*S	VCH	AREA	.01K
4.000	49.00	0.0	0.0	603.60	30800.00	622.74	0.0	622.87	0.86	3.15	15901.58	33262.73
4.000	49.00	0.0	0.0	603.60	44900.00	626.13	0.0	626.30	0.93	3.67	21133.50	46680.79
4.000	49.00	0.0	0.0	603.60	51400.00	627.53	0.0	627.72	0.95	3.87	23291.41	52803.38
4.000	49.00	0.0	0.0	603.60	69200.00	631.28	0.0	631.51	0.95	4.30	29084.82	70827.62
4.100	500.00	0.0	0.0	603.60	30800.00	622.78	0.0	622.91	0.85	3.15	15387.11	33362.71
4.100	500.00	0.0	0.0	603.60	44900.00	626.17	0.0	626.35	0.92	3.66	20595.07	46830.40
4.100	500.00	0.0	0.0	603.60	51400.00	627.58	0.0	627.77	0.94	3.86	22802.02	53090.98
4.100	500.00	0.0	0.0	603.60	69200.00	631.34	0.0	631.56	0.93	4.26	28742.11	71686.44
5.000	6398.00	0.0	0.0	601.60	30800.00	623.37	0.0	623.51	1.06	3.43	19869.38	29962.33
5.000	6398.00	0.0	0.0	601.60	44900.00	626.79	0.0	626.95	0.98	3.71	29653.99	45437.96
5.000	6398.00	0.0	0.0	601.60	51400.00	628.21	0.0	628.36	0.95	3.82	33925.70	52837.55
5.000	6398.00	0.0	0.0	601.60	69200.00	631.97	0.0	632.12	0.84	3.98	45916.82	75605.25
6.000	6335.00	0.0	0.0	602.30	30800.00	624.09	0.0	624.25	1.42	3.73	19079.63	25875.45
6.000	6335.00	0.0	0.0	602.30	44900.00	627.45	0.0	627.62	1.34	4.05	29694.42	38831.59
6.000	6335.00	0.0	0.0	602.30	51400.00	628.84	0.0	629.01	1.28	4.13	34481.23	45397.15
6.000	6335.00	0.0	0.0	602.30	69200.00	632.52	0.0	632.68	1.12	4.25	47185.12	65487.95
7.000	4380.00	0.0	0.0	603.20	30800.00	624.59	0.0	624.73	0.87	3.18	16169.20	33072.11
7.000	4380.00	0.0	0.0	603.20	44900.00	627.92	0.0	628.08	0.88	3.58	25441.34	47939.97
7.000	4380.00	0.0	0.0	603.20	51400.00	629.29	0.0	629.45	0.86	3.68	29820.96	55495.74
7.000	4380.00	0.0	0.0	603.20	69200.00	632.90	0.0	633.07	0.77	3.86	41400.62	78672.44
8.000	6180.00	0.0	0.0	604.70	30800.00	625.17	0.0	625.26	0.84	2.79	21787.79	33530.27
8.000	6180.00	0.0	0.0	604.70	44900.00	628.52	0.0	628.63	0.89	3.21	28500.90	47677.20
8.000	6180.00	0.0	0.0	604.70	51400.00	629.88	0.0	630.00	0.90	3.38	31291.84	54063.12
8.000	6180.00	0.0	0.0	604.70	69200.00	633.45	0.0	633.59	0.91	3.74	38894.23	72594.37
8.100	1250.00	0.0	0.0	604.70	30800.00	625.27	0.0	625.37	0.92	2.93	19538.27	32117.10
8.100	1250.00	0.0	0.0	604.70	44900.00	628.62	0.0	628.75	0.98	3.39	25572.81	45387.61
8.100	1250.00	0.0	0.0	604.70	51400.00	629.98	0.0	630.12	1.00	3.57	28209.23	51406.76
8.100	1250.00	0.0	0.0	604.70	69200.00	633.55	0.0	633.71	1.01	3.95	35438.44	68971.50
8.900	1200.00	0.0	0.0	604.70	30800.00	625.37	0.0	625.50	1.03	3.10	16522.54	30398.79
8.900	1200.00	0.0	0.0	604.70	44900.00	628.73	0.0	628.89	1.13	3.65	21332.55	42294.24
8.900	1200.00	0.0	0.0	604.70	51400.00	630.08	0.0	630.26	1.17	3.86	23344.40	47611.43
8.900	1200.00	0.0	0.0	604.70	69200.00	633.64	0.0	633.86	1.21	4.34	28874.12	62924.02
9.000	720.00	0.0	0.0	607.70	30800.00	625.33	0.0	625.68	2.98	4.93	8812.77	17848.09
9.000	720.00	0.0	0.0	607.70	44900.00	628.65	0.0	629.10	3.04	5.64	12482.67	25758.14
9.000	720.00	0.0	0.0	607.70	51400.00	630.01	0.0	630.48	3.06	5.92	14047.21	29395.43
9.000	720.00	0.0	0.0	607.70	69200.00	633.55	0.0	634.09	2.98	6.49	18336.25	40076.34
9.900	1415.00	0.0	0.0	603.70	30800.00	625.77	0.0	625.96	1.02	3.65	12201.78	30454.20
9.900	1415.00	0.0	0.0	603.70	44900.00	629.14	0.0	629.40	1.21	4.41	15522.00	40740.69
9.900	1415.00	0.0	0.0	603.70	51400.00	630.49	0.0	630.80	1.29	4.72	16910.96	45282.14
9.900	1415.00	0.0	0.0	603.70	69200.00	634.03	0.0	634.41	1.42	5.41	20651.01	58105.62
10.000	1415.00	0.0	0.0	603.70	30800.00	625.90	0.0	626.14	1.20	3.97	7933.67	28094.45
10.000	1415.00	0.0	0.0	603.70	44900.00	629.27	0.0	629.65	1.52	4.96	9312.43	36399.12
10.000	1415.00	0.0	0.0	603.70	51400.00	630.63	0.0	631.07	1.65	5.37	9867.71	39981.76
10.000	1415.00	0.0	0.0	603.70	69200.00	634.14	0.0	634.76	1.93	6.33	11305.00	49865.09

SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10K*S	VCH	AREA	.01K
10.100	50.00	0.0	0.0	600.00	30800.00	625.89	0.0	626.17	1.55	4.18	7362.53	24708.05
10.100	50.00	0.0	0.0	600.00	44900.00	629.26	0.0	629.68	1.89	5.15	8718.80	32691.20
10.100	50.00	0.0	0.0	600.00	51400.00	630.62	0.0	631.10	2.02	5.55	9264.81	36140.60
10.100	50.00	0.0	0.0	600.00	69200.00	634.70	0.0	634.90	0.96	4.27	43608.61	70780.25
10.200	34.00	633.90	629.20	600.00	30800.00	625.90	0.0	626.18	1.55	4.18	7364.20	24717.30
10.200	34.00	633.90	629.20	600.00	44900.00	629.52	0.0	629.92	1.82	5.09	8818.57	33311.68
10.200	34.00	633.90	629.20	600.00	51400.00	631.02	0.0	631.48	1.91	5.45	9422.74	37162.59
10.200	34.00	633.90	629.20	600.00	69200.00	635.35	0.0	635.53	0.85	4.08	46121.34	75170.69
11.000	50.00	0.0	0.0	603.70	30800.00	625.96	0.0	626.19	1.16	3.91	8623.37	28641.27
11.000	50.00	0.0	0.0	603.70	44900.00	629.59	0.0	629.95	1.40	4.80	10382.34	37941.11
11.000	50.00	0.0	0.0	603.70	51400.00	631.11	0.0	631.51	1.49	5.16	11113.34	42107.68
11.000	50.00	0.0	0.0	603.70	69200.00	635.18	0.0	635.71	1.63	5.96	13083.61	54177.12
11.100	243.00	0.0	0.0	603.70	30300.00	626.05	0.0	626.23	0.96	3.57	11890.89	30905.75
11.100	243.00	0.0	0.0	603.70	44100.00	629.75	0.0	630.00	1.10	4.27	15297.57	42111.48
11.100	243.00	0.0	0.0	603.70	50500.00	631.29	0.0	631.58	1.14	4.54	16778.30	47250.80
11.100	243.00	0.0	0.0	603.70	67900.00	635.45	0.0	635.80	1.18	5.10	20815.00	62528.16
11.500	243.00	0.0	0.0	603.70	30300.00	626.09	0.0	626.26	0.92	3.50	13024.17	31574.20
11.500	243.00	0.0	0.0	603.70	44100.00	629.81	0.0	630.04	1.02	4.13	17318.37	43619.59
11.500	243.00	0.0	0.0	603.70	50500.00	631.36	0.0	631.61	1.05	4.37	19187.09	49214.88
11.500	243.00	0.0	0.0	603.70	67900.00	635.54	0.0	635.84	1.06	4.85	24405.91	65879.87
11.700	182.00	0.0	0.0	603.70	25000.00	626.17	0.0	626.29	0.62	2.87	13125.87	31849.00
11.700	182.00	0.0	0.0	603.70	36300.00	629.92	0.0	630.07	0.68	3.38	17474.03	43996.67
11.700	182.00	0.0	0.0	603.70	41600.00	631.48	0.0	631.65	0.70	3.58	19417.12	49640.66
11.700	182.00	0.0	0.0	603.70	56000.00	635.69	0.0	635.89	0.71	3.98	25026.42	66526.06
11.900	182.00	0.0	0.0	606.70	25000.00	626.17	0.0	626.32	0.93	3.28	13524.44	25973.37
11.900	182.00	0.0	0.0	606.70	36300.00	629.93	0.0	630.09	0.89	3.65	19404.29	38422.25
11.900	182.00	0.0	0.0	606.70	41600.00	631.49	0.0	631.67	0.88	3.79	21927.30	44312.90
11.900	182.00	0.0	0.0	606.70	56000.00	635.72	0.0	635.91	0.81	4.06	28953.41	62174.30
12.000	146.00	0.0	0.0	606.70	25000.00	626.19	0.0	626.33	0.93	3.28	13852.34	25954.43
12.000	146.00	0.0	0.0	606.70	36300.00	629.95	0.0	630.11	0.88	3.61	20281.37	38779.09
12.000	146.00	0.0	0.0	606.70	41600.00	631.51	0.0	631.68	0.86	3.74	23038.26	44894.04
12.000	146.00	0.0	0.0	606.70	56000.00	635.74	0.0	635.92	0.78	3.97	30712.94	63554.98
13.000	4870.00	0.0	0.0	607.00	25000.00	626.66	0.0	626.82	1.07	3.49	13194.20	24114.97
13.000	4870.00	0.0	0.0	607.00	36300.00	630.39	0.0	630.57	1.00	3.82	20439.47	36227.35
13.000	4870.00	0.0	0.0	607.00	41600.00	631.95	0.0	632.13	0.97	3.94	23923.05	42200.24
13.000	4870.00	0.0	0.0	607.00	56000.00	636.13	0.0	636.31	0.84	4.09	34662.47	61167.54

GRAND RIVER. KENT COUNTY

SUMMARY PRINTOUT TABLE 150

SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
1.000	30800.00	621.46	0.0	0.0	0.0	2000.00	0.0
1.000	44900.00	624.70	3.24	0.0	0.0	2000.00	0.0
1.000	51400.00	626.04	1.34	0.0	0.0	2000.00	0.0
1.000	69200.00	629.61	3.57	0.0	0.0	2000.00	0.0
2.000	30800.00	621.76	0.0	0.30	0.0	1809.16	3650.00
2.000	44900.00	625.00	3.24	0.30	0.0	1843.32	3650.00
2.000	51400.00	626.34	1.34	0.30	0.0	1878.18	3650.00
2.000	69200.00	629.90	3.56	0.29	0.0	1970.65	3650.00
2.100	30800.00	622.08	0.0	0.32	0.0	1243.04	2150.00
2.100	44900.00	625.32	3.24	0.32	0.0	1284.82	2150.00
2.100	51400.00	626.66	1.34	0.31	0.0	1319.42	2150.00
2.100	69200.00	630.18	3.53	0.28	0.0	1714.29	2150.00
3.000	30800.00	622.59	0.0	0.51	0.0	1465.00	3263.00
3.000	44900.00	625.91	3.32	0.59	0.0	1465.00	3263.00
3.000	51400.00	627.27	1.36	0.62	0.0	1465.00	3263.00
3.000	69200.00	630.84	3.56	0.65	0.0	1465.00	3263.00
3.100	30800.00	622.57	0.0	-0.03	0.0	837.23	49.00
3.100	44900.00	625.87	3.30	-0.04	0.0	1288.08	49.00
3.100	51400.00	627.22	1.35	-0.05	0.0	1440.57	49.00
3.100	69200.00	630.78	3.56	-0.06	0.0	1621.58	49.00
3.110	30800.00	622.52	0.0	-0.05	0.0	830.72	1.00
3.110	44900.00	625.80	3.28	-0.07	0.0	1278.94	1.00
3.110	51400.00	627.14	1.34	-0.08	0.0	1441.33	1.00
3.110	69200.00	630.59	3.45	-0.19	0.0	1880.19	1.00
3.190	30800.00	622.52	0.0	0.00	0.0	831.29	44.00
3.190	44900.00	625.80	3.28	0.00	0.0	1279.59	44.00
3.190	51400.00	627.15	1.35	0.01	0.0	1442.02	44.00
3.190	69200.00	630.60	3.46	0.01	0.0	1882.86	44.00
3.200	30800.00	622.65	0.0	0.13	0.0	848.19	1.00
3.200	44900.00	625.97	3.33	0.17	0.0	1302.20	1.00
3.200	51400.00	627.35	1.37	0.20	0.0	1442.00	1.00
3.200	69200.00	631.05	3.71	0.45	0.0	1686.87	1.00
4.000	30800.00	622.74	0.0	0.09	0.0	1542.00	49.00
4.000	44900.00	626.13	3.39	0.15	0.0	1542.00	49.00
4.000	51400.00	627.53	1.40	0.18	0.0	1542.00	49.00
4.000	69200.00	631.28	3.76	0.23	0.0	1542.00	49.00
4.100	30800.00	622.78	0.0	0.04	0.0	1490.39	500.00
4.100	44900.00	626.17	3.40	0.05	0.0	1575.00	500.00
4.100	51400.00	627.58	1.40	0.05	0.0	1575.00	500.00
4.100	69200.00	631.34	3.76	0.05	0.0	1575.00	500.00
5.000	30800.00	623.37	0.0	0.59	0.0	2735.79	6398.00
5.000	44900.00	626.79	3.43	0.62	0.0	2975.63	6398.00
5.000	51400.00	628.21	1.41	0.63	0.0	3074.48	6398.00
5.000	69200.00	631.97	3.76	0.63	0.0	3268.88	6398.00

SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
6.000	30800.00	624.09	0.0	0.72	0.0	2808.01	6335.00
6.000	44900.00	627.45	3.36	0.65	0.0	3451.00	6335.00
6.000	51400.00	628.84	1.39	0.63	0.0	3451.00	6335.00
6.000	69200.00	632.52	3.68	0.55	0.0	3451.00	6335.00
7.000	30800.00	624.59	0.0	0.50	0.0	2387.68	4380.00
7.000	44900.00	627.92	3.33	0.47	0.0	3165.62	4380.00
7.000	51400.00	629.29	1.37	0.45	0.0	3200.00	4380.00
7.000	69200.00	632.90	3.62	0.39	0.0	3200.00	4380.00
8.000	30800.00	625.17	0.0	0.59	0.0	1964.24	6180.00
8.000	44900.00	628.52	3.35	0.60	0.0	2036.23	6180.00
8.000	51400.00	629.88	1.36	0.59	0.0	2075.83	6180.00
8.000	69200.00	633.45	3.57	0.54	0.0	2180.03	6180.00
8.100	30800.00	625.27	0.0	0.10	0.0	1762.48	1250.00
8.100	44900.00	628.62	3.35	0.10	0.0	1855.33	1250.00
8.100	51400.00	629.98	1.36	0.10	0.0	1973.95	1250.00
8.100	69200.00	633.55	3.57	0.10	0.0	2078.02	1250.00
8.900	30800.00	625.37	0.0	0.10	0.0	1403.29	1200.00
8.900	44900.00	628.73	3.35	0.10	0.0	1465.43	1200.00
8.900	51400.00	630.08	1.36	0.10	0.0	1504.93	1200.00
8.900	69200.00	633.64	3.56	0.09	0.0	1608.54	1200.00
9.000	30800.00	625.33	0.0	-0.04	0.0	1035.18	720.00
9.000	44900.00	628.66	3.33	-0.07	0.0	1146.88	720.00
9.000	51400.00	630.01	1.35	-0.07	0.0	1175.18	720.00
9.000	69200.00	633.55	3.54	-0.09	0.0	1249.47	720.00
9.900	30800.00	625.77	0.0	0.44	0.0	961.55	1415.00
9.900	44900.00	629.14	3.36	0.48	0.0	1012.25	1415.00
9.900	51400.00	630.49	1.36	0.49	0.0	1032.73	1415.00
9.900	69200.00	634.03	3.53	0.48	0.0	1085.94	1415.00
10.000	30800.00	625.90	0.0	0.13	0.0	409.00	1415.00
10.000	44900.00	629.27	3.37	0.14	0.0	409.00	1415.00
10.000	51400.00	630.63	1.36	0.13	0.0	409.00	1415.00
10.000	69200.00	634.14	3.51	0.12	0.0	409.00	1415.00
10.100	30800.00	625.89	0.0	-0.01	0.0	402.22	50.00
10.100	44900.00	629.26	3.37	-0.01	0.0	402.22	50.00
10.100	51400.00	630.62	1.36	-0.01	0.0	402.22	50.00
10.100	69200.00	634.70	4.08	0.56	0.0	3845.69	50.00
10.200	30800.00	625.90	0.0	0.01	0.0	402.22	34.00
10.200	44900.00	629.52	3.62	0.25	0.0	402.22	34.00
10.200	51400.00	631.02	1.50	0.40	0.0	402.22	34.00
10.200	69200.00	635.35	4.33	0.65	0.0	3902.22	34.00
11.000	30800.00	625.96	0.0	0.06	0.0	484.00	50.00
11.000	44900.00	629.59	3.64	0.08	0.0	484.00	50.00
11.000	51400.00	631.11	1.51	0.08	0.0	484.00	50.00
11.000	69200.00	635.18	4.07	-0.18	0.0	484.00	50.00

SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
11.100	30300.00	626.05	0.0	0.09	0.0	892.76	243.00
11.100	44100.00	629.75	3.70	0.16	0.0	948.53	243.00
11.100	50500.00	631.29	1.54	0.19	0.0	970.00	243.00
11.100	67900.00	635.45	4.16	0.28	0.0	970.00	243.00
11.500	30300.00	626.09	0.0	0.04	0.0	1099.07	243.00
11.500	44100.00	629.81	3.72	0.06	0.0	1192.37	243.00
11.500	50500.00	631.36	1.55	0.07	0.0	1215.76	243.00
11.500	67900.00	635.54	4.18	0.09	0.0	1278.83	243.00
11.700	25000.00	626.17	0.0	0.09	0.0	1101.96	182.00
11.700	36300.00	629.92	3.75	0.11	0.0	1219.31	182.00
11.700	41600.00	631.48	1.56	0.12	0.0	1268.24	182.00
11.700	56000.00	635.69	4.21	0.15	0.0	1399.94	182.00
11.900	25000.00	626.17	0.0	-0.00	0.0	1531.02	182.00
11.900	36300.00	629.93	3.76	0.01	0.0	1600.32	182.00
11.900	41600.00	631.49	1.57	0.01	0.0	1629.14	182.00
11.900	56000.00	635.72	4.22	0.03	0.0	1706.87	182.00
12.000	25000.00	626.19	0.0	0.01	0.0	1677.09	146.00
12.000	36300.00	629.95	3.76	0.02	0.0	1746.39	146.00
12.000	41600.00	631.51	1.57	0.02	0.0	1775.28	146.00
12.000	56000.00	635.74	4.23	0.02	0.0	1853.33	146.00
13.000	25000.00	626.66	0.0	0.47	0.0	1736.84	4870.00
13.000	36300.00	630.39	3.73	0.44	0.0	2153.69	4870.00
13.000	41600.00	631.95	1.56	0.43	0.0	2327.70	4870.00
13.000	56000.00	636.13	4.19	0.39	0.0	2796.80	4870.00

SUMMARY OF ERRORS

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**************************************************                    THIS RUN EXECUTED  01/26/79
  HEC2 RELEASE DATED NOV 76 UPDATED  AUG1977
  ERROR CORR -  01.02
  MODIFICATION -  50,51,52,53
**************************************************

T1      ADA TOWNSHIP HUD1 62-0104-009
T2      100-YEAR FLOOD
T3      GRAND RIVER,ADA TWP,KENT COUNTY

J1  ICHECK     INQ       NINV      IDIR      STRT      METRIC    HVINS     0         WSEL      FQ
        0.       4.        0.        0.   0.0          0.0       0.0       0.      631.950     0.0
J2  NPROF      IPLOT     PRFVS     XSECV     XSECH     FN        ALLOC     IBW       CHNIM     ITRACE
    -1.000      1.000    -1.000     0.0       0.0       0.0       0.0       0.0       0.0      15.000
J3  VARIABLE CODES FOR SUMMARY PRINTOUT
    110.000   150.000     0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
OT      4.000  25000.000  36300.000  41600.000  56000.000     0.0       0.0       0.0       0.0       0.0
NC      0.100      0.100      0.030      0.100      0.300     0.0       0.0       0.0       0.0       0.0

X1     13.000     34.000   2300.000   2647.000      0.0       0.0       0.0       0.0       0.0       0.0
GR    700.000      0.0      680.000    100.000    660.000    200.000   640.000   670.000   615.700  2000.000
GR    619.800   2100.000    619.900   2200.000   621.900   2266.000   616.600   2300.000  615.400  2307.000
GR    612.200   2310.000    609.800   2320.000   608.300   2330.000   608.200   2350.000  609.600  2360.000
GR    608.700   2370.000    608.300   2380.000   608.600   2400.000   608.200   2450.000  607.000  2560.000
GR    607.500   2600.000    609.500   2620.000   620.200   2647.000   618.000   2750.000  618.800  2770.000
GR    619.800   2825.000    620.800   2840.000   620.400   2900.000   620.800   2950.000  640.000  3000.000
GR    660.000   4175.000    680.000   4225.000   680.000   4550.000   700.000   4650.000    0.0      0.0

X1     14.000     41.000   2590.000   2950.000   5175.000   5175.000   5175.000     0.0       0.0       0.0
GR    640.000   1680.000    640.000   1680.000   640.000   1680.000   640.000   1680.000  640.000  1680.000
GR    618.000   2100.000    619.000   2300.000   619.000   2345.000   622.500   2385.000  620.800  2500.000
GR    618.100   2550.000    620.800   2590.000   610.800   2600.000   610.500   2610.000  609.500  2620.000
GR    609.300   2660.000    609.100   2670.000   608.400   2700.000   608.000   2760.000  607.700  2770.000
GR    608.100   2790.000    607.800   2800.000   607.700   2810.000   607.100   2820.000  607.200  2830.000
GR    607.000   2870.000    607.100   2880.000   607.200   2900.000   610.200   2930.000  614.700  2940.000
GR    619.900   2950.000    619.000   3000.000   619.400   3050.000   619.000   3100.000  623.300  3200.000
GR    622.800   3250.000    624.100   3300.000   625.000   3350.000   623.500   3450.000  630.000  4000.000
GR    640.000   4780.000      0.0       0.0        0.0       0.0       0.0       0.0       0.0      0.0

X1     15.000     49.000   2550.000   2950.000   5700.000   5700.000   5700.000     0.0       0.0       0.0
GR    640.000    900.000    630.000   2050.000   630.000   2050.000   630.000   2050.000  630.000  2050.000
GR    619.300   2100.000    619.000   2150.000   619.700   2200.000   620.100   2300.000  621.600  2350.000
GR    621.700   2400.000    622.600   2450.000   621.800   2500.000   622.500   2540.000  623.500  2550.000
GR    614.300   2580.000    610.600   2590.000   610.400   2600.000   609.900   2610.000  609.400  2620.000
GR    608.700   2630.000    608.500   2660.000   609.200   2700.000   608.900   2710.000  609.700  2720.000
GR    608.700   2740.000    608.700   2790.000   609.100   2800.000   610.000   2850.000  609.600  2670.000
GR    610.000   2890.000    610.600   2900.000   610.900   2910.000   611.900   2920.000  615.100  2930.000
GR    622.100   2950.000    618.300   2980.000   622.700   3040.000   613.700   3070.000  620.500  3090.000
GR    616.500   3120.000    616.300   3150.000   615.700   3200.000   614.900   3250.000  616.400  3280.000
GR    622.000   3310.000    620.800   3340.000   630.000   3500.000   640.000   4150.000    0.0      0.0
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THIS RUN EXECUTED 01/26/79

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**********************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED  AUG1977
  ERROR CORR -  01.02
  MODIFICATION -  50.51.52.53
**********************************************************
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NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

GRAND RIVER.ADA TWP.KENT

SUMMARY PRINTOUT TABLE 110

SECNO	CWSEL	DIFKWS	EG	TOPWID	QLOB	QCH	QROB	PERENC	STENCL	STCHL	STCHR	STENCR
13.000	631.95	0.0	632.13	2329.03	5644.18	31646.78	4309.02	0.0	0.0	2300.00	2647.00	0.0
14.000	632.44	0.0	632.60	2367.10	5688.61	31067.69	4843.69	0.0	0.0	2550.00	2950.00	0.0
15.000	632.92	0.0	633.07	1975.67	4255.94	31820.20	5523.84	0.0	0.0	2550.00	2950.00	0.0

GRAND RIVER,ADA TWP,KENT

SUMMARY PRINTOUT TABLE 150

SECNO	XLCH	ELTRO	ELLC	LMIN	Q	CWSEL	CRIWS	EG	10K*S	VCH	AREA	.01K
13.000	0.0	0.0	0.0	607.00	41600.00	631.95	0.0	632.13	0.97	3.94	23950.90	42248.32
14.000	5175.00	0.0	0.0	607.00	41600.00	632.44	0.0	632.60	0.82	3.65	25405.52	45847.57
15.000	5700.00	0.0	0.0	608.50	41600.00	632.92	0.0	633.07	0.85	3.58	22528.13	45149.17

GRAND RIVER,ADA TWP,KENT

SUMMARY PRINTOUT TABLE 150

SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
13.000	41600.00	631.95	0.0	0.0	0.0	2329.03	0.0
14.000	41600.00	632.44	0.0	0.49	0.0	2367.10	5175.00
15.000	41600.00	632.92	0.0	0.48	0.0	1975.67	5700.00

SUMMARY OF ERRORS

1) COUNTY: KENT

2) STUDY NAME: AOA, CITY OF

3) WATERCOURSE: THORNAPPLE RIVER

4) DOCUMENT TYPE: ~~100~~ 10, 50, 100, 500 SUMMARY OUTPUT.

00BREAK00

H A S P S Y S T E M L O G

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$ 14.24.01 JOB 170 -- HEC2      -- BEGINNING EXEC - INIT C - CLASS C
$*14.25.02 JOB 170 ESTIMATED TIME EXCEEDED.
$ 14.25.38 JOB 170 END EXECUTION.

JOB STATS -      210 CARDS READ          768 LINES PRINTED          0 CARDS PUNCHED          6 PLOT BLOCKS          1.61 MINS EXEC
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Commonwealth Associates, Inc.
Ada Township
Thornapple River
Multi Profile Run (10, 50, 100 + 500 yr storms)

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HEC2 RELEASE DATED NOV 76 UPDATED AUG1977
ERROR CORR - 01.02
MODIFICATION - 50,51,52,53
****

NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

THORNAPPLE RIVER AT ADA

SUMMARY PRINTOUT TABLE 150

SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	IOPT	VCH	AREA	TOPIK
1000.000	0.0	0.0	0.0	604.00	6400.00	626.15	0.0	626.18	0.10	1.09	1[illegible]78.41	20665.93
1000.000	0.0	0.0	0.0	604.00	10900.00	629.84	0.0	629.85	0.13	1.41	23542.33	30663.32
1000.000	0.0	0.0	0.0	604.00	13000.00	631.38	0.0	631.30	0.14	1.53	25445.73	35306.70
1000.000	0.0	0.0	0.0	604.00	19000.00	635.53	0.0	635.55	0.15	1.77	3[illegible]45.69	49123.41
2000.000	1000.00	0.0	0.0	605.40	6400.00	626.13	0.0	626.19	0.42	2.15	5144.30	9864.83
2000.000	1000.00	0.0	0.0	605.40	10900.00	629.82	0.0	629.88	0.44	2.60	9816.17	15502.95
2000.000	1000.00	0.0	0.0	605.40	13000.00	631.36	0.0	631.44	0.50	2.85	11347.77	18294.98
2000.000	1000.00	0.0	0.0	605.40	19000.00	635.50	0.0	635.59	0.59	3.15	15475.21	26945.84
3245.000	1245.00	0.0	0.0	607.30	6400.00	626.16	0.0	626.20	0.41	2.08	2[illegible]9.65	6705.54
3245.000	1245.00	0.0	0.0	607.30	10900.00	629.81	0.0	630.03	1.23	3.03	3841.28	9869.30
3245.000	1245.00	0.0	0.0	607.30	13000.00	631.33	0.0	631.55	1.26	4.26	4265.86	11446.75
3245.000	1245.00	0.0	0.0	607.30	19000.00	635.44	0.0	635.76	1.36	4.56	5819.29	16320.04
3345.000	100.00	0.0	0.0	607.30	6400.00	626.19	0.0	626.30	0.85	2.60	2460.26	6934.07
3345.000	100.00	0.0	0.0	607.30	10900.00	629.83	0.0	630.04	1.34	3.75	3914.67	9308.79
3345.000	100.00	0.0	0.0	607.30	13000.00	631.34	0.0	631.61	1.53	4.16	[illegible]31.41	10500.44
3345.000	100.00	0.0	0.0	607.30	19000.00	635.43	0.0	635.81	1.72	4.62	4459.95	14503.03
3375.000	30.00	631.30	626.40	607.30	6400.00	626.20	0.0	626.31	0.85	2.56	2330.97	6942.23
3375.000	30.00	631.30	626.40	607.30	10900.00	630.21	0.0	630.42	1.27	3.65	2951.39	9677.58
3375.000	30.00	631.30	626.40	607.30	13000.00	631.85	0.0	632.10	1.41	4.06	3[illegible]3.80	10930.18
3375.000	30.00	631.30	626.40	607.30	19000.00	635.84	0.0	636.20	1.62	4.55	4542.72	14950.10
3475.000	100.00	0.0	0.0	607.30	6400.00	626.19	0.0	626.34	0.95	3.17	2[illegible]2.55	6574.70
3475.000	100.00	0.0	0.0	607.30	10900.00	630.20	0.0	630.45	1.34	4.[illegible]	[illegible]2.84	9703.18
3475.000	100.00	0.0	0.0	607.30	13000.00	631.85	0.0	632.13	1.52	4.47	3745.24	11324.27
3475.000	100.00	0.0	0.0	607.30	19000.00	635.84	0.0	636.23	1.81	5.26	4957.07	15503.05
3655.000	180.00	0.0	0.0	606.00	6400.00	626.18	0.0	626.36	1.30	3.47	2016.26	5616.08
3655.000	180.00	0.0	0.0	606.00	10900.00	630.18	0.0	630.49	1.54	4.57	2736.41	8390.55
3655.000	180.00	0.0	0.0	606.00	13000.00	631.82	0.0	632.15	1.71	4.[illegible]	3030.22	9650.46
3655.000	180.00	0.0	0.0	606.00	19000.00	635.77	0.0	636.20	2.12	5.01	4742.40	13036.09
3705.000	50.00	0.0	0.0	606.20	6400.00	626.16	0.0	626.41	1.[illegible]	3.[illegible]	1614.64	4537.84
3705.000	50.00	0.0	0.0	606.20	10900.00	630.12	0.0	630.55	3.22	5.41	1987.66	6015.36
3705.000	50.00	0.0	0.0	606.20	13000.00	631.73	0.0	632.29	3.66	6.04	2177.21	6615.75
3705.000	50.00	0.0	0.0	606.20	19000.00	635.66	0.0	636.45	4.65	7.31	2745.67	8812.66



1) COUNTY: KENT

2) STUDY NAME: AOA, CITY OF

3) WATERCOURSE: THORNAPPLE RIVER

4) DOCUMENT TYPE: 100-YEAR RUN



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*****************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED  AUG1977
  ERROR CORR -  01,02
  MODIFICATION -  50,51,52,53
*****************************************************

C
T1      FLOOD INSURANCE STUDY
T2      100-YEAR FLOOD
T3      THORNAPPLE RIVER AT ADA TOWNSHIP

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ
      0.        4.        0.        0.   0.0          0.0       0.0       0.    631.380     0.0
J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE
    -1.000     1.000    -1.000     0.0       0.0       0.0      -1.000     0.0       0.0      15.000
J3  VARIABLE CODES FOR SUMMARY PRINTOUT
    110.000   150.000     0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
NC      0.100     0.100     0.030     0.100     0.300     0.0       0.0       0.0       0.0       0.0
QT      4.000  6400.000 10900.000 13000.000 19000.000     0.0       0.0       0.0       0.0       0.0

        CROSS SECTION NO. 1

X1   1000.000    42.000   750.000   885.000     0.0       0.0       0.0       0.0       0.0       0.0
X3      0.0       0.0       0.0     100.000     0.0    1605.000     0.0       0.0       0.0       0.0
GR    634.000     0.0     632.000    10.000   628.000    30.000   624.000    40.000   620.000    45.000
GR    616.000    65.000   614.000   105.000   616.000   135.000   617.000   185.000   616.000   245.000
GR    614.200   335.000   612.000   750.000   611.900   755.000   607.500   770.000   605.100   785.000
GR    604.500   805.000   605.400   810.000   605.700   815.000   604.300   825.000   604.000   835.000
GR    608.600   865.000   611.800   875.000   612.000   885.000   616.000   895.000   617.000   915.000
GR    616.000   985.000   614.600  1225.000   616.000  1525.000   618.000  1745.000   618.200  1785.000
GR    618.000  1845.000   617.800  1885.000   618.000  1915.000   620.000  1995.000   624.000  2035.000
GR    628.000  2075.000   632.000  2235.000   636.000  2425.000   636.000  2675.000   636.000  2735.000
GR    637.800  2985.000   638.000  3365.000     0.0       0.0       0.0       0.0       0.0       0.0
NC      0.090     0.090     0.030     0.0       0.0       0.0       0.0       0.0       0.0       0.0

        CROSS SECTION NO.2

X1   2000.000    41.000   750.000   875.000   860.000  1160.000  1000.000     0.0       0.0       0.0
X3      0.0       0.0       0.0     350.000     0.0    1345.000     0.0       0.0       0.0       0.0
GR    633.000     0.0     628.000    45.000   624.000    50.000   620.000    60.000   617.000    80.000
GR    620.000   100.000   622.300   180.000   620.000   280.000   617.000   360.000   620.000   450.000
GR    621.000   470.000   620.000   500.000   616.000   525.000   614.900   540.000   616.000   560.000
GR    620.000   600.000   621.800   650.000   620.000   715.000   616.000   730.000   612.000   750.000
GR    611.900   760.000   608.900   765.000   605.500   780.000   605.900   800.000   606.800   805.000
GR    607.100   810.000   605.700   820.000   605.400   830.000   610.000   855.000   611.800   865.000
GR    612.000   875.000   616.000   885.000   620.000   890.000   624.000   910.000   624.000  1140.000
GR    628.000  1530.000   630.600  1710.000   628.000  1870.000   632.000  2080.000   636.000  2280.000
GR    640.000  2300.000     0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
NC      0.070     0.070     0.030     0.0       0.0       0.0       0.0       0.0       0.0       0.0

        DOWNSTREAM OF THORNAPPLE DRIVE BR.
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X1	3245.000	44.000	1510.000	1640.000	1500.000	1000.000	1245.000	0.0	0.0	0.0	
X3	0.0	0.0	0.0	1422.000	0.0	1800.000	0.0	0.0	0.0	0.0	
GR	636.000	0.0	635.800	240.000	636.000	480.000	639.200	930.000	637.200	1100.000	
GR	636.000	1350.000	632.000	1380.000	628.000	1420.000	624.000	1490.000	620.000	1500.000	
GR	616.000	1510.000	615.100	1515.000	611.900	1525.000	607.300	1555.000	607.800	1565.000	
GR	609.000	1575.000	608.700	1580.000	607.800	1585.000	608.400	1610.000	610.800	1625.000	
GR	615.200	1630.000	616.000	1640.000	620.000	1650.000	624.000	1660.000	628.000	1670.000	
GR	628.000	1740.000	624.000	1760.000	624.000	1920.000	620.000	1980.000	619.600	2010.000	
GR	620.000	2050.000	624.000	2250.000	627.000	2290.000	624.000	2330.000	620.000	2350.000	
GR	619.600	2380.000	620.000	2410.000	624.000	2430.000	628.000	2470.000	631.500	2730.000	
GR	630.600	3100.000	628.000	3450.000	632.000	3500.000	636.000	3700.000	0.0	0.0	
NC	0.100	0.050	0.030	0.300	0.500	0.0	0.0	0.0	0.0	0.0	

X1	3345.000	43.000	1510.000	1655.000	110.000	90.000	100.000	0.0	0.0	0.0	
X3	0.0	0.0	0.0	1450.000	700.000	1780.000	700.000	0.0	0.0	0.0	
GR	637.300	0.0	636.000	100.000	635.800	320.000	636.000	560.000	639.200	900.000	
GR	637.200	1190.000	636.000	1400.000	632.000	1465.000	631.300	1490.000	631.300	1510.000	
GR	615.400	1511.000	611.900	1520.000	607.300	1560.000	609.000	1580.000	608.700	1585.000	
GR	607.800	1590.000	608.400	1620.000	610.800	1640.000	615.200	1654.000	631.300	1655.000	
GR	631.300	1710.000	631.300	1780.000	631.300	1780.000	631.300	1780.000	631.300	1780.000	
GR	631.300	1780.000	629.400	1810.000	629.600	1910.000	628.000	1960.000	624.000	1975.000	
GR	624.000	2225.000	628.000	2245.000	629.000	2255.000	628.000	2265.000	624.000	2285.000	
GR	624.000	2675.000	628.000	2775.000	630.600	3225.000	628.000	3415.000	628.000	3435.000	
GR	632.000	3525.000	636.000	3855.000	636.800	3965.000	0.0	0.0	0.0	0.0	
SB	1.050	1.500	2.600	0.0	118.000	5.000	2160.000	0.0	607.300	607.300	

X1	3375.000	0.0	0.0	0.0	30.000	30.000	30.000	0.0	0.0	0.0	
X2	0.0	0.0	1.000	626.400	631.300	0.0	0.0	0.0	0.0	0.0	
X3	0.0	0.0	0.0	1450.000	700.000	1780.000	700.000	0.0	0.0	0.0	
BT	15.000	0.0	637.300	0.0	100.000	636.000	0.0	320.000	635.800	0.0	
BT	560.000	636.000	0.0	900.000	639.200	0.0	1190.000	637.200	0.0	1400.000	
BT	636.000	0.0	1465.000	632.000	0.0	1490.000	631.300	0.0	1510.000	631.300	
BT	626.400	1655.000	631.300	626.400	1710.000	631.300	0.0	1780.000	631.300	0.0	
BT	1780.000	640.000	0.0	3965.000	640.000	0.0	0.0	0.0	0.0	0.0	
NC	0.090	0.060	0.030	0.0	0.0	0.0	0.0	0.0	0.0	0.0	

UPSTREAM OF THORNAPPLE DRIVE BR.

X1	3475.000	37.000	1515.000	1635.000	100.000	100.000	100.000	0.0	0.0	0.0	
X3	0.0	0.0	0.0	1440.000	0.0	1730.000	0.0	0.0	0.0	0.0	
GR	636.000	0.0	635.500	100.000	635.200	350.000	636.000	490.000	639.200	780.000	
GR	637.200	1080.000	636.000	1310.000	632.000	1370.000	628.000	1495.000	624.000	1505.000	
GR	620.000	1510.000	616.000	1515.000	612.000	1520.000	607.300	1555.000	607.800	1565.000	
GR	609.000	1575.000	608.700	1580.000	607.800	1585.000	608.400	1610.000	610.800	1625.000	
GR	612.000	1630.000	616.000	1635.000	620.000	1640.000	624.000	1655.000	628.000	1905.000	
GR	628.200	1955.000	628.000	2005.000	624.000	2115.000	622.000	3005.000	624.000	3135.000	
GR	628.000	3155.000	631.500	3505.000	630.600	3905.000	628.000	4085.000	628.000	4175.000	
GR	632.000	4205.000	636.000	4600.000	0.0	0.0	0.0	0.0	0.0	0.0	
NC	0.0	0.0	0.0	0.100	0.300	0.0	0.0	0.0	0.0	0.0	

DOWNSTREAM OF COVERED BRIDGE

X1	3655.000	26.000	940.000	1055.000	180.000	180.000	180.000	0.0	0.0	0.0	
X3	0.0	0.0	0.0	925.000	0.0	1105.000	0.0	0.0	0.0	0.0	
GR	640.000	0.0	636.000	910.000	632.000	915.000	628.000	920.000	624.000	930.000	
GR	621.000	940.000	618.000	945.000	607.500	975.000	606.200	985.000	606.000	995.000	
GR	609.000	1035.000	614.300	1047.000	620.000	1055.000	624.000	1075.000	624.000	1225.000	
GR	623.200	1285.000	624.000	1405.000	628.000	1505.000	628.000	1695.000	632.000	1765.000	
GR	632.200	1805.000	632.000	1835.000	631.500	2100.000	630.600	2485.000	632.000	2625.000	
GR	636.000	2835.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
NC	0.100	0.050	0.030	0.300	0.500	0.0	0.0	0.0	0.0	0.0	

GR	611.500	815.000	614.500	825.000	622.000	845.000	624.000	855.000	630.000	1[illegible]
GR	630.000	1190.000	632.000	1370.000	636.000	1380.000	636.000	2180.000	0.0	0.0
NC	0.0	0.0	0.0	0.100	0.300	0.0	0.0	0.0	0.0	0.0

DOWNSTREAM OF DAM

X1	4410.000	31.000	265.000	655.000	700.000	250.000	515.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	0.0	0.0	720.000	0.0	0.0	0.0	0.0
GR	660.000	0.0	656.000	32.000	652.000	65.000	648.000	95.000	644.000	170.000
GR	640.000	210.000	636.000	220.000	632.000	230.000	628.000	238.000	624.000	250.000
GR	620.000	265.000	614.500	315.000	606.500	335.000	605.000	345.000	607.000	375.000
GR	607.000	405.000	605.000	425.000	606.000	435.000	605.500	465.000	607.000	485.000
GR	606.500	515.000	608.000	535.000	610.500	545.000	616.500	595.000	620.000	655.000
GR	626.500	675.000	628.000	705.000	630.000	720.000	632.000	980.000	636.000	990.000
GR	636.000	1790.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.060	0.060	0.030	0.0	0.0	0.0	0.0	0.0	0.0	0.0

100 FEET U/S OF DAM. STARTING EL. BASED ON HAND CALCULATION AT SPILLWAY

X1	4580.000	25.000	160.000	856.000	145.000	145.000	145.000	0.0	0.0	0.0
X5	4.000	632.650	636.700	638.480	644.100	0.0	0.0	0.0	0.0	0.0
GR	647.100	0.0	643.000	60.000	638.100	115.000	636.600	160.000	635.900	161.000
GR	635.000	171.000	632.700	221.000	629.300	241.000	620.000	271.000	619.000	291.000
GR	619.000	361.000	620.000	371.000	619.400	391.000	619.500	411.000	620.000	421.000
GR	620.000	461.000	623.000	721.000	624.000	741.000	624.000	821.000	625.000	831.000
GR	628.000	841.000	637.000	856.000	638.500	860.000	638.500	1760.000	639.800	1800.000
NC	0.0	0.0	0.0	0.100	0.300	0.0	0.0	0.0	0.0	0.0

CROSS SECTION NO. 9

X1	5600.000	29.000	160.000	856.000	1020.000	1020.000	1020.000	0.0	0.0	0.0
GR	647.100	0.0	643.000	60.000	638.100	115.000	636.600	160.000	635.900	161.000
GR	635.000	171.000	632.700	221.000	629.300	241.000	620.000	271.000	619.000	291.000
GR	619.000	361.000	620.000	371.000	619.400	391.000	619.500	411.000	620.000	421.000
GR	620.000	461.000	623.000	721.000	624.000	741.000	624.000	821.000	625.000	831.000
GR	628.000	841.000	637.000	856.000	637.500	896.000	641.000	921.000	641.700	976.000
GR	641.000	1026.000	647.200	1226.000	648.000	1326.000	650.200	1576.000	0.0	0.0

ADA-CASCADE TOWNSHIP LINE

X1	8960.000	31.000	50.000	1640.000	3360.000	3360.000	3360.000	0.0	0.0	0.0
GR	660.000	0.0	656.000	10.000	652.000	20.000	648.000	30.000	644.000	40.000
GR	640.000	45.000	637.000	50.000	632.000	70.000	623.500	90.000	620.500	110.000
GR	621.000	240.000	622.500	270.000	626.500	290.000	625.800	460.000	628.000	480.000
GR	629.000	560.000	627.300	600.000	626.000	660.000	625.600	840.000	627.000	900.000
GR	627.300	1040.000	626.800	1060.000	626.800	1500.000	628.200	1550.000	630.200	1580.000
GR	634.500	1630.000	636.500	1640.000	640.000	1720.000	644.000	1790.000	648.000	1910.000
GR	652.000	2180.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EJ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

X1	3705.000	27.000	1030.000	1146.000	50.000	50.000	50.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	1029.000	0.0	1177.000	0.0	0.0	0.0	0.0
GR	640.000	0.0	637.600	200.000	638.000	500.000	637.000	840.000	635.500	930.000
GR	634.900	980.000	633.300	1030.000	631.500	1040.000	631.300	1041.000	629.200	1048.000
GR	617.000	1048.000	615.000	1053.000	607.600	1073.000	606.200	1083.000	606.500	1103.000
GR	609.200	1133.000	611.000	1141.000	628.000	1141.000	631.000	1146.000	631.000	1176.000
GR	631.000	1177.000	627.000	1290.000	626.500	1390.000	628.200	1490.000	630.000	2530.000
GR	632.000	2700.000	636.000	2840.000	0.0	0.0	0.0	0.0	0.0	0.0
SB	1.050	1.500	2.600	0.0	72.900	0.0	1742.000	0.0	606.200	606.200
X1	3725.000	0.0	0.0	0.0	20.000	20.000	20.000	0.0	0.0	0.0
X2	0.0	0.0	1.000	629.200	631.000	0.0	0.0	0.0	0.0	0.0
X3	0.0	0.0	0.0	1029.000	0.0	1177.000	0.0	0.0	0.0	0.0
BT	15.000	0.0	640.000	0.0	200.000	637.600	0.0	500.000	638.000	0.0
BT	840.000	637.000	0.0	930.000	635.500	0.0	980.000	634.900	0.0	1030.000
BT	633.300	0.0	1030.000	640.000	629.200	1040.000	640.000	629.200	1146.000	640.000
BT	629.200	1146.000	631.000	0.0	1176.000	631.000	0.0	1177.000	631.000	0.0
BT	1177.000	640.000	0.0	2840.000	640.000	0.0	0.0	0.0	0.0	0.0
NC	0.100	0.060	0.030	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UPSTREAM OF COVERED BRIDGE

X1	3760.000	26.000	890.000	1005.000	35.000	35.000	35.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	870.000	0.0	1025.000	0.0	0.0	0.0	0.0
GR	640.000	0.0	637.600	20.000	640.000	40.000	640.000	700.000	636.000	735.000
GR	632.000	850.000	628.000	870.000	624.000	885.000	621.000	890.000	618.000	895.000
GR	607.500	925.000	606.200	935.000	606.000	945.000	609.000	985.000	614.300	997.000
GR	620.000	1005.000	624.000	1015.000	628.000	1025.000	628.000	1075.000	627.500	1215.000
GR	628.000	1315.000	632.000	1645.000	632.700	1975.000	632.000	2485.000	632.000	2565.000
GR	636.000	3415.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.0	0.080	0.0	0.100	0.300	0.0	0.0	0.0	0.0	0.0

DOWNSTREAM OF GRAND TRUNK WESTERN R.R.

X1	3790.000	0.0	0.0	0.0	30.000	30.000	30.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	880.000	0.0	1015.000	0.0	0.0	0.0	0.0
NC	0.0	0.0	0.0	0.300	0.500	0.0	0.0	0.0	0.0	0.0
X1	3825.000	27.000	1210.000	1401.000	35.000	35.000	35.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	648.400	646.600	0.0
GR	656.000	0.0	652.000	260.000	642.000	260.000	642.000	300.000	652.000	300.000
GR	652.000	710.000	648.900	1110.000	648.400	1210.000	631.700	1211.000	631.000	1225.000
GR	621.500	1235.000	619.500	1245.000	617.000	1255.000	605.500	1290.000	607.600	1320.000
GR	611.500	1340.000	614.500	1350.000	614.500	1351.000	622.000	1370.000	639.000	1400.000
GR	647.100	1401.000	646.600	1500.000	646.500	1705.000	630.000	1706.000	630.000	1745.000
GR	646.500	1746.000	641.900	2735.000	0.0	0.0	0.0	0.0	0.0	0.0
SB	1.050	1.500	2.800	0.0	127.300	40.000	3397.000	0.0	605.500	605.500
X1	3845.000	0.0	0.0	0.0	20.000	20.000	20.000	0.0	0.0	0.0
X2	0.0	0.0	1.000	644.400	647.100	0.0	0.0	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	648.400	647.100	0.0
BT	10.000	1110.000	648.900	0.0	1210.000	648.400	0.0	1211.000	648.400	644.400
BT	1235.000	648.200	644.200	1245.000	648.000	637.200	1340.000	647.500	636.600	1350.000
BT	647.400	636.600	1351.000	647.400	641.500	1400.000	647.100	641.200	1401.000	647.100
BT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UPSTREAM OF GRAND TRUNK R.R.

X1	3895.000	19.000	710.000	845.000	50.000	50.000	50.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	660.000	0.0	895.000	0.0	0.0	0.0	0.0
GR	642.000	0.0	640.000	10.000	636.000	550.000	632.000	680.000	628.000	695.000
GR	624.000	710.000	619.500	720.000	617.000	730.000	605.500	765.000	607.600	795.000

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*PROF 1

CRITICAL DEPTH TO BE CALCULATED AT ALL CROSS SECTIONS

CCHV=   0.100 CEHV=   0.300
*SECNO 1000.000
   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        QLOSS    BANK ELEV
   Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA    LEFT/RIGHT
   TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN       SSTA
   SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID      ENDST

3470 ENCROACHMENT STATIONS=      100.0     1605.0  TYPE=      1  TARGET=     1505.000

          CROSS SECTION NO. 1
                    631.36 ok
  1000.00     27.38    631.38    614.31    631.38    631.39      0.01      0.0       0.0    612.00
   13000.     4122.     4989.     3889.    11266.     3287.    11397.       0.        0.    612.00
     0.0       0.37      1.52      0.34     0.100     0.030     0.100      0.0    604.00    100.00
 0.000014        0.        0.        0.         0        17         0      0.0   1505.00   1605.00

FLOW DISTRIBUTION FOR SECNO=    1000.00          CWSEL=     631.38

STA=      100.      185.      335.      750.      885.      985.     1225.     1525.     1605.
  PER Q=      3.3       6.2      22.2      38.4       3.9      10.3      12.9       2.8
   AREA=   1321.7    2358.0    7586.2    3286.5    1513.0    3859.2    4823.9    1201.3
    VEL=      0.3       0.3       0.4       1.5       0.3       0.3       0.3       0.3

*SECNO 2000.000

3470 ENCROACHMENT STATIONS=      350.0     1345.0  TYPE=      1  TARGET=      995.000

          CROSS SECTION NO.2

  2000.00     25.96    631.36    614.93       0.0    631.44      0.08      0.02      0.02    612.00
   13000.     3167.     8309.     1523.     5016.     2920.     3412.      429.       29.    612.00
     0.14      0.63      2.85      0.45     0.090     0.030     0.090     0.030    605.40    350.00
 0.000050      860.     1000.     1160.         2        22         0      0.0    995.00   1345.00

FLOW DISTRIBUTION FOR SECNO=    2000.00          CWSEL=     631.36

STA=      350.      450.      525.      560.      650.      730.      750.      875.     1140.     1345.
  PER Q=      6.1       4.1       3.2       5.0       3.9       2.1      63.9       7.8       3.9
   AREA=   1298.7     876.7     556.7    1057.1     880.0     347.1    2919.5    2119.4    1292.5
    VEL=      0.6       0.6       0.7       0.6       0.6       0.8       2.8       0.5       0.4

*SECNO 3245.000

3470 ENCROACHMENT STATIONS=     1422.0     1800.0  TYPE=      1  TARGET=      378.000

          DOWNSTREAM OF THORNAPPLE DRIVE BR.

  3245.00     24.03    631.33    616.83       0.0    631.59      0.25      0.10      0.05    616.00
   13000.      529.    11725.      746.      593.     2760.      913.      657.       48.    616.00
     0.23      0.89      4.25      0.82     0.070     0.030     0.070     0.030    607.30   1422.00
 0.000129     1500.     1245.     1000.         2        22         0      0.0    378.00   1800.00

FLOW DISTRIBUTION FOR SECNO=    3245.00          CWSEL=     631.33
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from Grand River by GCA

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STA=     1422.     1490.     1500.     1510.     1640.     1650.     1660.     1670.     1740.     1760.     1800.
  PER Q=       2.0       0.7       1.3      90.2       1.3       0.7       0.3       1.0       0.6       1.8
   AREA=     366.4      93.3     133.3    2759.8     133.3      93.3      53.3     233.2     106.6     293.2
    VEL=       0.7       1.0       1.3       4.2       1.3       1.0       0.7       0.5       0.7       0.8

CCHV=   0.300 CEHV=   0.500
*SECNO 3345.000

3470 ENCROACHMENT STATIONS=     1450.0     1780.0  TYPE=      1  TARGET=      330.000
 ELENCL=     700.00  ELENCR=     700.00
  3345.00     24.04    631.34    615.91       0.0    631.61      0.27      0.01      0.01    631.30
   13000.        0.   13000.        0.        1.    3125.        5.      665.       49.    631.30
     0.23      0.02      4.16      0.04     0.100     0.030     0.050     0.030    607.30   1488.54
 0.000153      110.      100.       90.         0        22         0       0.0    291.46   1780.00

FLOW DISTRIBUTION FOR SECNO=    3345.00          CWSEL=     631.34

STA=     1489.     1510.     1655.     1780.
  PER Q=       0.0     100.0       0.0
   AREA=       0.8    3125.5       5.1
    VEL=       0.0       4.2       0.0

SPECIAL BRIDGE

SB  XK        XKOR       COFQ       RDLEN      BWC        BWP        BAREA      SS         FLCHU      FLCHD
     1.05      1.50       2.60       0.0      118.00      5.00    2160.00      0.0      607.30     607.30

*SECNO 3375.000
     3700.   BRIDGE STENCL=    1450.00    STENCR=    1780.00
   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        QLOSS    BANK ELEV
   Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA      LEFT/RIGHT
   TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN       SSTA
   SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID      ENDST

PRESSURE AND WEIR FLOW

 EGPRS      EGLWC       H3        QWEIR      QPR        BAREA    TRAPEZOID      ELLC      ELTRD
                                                                   AREA
   632.18    631.62      0.01       563.    12378.      2160.     2158.       626.40    631.30

3470 ENCROACHMENT STATIONS=     1450.0     1780.0  TYPE=      1  TARGET=      330.000
 ELENCL=     700.00  ELENCR=     700.00
  3375.00     24.55    631.85      0.0       0.0    632.10      0.26      0.50      0.0     631.30
   13000.        2.   12982.       16.       16.    3199.       68.      667.       49.    631.30
     0.23      0.10      4.06      0.24     0.100     0.030     0.050     0.030    607.30   1470.43
 0.000141       30.       30.       30.         2         0         3       0.0    309.57   1780.00

FLOW DISTRIBUTION FOR SECNO=    3375.00          CWSEL=     631.85

STA=     1470.     1510.     1655.     1710.     1780.
  PER Q=       0.0      99.9       0.1       0.1
   AREA=      16.3    3199.0      30.1      38.3
    VEL=       0.1       4.1       0.2       0.2

*SECNO 3475.000

3470 ENCROACHMENT STATIONS=     1440.0     1730.0  TYPE=      1  TARGET=      290.000

          UPSTREAM OF THORNAPPLE DRIVE BR.

  3475.00     24.55    631.85    616.50       0.0    632.13      0.28      0.01      0.01    616.00
```

12378/2160 = 5.73
ΣK = 1.7 → 0.87 = H
HEC2 = 0.76 say OK close enough

13000.	198.	11970.	833.	341.	2696.	761.	675.	50.	616.00
0.24	0.58	4.44	1.09	0.090	0.030	0.060	0.030	607.30	1440.00
0.000132	100.	100.	100.	1	18	0	0.0	290.00	1730.00

FLOW DISTRIBUTION FOR SECNO= 3475.00 CWSEL= 631.85

STA=	1440.	1495.	1505.	1510.	1515.	1635.	1640.	1655.	1730.
PER Q=	0.5	0.3	0.3	0.5	92.1	0.7	1.5	4.2	
AREA=	163.6	58.5	49.3	69.3	2696.3	69.3	147.8	544.1	
VEL=	0.4	0.6	0.7	0.9	4.4	1.4	1.3	1.0	

CCHV= 0.100 CEHV= 0.300
*SECNO 3655.000

3470 ENCROACHMENT STATIONS= 925.0 1105.0 TYPE= 1 TARGET= 180.000

DOWNSTREAM OF COVERED BRIDGE

3655.00	25.82	631.82	617.23	0.0	632.18	0.37	0.03	0.03	621.00
13000.	105.	12335.	560.	127.	2472.	431.	689.	51.	620.00
0.25	0.82	4.99	1.30	0.090	0.030	0.060	0.030	606.00	925.00
0.000181	180.	180.	180.	2	14	0	0.0	180.00	1105.00

FLOW DISTRIBUTION FOR SECNO= 3655.00 CWSEL= 631.82

STA=	925.	930.	940.	1055.	1075.	1105.
PER Q=	0.1	0.7	94.9	2.3	2.0	
AREA=	34.1	93.2	2472.2	196.3	234.4	
VEL=	0.5	1.0	5.0	1.5	1.1	

CCHV= 0.300 CEHV= 0.500
*SECNO 3705.000

3470 ENCROACHMENT STATIONS= 1029.0 1177.0 TYPE= 1 TARGET= 148.000

3705.00	25.53	631.73	617.21	0.0	632.29	0.56	0.01	0.10	633.30	
13000.	0.	12989.	11.	0.	2155.	23.	692.	51.	631.00	
0.25	0.0	6.03	0.47	0.100	0.030	0.050	0.030	606.20	1038.72	
0.000386	50.	50.	50.	2	18	0	0.0	138.28	1177.00	

FLOW DISTRIBUTION FOR SECNO= 3705.00 CWSEL= 631.73

STA=	1039.	1146.	1176.	1177.
PER Q=	99.9	0.1	0.0	
AREA=	2154.6	21.9	0.7	
VEL=	6.0	0.5	0.3	

SPECIAL BRIDGE

SB	XK	XKOR	COFQ	RDLEN	BWC	BWP	BAREA	SS	FLCHL	FLCHR
	1.05	1.50	2.60	0.0	72.90	0.0	1742.00	0.0	606.20	606.20

*SECNO 3725.000
3700. BRIDGE STENCL= 1029.00 STENCR= 1177.00
PRESSURE AND WEIR FLOW

EGPRS	EGLWC	H3	QWEIR	QPR	BAREA	TRAPEZOID AREA	ELLC	ELTRD
633.03	632.29	0.0	221.	12761.	1742.	1677.	629.20	631.00

3470 ENCROACHMENT STATIONS= 1029.0 1177.0 TYPE= 1 TARGET= 148.000

3725.00	26.26	632.46	0.0	0.0	632.98	0.52	0.69	0.0	633.30

12×6' → 7.3² → H:1.4² > 0.17
17ft² K=1.7 HEC2: 1.25 close enough

```
   13000.       0.    12968.      32.       0.     2234.      45.     693.      51.    631.00
     0.25      0.0      5.80     0.71    0.100    0.030    0.050    0.030   606.20  1034.67
 0.000354      20.      20.      20.        2        0        3      0.0    142.33  1177.00

FLOW DISTRIBUTION FOR SECNO=    3725.00          CWSEL=     632.46

STA=     1035.     1146.     1176.     1177.
  PER Q=      99.8       0.2       0.0
   AREA=    2234.3      43.8       1.5
    VEL=       5.8       0.7       0.4

*SECNO 3760.000
   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        QLOSS    BANK ELEV
   Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA    LEFT/RIGHT
   TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN       SSTA
   SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID      ENDST

3470 ENCROACHMENT STATIONS=      870.0     1025.0  TYPE=      1  TARGET=      155.000
          UPSTREAM OF COVERED BRIDGE

  3760.00     26.66    632.66    617.23       0.0    633.03      0.37      0.01      0.05    621.00
   13000.       98.    12688.      215.      151.     2570.      173.      696.       51.    620.00
     0.26      0.65      4.94      1.24     0.100    0.030     0.060     0.030    606.00    870.00
 0.000168       35.       35.       35.         2       18         0       0.0    155.00   1025.00

FLOW DISTRIBUTION FOR SECNO=    3760.00          CWSEL=     632.66

STA=      870.      885.      890.     1005.     1015.     1025.
  PER Q=       0.4       0.3      97.6       1.2       0.4
   AREA=     100.0      50.8    2569.9     106.6      66.6
    VEL=       0.6       0.8       4.9       1.5       0.9

CCHV=    0.100 CEHV=    0.300
*SECNO 3790.000

3470 ENCROACHMENT STATIONS=      880.0     1015.0  TYPE=      1  TARGET=      135.000
          DOWNSTREAM OF GRAND TRUNK WESTERN R.R.

  3790.00     26.66    632.66    617.23       0.0    633.04      0.38      0.01      0.00    621.00
   13000.       59.    12860.       81.       91.     2570.      107.      697.       52.    620.00
     0.26      0.65      5.00      0.76     0.100    0.030     0.080     0.030    606.00    880.00
 0.000173       30.       30.       30.         1       18         0       0.0    135.00   1015.00

FLOW DISTRIBUTION FOR SECNO=    3790.00          CWSEL=     632.66

STA=      880.      885.      890.     1005.     1015.
  PER Q=       0.1       0.3      98.9       0.6
   AREA=      40.0      50.8    2570.0     106.6
    VEL=       0.4       0.8       5.0       0.8

CCHV=    0.300 CEHV=    0.500
*SECNO 3825.000

3265 DIVIDED FLOW

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=       648.40 ELREA=       646.60

  3825.00     27.27    632.77    618.05       0.0    633.07      0.30      0.01      0.03    648.40
   13000.        0.    13000.        0.        0.     2952.        0.      700.       52.    647.10
     0.26       0.0      4.40       0.0     0.100    0.030     0.080     0.030    605.50   1210.94
```

```
 0.000204      35.      35.      35.       2       14        0      0.0     178.08   1401.00

FLOW DISTRIBUTION FOR SECNO=   3825.00          CWSEL=    632.77

STA=     1211.     1401.
  PER Q=     100.0
   AREA=    2952.2
    VEL=       4.4

SPECIAL BRIDGE

SB  XK        XKOR      COFQ      RDLEN     BWC       BWP       BAREA     SS        ELCHU     ELCHD
     1.05      1.50      2.80      0.0     127.30     40.00    3397.00     0.0      605.50    605.50

*SECNO 3845.000

3265 DIVIDED FLOW

CLASS A LOW FLOW

3420 BRIDGE W.S.=    632.48 BRIDGE VELOCITY=.      5.52      CALCULATED CHANNEL AREA=.     2356.

 EGPRS      EGLWC       H3       QWEIR      QPR       BAREA    TRAPEZOID      ELLC      ELTPD
                                                                  AREA
     0.0     633.23      0.16        0.    13000.     3397.     3396.      644.40     647.10

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=      648.40 ELREA=      647.10

  3845.00     27.44    632.94      0.0       0.0     633.23      0.30      0.16      0.0     648.40

   13000.        0.    13000.       0.        0.     2981.        0.       701.       52.     647.10
     0.26       0.0      4.36      0.0     0.100     0.030     0.080     0.030    605.50   1210.93
 0.000199       20.       20.       20.         0         0         0       0.0    178.37   1401.00

8930,RDST NOT ON GR CARD   1109.99
FLOW DISTRIBUTION FOR SECNO=   3845.00          CWSEL=    632.94

STA=     1211.     1401.
  PER Q=     100.0
   AREA=    2981.1
    VEL=       4.4

*SECNO 3895.000

3470 ENCROACHMENT STATIONS=     660.0     895.0  TYPE=     1  TARGET=     235.000

          UPSTREAM OF GRAND TRUNK R.R.

  3895.00     27.44    632.94    618.06      0.0     633.25      0.31      0.01      0.00    624.00
   13000.       87.    12514.      399.      161.     2772.      442.      705.       52.     622.00
     0.27      0.54      4.52      0.90     0.100     0.030     0.080     0.030    605.50    660.00
 0.000156       50.       50.       50.         0        14         0       0.0    235.00    895.00

FLOW DISTRIBUTION FOR SECNO=   3895.00          CWSEL=    632.94

STA=      660.      680.      695.      710.      845.      855.      895.
  PER Q=       0.0       0.1       0.5      96.3       0.8       2.3
   AREA=      12.8      44.2     104.2    2771.6      99.5     342.4
    VEL=       0.1       0.4       0.7       4.5       1.1       0.9

CCHV=   0.100 CEHV=   0.300
*SECNO 4410.000
   SECNO    DEPTH    CWSEL    CRIWS    WSELK    EG       HV       HL       GLOSS    BANK ELEV
```

Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	FWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	FTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWTD	ENDST

3470 ENCROACHMENT STATIONS= 0.0 720.0 TYPE= 1 TARGET= 719.999

DOWNSTREAM OF DAM

-4410.00	28.26	633.26	611.36	0.0	633.29	0.03	0.02	0.03	620.00
13000.	66.	12820.	113.	284.	8768.	444.	779.	56.	620.00
0.36	0.23	1.46	0.26	0.100	0.030	0.080	0.030	605.00	226.86
0.000014	700.	515.	250.	2	17	0	0.0	493.14	720.00

FLOW DISTRIBUTION FOR SECNO= 4410.00 CWSEL= 633.26

STA=	227.	238.	250.	265.	655.	675.	705.	720.
PER Q=	0.0	0.1	0.4	98.6	0.5	0.3	0.1	
AREA=	28.0	87.1	168.8	8767.7	200.1	180.2	63.8	
VEL=	0.1	0.2	0.3	1.5	0.3	0.2	0.2	

*SECNO 4580.000
WATER EL=XS CARD= 638.480

100 FEET U/S OF DAM. STARTING EL. BASED ON HAND CALCULATION AT SPILLWAY

4580.00	19.48	638.48	623.55	0.0	638.50	0.02	0.00	0.00	636.60
13000.	5.	12994.	0.	52.	10666.	3.	813.	58.	637.00
0.40	0.11	1.22	0.08	0.060	0.030	0.060	0.030	619.00	110.74
0.000016	145.	145.	145.	0	20	0	0.0	749.21	859.95

COE = 638.54 @ 13000 cfs
agrees good
This stage does not
include the possible
1408 cfs thru the
turbines.

FLOW DISTRIBUTION FOR SECNO= 4580.00 CWSEL= 638.48

STA=	111.	160.	856.	860.
PER Q=	0.0	100.0	0.0	
AREA=	51.7	10666.3	2.9	
VEL=	0.1	1.2	0.1	

CCHV= 0.100 CEHV= 0.300
*SECNO 5600.000

CROSS SECTION NO. 9

5600.00	19.50	638.50	623.54	0.0	638.52	0.02	0.02	0.00	636.60
13000.	6.	12988.	6.	52.	10677.	53.	1065.	76.	637.00
0.63	0.11	1.22	0.11	0.060	0.030	0.060	0.030	619.00	110.57
0.000016	1020.	1020.	1020.	0	17	0	0.0	792.54	903.11

FLOW DISTRIBUTION FOR SECNO= 5600.00 CWSEL= 638.50

STA=	111.	160.	856.	896.	903.
PER Q=	0.0	99.9	0.0	0.0	
AREA=	52.4	10676.8	49.8	3.5	
VEL=	0.1	1.2	0.1	0.1	

*SECNO 8960.000

ADA-CASCADE TOWNSHIP LINE

8960.00	18.05	638.55	627.16	0.0	638.55	0.01	0.03	0.00	637.00
13000.	0.	12997.	3.	2.	19201.	48.	2223.	170.	636.50
2.01	0.05	0.68	0.07	0.060	0.030	0.060	0.030	620.50	47.42
0.000007	3360.	3360.	3360.	0	18	0	0.0	1639.44	1686.85

FLOW DISTRIBUTION FOR SECNO= 8960.00 CWSEL= 638.55

STA=	47.	50.	1640.	1687.
PER Q=	0.0	100.0	0.0	
AREA=	2.0	19201.1	48.0	
VEL=	0.0	0.7	0.1	

1) COUNTY: KENT

2) STUDY NAME: ADA, CITY OF

3) WATERCOURSE: THORNAPPLE RIVER

4) DOCUMENT TYPE: REPORT

00BREAK00

HYDRAULIC ANALYSIS REPORT

GRAND RIVER AT ADA TOWNSHIP

KENT COUNTY, MICHIGAN

Prepared by

COMMONWEALTH ASSOCIATES INC.
209 East Washington
Jackson, Michigan 49201

January 1979

CROSS SECTION REFERENCE

Cross Section ID in Profile/ Table	Sec. No. in HEC-2 Program	Corps of Engineers Cross Section No.
A	1	1
B	2	2
C	3.1	3
D	3.2	3
E	5	5
F	6	6
G	7	7
H	8	8
I	9	9
J	10.1	10
K	10.2	10
L	11.5	11
M	12	12
N	13	13
O	14	14
P	15	15

Introduction

Hydraulic calculations were performed for Grand River within the entire corporate boundaries of Ada Township. Field cross section data, surveyed in 1972, were obtained from the Corps of Engineers office in Detroit. (Sections 14 and 15 were surveyed by the Corps of Engineers during 1974). In addition, the input data used by the Corps of Engineers in their HEC-2 model was found in a copy of their Technical Appendix.[1] These cross section data were already the combinations of field cross sections and information obtained from U.S.G.S. topographic maps. This study was matched with the FIS of Plainfield Township at the downstream end. The flood flows for 10, 50, 100 and 500 year recurrence intervals were approved by the Michigan Department of Natural Resources. This study was performed by Commonwealth Associates Inc., Jackson, Michigan and the Project Manager was E. A. Meyer, P.E.

Method of Analysis

HEC-2 computer program was utilized for the entire hydraulic analysis.

Variables and Coefficients

Manning's Roughness Coefficient

For Channel	0.030 - 0.033
For Overbanks	0.080 - 0.110

Coefficients for Floodway

Contraction	0.10
Expansion	0.30

Coefficients for Bridges

Contraction	0.30
Expansion	0.50

Ratios

Contraction	1:1
Expansion	1:4

Coefficients for Weir Flow 2.8

High Water Marks

No documented high water marks were available.

Starting Elevations

Starting elevations were based on the FIS of Plainfield Township. A detailed hydraulic analysis was performed between the Plainfield--Ada Township line and Knapp Street Bridge in order to have a valid starting elevation at the bridge even though this portion of the river was an approximate study.

Special Problems

New developments by Amway Corporation[2] just downstream of the M-21 Bridge were taken into consideration by modifying the appropriate cross sections.

References

1. U.S. Department of the Army, Corps of Engineers, Technical Appendix to Flood Plain Information Report, Grand and Thornapple Rivers, Ada Township, Michigan, 1974.

2. Topographical Survey for Amway Corporation, Ada Michigan, prepared by Exxel Engineering Corporation, Grand Rapids, Michigan, December, 1975.

Bridge Notes and Sketches

1. Knapp Road Bridge - Coded as Normal Bridge
   Manning's Roughness Coefficient for Bridge Section - 0.015
   Skew Factor for the Bridge Section - 0.930

2. M-21 Bridge
   Pier coefficient for low flow - 0.90
   "XKOR" value (friction loss negligible) - 1.50
   Weir flow coefficient - 2.80
   Skew coefficient - 0.838
   Adjusted cross sectional area, normal to flow - 8450 ft^2

HYDRAULIC ANALYSIS REPORT

for the

THORNAPPLE RIVER

in

ADA TOWNSHIP

KENT COUNTY, MICHIGAN

Introduction:

This portion of the flood study is the hydraulic analysis of a reach of the Thornapple River beginning at it's confluence with the Grand River and ending 1.7 miles upstream at the corporate boundary of Ada Township. Cross section data was obtained from the technical appendices of the Ada Township "Flood Plain Information" study prepared by the Department of the Army, Corps of Engineers dated 1974. The water surface elevations at the downstream limit of this study have been matched with the elevations from the Grand River portion of this study. Flood discharges for 10, 50, 100 and 500 year storm events which were used in the hydraulic analysis had previously been approved by the Department of Natural Resources. This study was performed by Commonwealth Associates located in Jackson, Michigan and the Project Manager was E. A. Meyer, P.E.

Method of Analysis:

Hydraulic Analysis for the Thornapple River was performed in two parts:

1. The HEC-2, "Water Surface Profiles," computer program was utilized for all portions of the stream except the Thornapple River Dam.

2. Hand calculations were performed for the Thornapple River Dam.

Variables and Coefficients:

Manning's n values for roughness were determined by comparison between the Ada Township aerial photograph and roughness coefficient tables as presented in reference No. 4. The roughness coefficient which was used for the channel was .03. Overbank roughness coefficients varied between .05 and .1 inclusive.

Contraction and expansion coefficients for unrestricted valley sections are .1 and .3 respectively whereas contraction and expansion coefficients for bridges are .3 and .5 respectively. A 1:1 contraction ratio was utilized to model effective flow for constriction approaches and a 1:4 expansion ratio was utilized for constriction exits.

A weir flow coefficient of 2.60 was used for flow over roadways and bridges. Weir flow coefficients for the Thornapple River Dam vary between 2.63 and 3.89 as determined from References 2 and 3. These coefficients vary with respect to weir configuration (Spillway or Embankment) and storm frequency. Tailwater submergence was taken into account in the weir flow calculation. During the 500 year storm event pressure flow controls at the spillway which is enclosed. A loss coefficient

(k) of 1.5 was applied to the pressure flow equation as recommended in Reference 5 (Page 1 of 2).

A pier shape coefficient of 1.05 and a loss coefficient of 1.50 were used for all bridges.

Highwater Marks:

There are no recorded historical high water marks available for the Thornapple River.

Starting Conditions:

Starting water surface elevations for the Thornapple River were obtained from the Grand River profile which is a part of this Ada Township flood study. Since the Thornapple River represents a major percentage of the Grand River drainage basin at Ada Township (approximately 20%), it is likely that a major storm will be experienced by both streams at the same time; furthermore, historical storm events have acted in this way. Therefore, 10, 50, 100 and 500 year flood elevations from the Grand River were applied to the Thornapple River computer model as starting water surface elevations.

Special Problems:

There were no special problems for this portion of the flood study.

References:

1. U.S. Department of the Army, Corps of Engineers, Technical Appendix, Flood Plain Information, Grand River, Ada Township, Michigan, 1974.

2. Brater, Ernest F. and King, Horace Williams, Handbook of Hydraulics, New York: McGraw-Hill, Inc., 1976, pgs. 5-18 and 5-40.

3. U.S. Department of the Interior, Bureau of Reclamation, Design of Small Dams, Washington: U.S. Printing Office, 1973, pg. 378.

4. Chow, Ven Te, Open Channel Hydraulics, New York: McGraw-Hill, Inc., 1959, pgs. 110-123.

5. U.S. Dept. of the Army, Corps of Engineers, HEC-2 Water Surface Profiles, Users Manual, Davis, California: The Hydrologic Engineering Center, 1977.

Cross Section Reference:

Miles above Mouth	Cross Section I.D. in Profile/Table	SEC NO in HEC-2 Program	FPI Study for Ada Township
.19	A	1000	1
.38	B	2000	2
.62	C	3245	3
.64	D	3375	4
.69	E	3655	5
.71	F	3725	6
.74	G	3895	8
.84	H	4410	9
.87	I	4580	10
1.06	J	5600	11
1.70	K	8960	12

Bridge and Dam Notes:

Thornapple River Drive:

Pier Shape Coefficient = 1.05
Total Loss Coefficient = 1.50
Weir Flow Coefficient = 2.60

Weir flow accounts for approximately 4 percent of the 100 year flow over this structure. The bridge will flow full for it's entire length and pressure flow will control during the 100 year storm.

Covered Bridge:

Pier Shape Coefficient = 1.05
Total Loss Coefficient = 1.50
Weir Flow Coefficient = 2.60

Weir flow amounts to less than 2 percent of the 100 yr. flow over the roadway. The bridge will flow full for it's entire length and pressure flow will control during the 100 year storm.

Grand Trunk Western R.R.:

Pier Shape Coefficient = 1.05
Total Loss Coefficient = 1.50
Weir Flow Coefficient = 2.80

The bridge will be under low flow control for the 100 year storm and there will be no weir flow.

Thornapple River Dam:

Preliminary HEC-2 computer runs indicated that the dam could not be effectively modeled by the computer; therefore, external computations were manually performed and entered into the model. (See Exhibit A).

FORM NO. CA-109

COMMONWEALTH ASSOCIATES INC.

BY W.J. Weaver DATE 1/19/79 SUBJECT Thornapple Creek SHEET NO. ____ OF ____

CHKD. BY ____ DATE ____ JOB NO. ____

"EXHIBIT A"

THORNAPPLE DAM

Calculations

The 100 year stage does not include the 1408 cfs - that is the Surface area.

Thornapple Creek
Ada Township
W.J. Weaver
1/17/79
O.K. DDJ 1-22-79

FORM NO. CA-109

COMMONWEALTH ASSOCIATES INC.

BY WJ. Weber DATE 1/17/79 SUBJECT Thornapple Creek FIS DAM Calculations SHEET NO. 1 OF 9

CHKD. BY ..... DATE ..... JOB NO. .....

SUMMARY

Storm Event (yr.)	Tailwater (Elev.)	Q (cfs)	Headwater (Elev.)
10	626.55	6400	632.65
50	631.25	10,900	636.70
100	633.26	13,000	638.48
500	638.40	19,000	644.10

The calculations on the following pages represent flood elevation determinations at the Thornapple Dam. Preliminary HEC-2 runs indicated that the computer would not handle this structure to an acceptable accuracy; therefore, the above headwater elevations will be input into the HEC-2 computer model U/S of the dam with an X5 card. Thus, the computer will handle all computations up to the D/S limit of the Dam and from 100 feet upstream of the Dam to the Study limit.

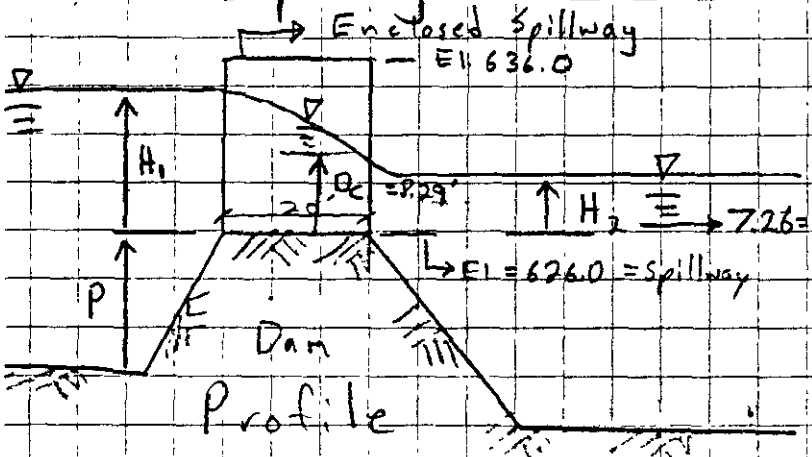
FORM NO. CA-108

COMMONWEALTH ASSOCIATES INC.

BY W.J. Weaver DATE 1/18/79 SUBJECT Thornapple Creek SHEET NO. 2 OF 9

CHKD. BY ..... DATE ..... JOB NO. .....

Spillway Calculation for 100yr. Storm



Tailwater El = 633.26 (From HEC-2 Run)

Q_{100} = 13000 cfs

L = 96 feet = length of wei

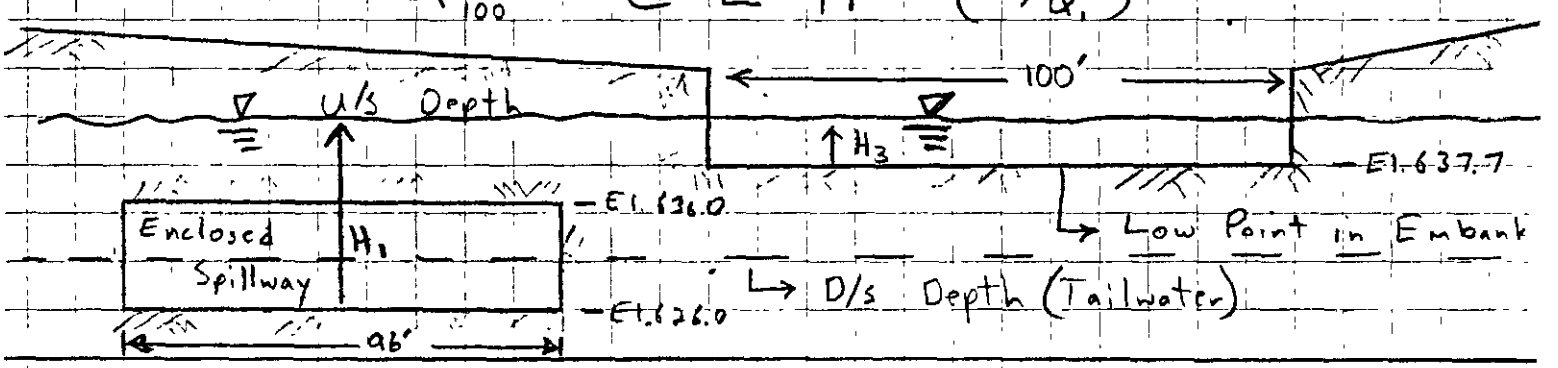
D_c = 8.29' (See pg. 3)

References: ① King + Brater, "Handbook of Hydraulics", Pg 5-15 for Weir Submergence Calculation

② "Design of Small Dams", Pg 378 for Weir coefficients

$$Q_{100} = C\,L\,H^{3/2}\left(Q/Q_1\right)$$

Submergence Reduction factor



DAM CROSS SECTION

$$C\,L\,H_1^{3/2}\left(Q/Q_1\right) + C\,L\,H_3^{3/2} = Q_{TOTAL} = Q_{100}$$

H_1	$H_1^{3/2}$	H_2/H_1	Q/Q_1	P/H_1	C_1	Q_1	H_3	$H_3^{3/2}$	C_3	Q_2	Q_{TOTAL}
12	41.57	.59	.78	.58	3.83	11922	.3	.164	2.69	44	11966
12.5	44.19	.56	.80	.56	3.82	12964	.8	.72	2.67	192	13156
12.4	43.67	.57	.79	.57	3.82	12652	.7	.59	2.68	158	12810
12.45	43.93	.57	.79	.57	3.82	12727	.75	.65	2.68	174	12900
12.48	44.09	.58	.795	.56	3.82	12854	.78	.69	2.68	184	13038

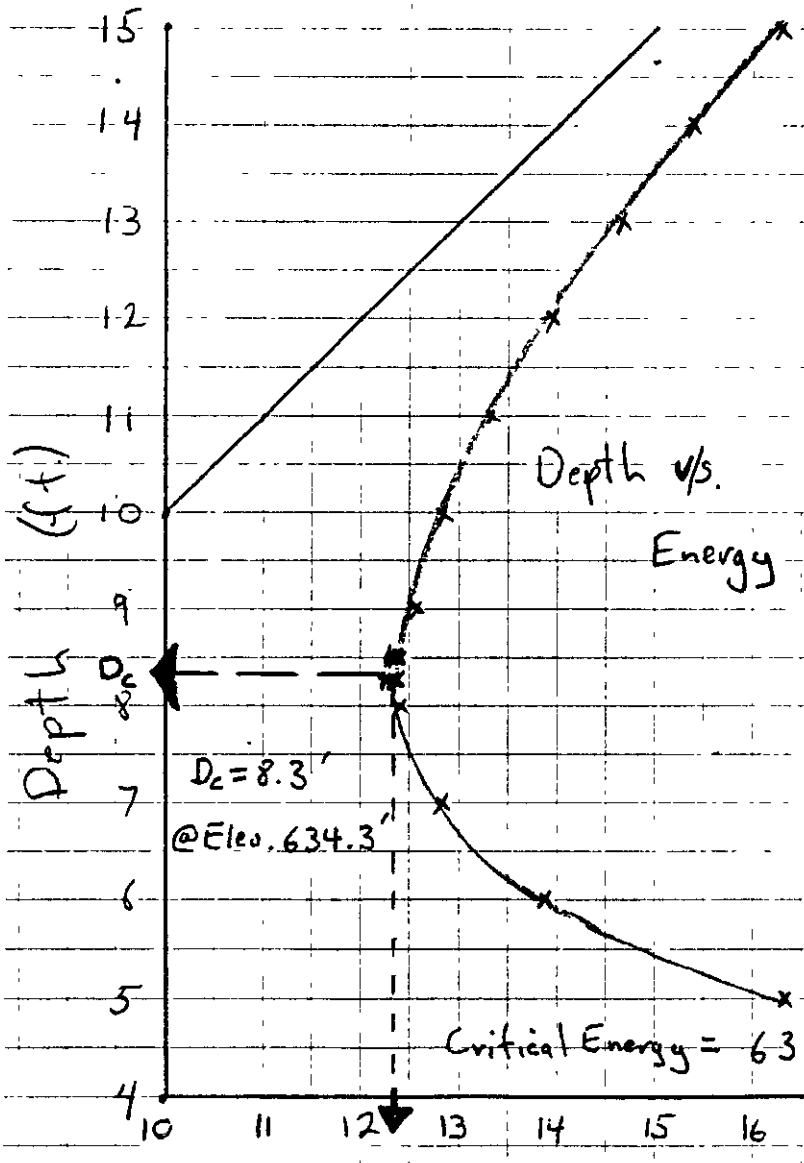
∴ The 100yr flood elevation u/s at the dam is:

626.0 + 12.48 = **638.48**

Thornapple Creek Dam

Specific Energy Curve

100 yr Storm



$Q = 13000$ cfs

Area = 960 ft² (full)

Depth	Vel.	$V^2/2g$	$D + V^2/2g$
5	27.1	11.389	16.39
6	22.6	7.91	13.91
7	19.35	5.81	12.81
8	16.93	4.45	12.45
9	15.05	3.52	12.52
10	13.54	2.85	12.85
11	12.31	2.35	13.35
12	11.29	1.98	13.98
13	10.42	1.69	14.69
14	9.67	1.45	15.45
15	9.03	1.27	16.27
8.5	15.93	3.94	12.44
8.25	16.41	4.18	12.43

Check

$$D_c = \left(\frac{Q}{5.67b}\right)^{2/3} = \left(\frac{1300}{(5.67}\right.$$

$D_c = 8.29'$ O.K.

Spillway Calculation for 10 year Storm

$Q_{10} = 6400$ cfs (Use Weir Flow Equati

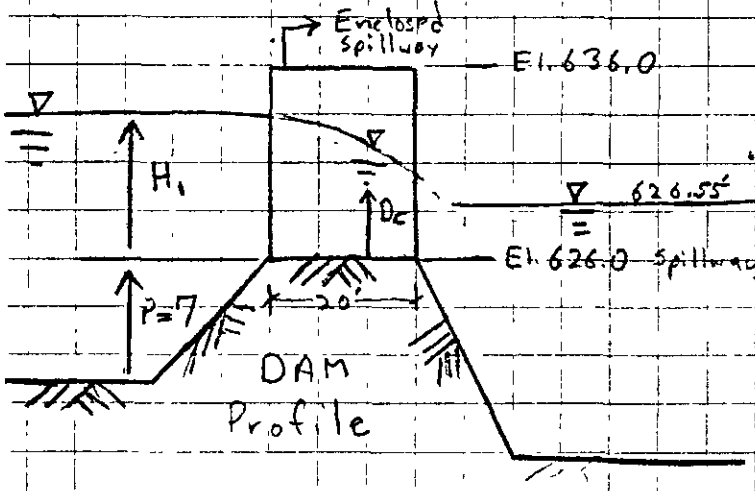
Tailwater El. = 626.55'

$$Q_T = C L H^{3/2}$$

$Q_1 + Q_2 = Q_T$

Q_1 = Outlet Structu

Q_2 = Add'l flow over embar



H_2 = Weir Submergence = .55'

H_3 = Head on Embankment

L_1 = 96 feet (Outlet Struct

L_2 = 100 feet (Embankment

Embankment Elevation = 637.7

References: "Kings Handbook of Hydraulics" Pg 5-18 (for effect of Su

"Design of Small Dams" Pg. 378 (for C Coefficient in Outlet St

H_1 (ft)	$H_1^{3/2}$	H_2/H_1	Q/Q_1	P/H_1	C_1	Q_1 (cfs)	H_3 (ft)	$H_3^{3/2}$	C	Q_2 (cf.)	Q_{To} (c f
6	14.7	.083	.995	1.167	3.9	5476	Embankment is not Overtopped			0	54
7	18.52	.08	1.0	1.0	3.88	6898				0	68
6.7	17.34	.08	1.0	1.05	3.89	6476					64
6.65	17.15	.08	1.0	1.05	3.89	6400					64

∴ the flood elevation U/s of the dam is:

626.0 + 6.65 = **632.65**

FORM NO CA-109

COMMONWEALTH ASSOCIATES INC.

BY [illegible] DATE ..... SUBJECT ..... SHEET NO. 5 OF 9

CHKD. BY ..... DATE ..... 50 year storm calculation JOB NO. .....

Spillway Calculations for 50 year storm

$Q_{50} = 10{,}900$ cfs

Tailwater Elevation = 631.25

★ [See Pg. 4 for Diagram and explanation of variables

$H_2 = 631.25 - 626 = 5.25$

$L = 96$ ft.

$$\boxed{Q = C L H^{3/2}}$$

Main Spillway							Embankment Flow				
H_1 (ft)	$H_1^{3/2}$	H_2/H_1	Q/Q_1	P/H_1	C_1	Q_1 cfs	H_3 (ft)	$H_3^{3/2}$	C	Q_2 (cfs)	QTota (cf
10	31.62	.51	.835	.70	3.85	9758	0			0	97
12	41.57	.43	.875	.58	3.83	13450	.3	TOO HIGH			~~1245~~
11	36.48	.47	.855	.64	3.84	11498	0			0	114
10.7	35.00	.49	.84	.65	3.84	10,840	0			0	108
10.3	33.06	[illegible]	[illegible]	.68	3.845	10556	0			0	105
10.4	33.54	.46	.865	.67	3.84	10695	0			0	106
10.45	33.78	.46	[illegible]	.67	3.84	10770	0			0	1077
	34.27	.45	.87	.66	3.84	10990	0			0	1099
[illegible]	34.02	.49	.845	.67	3.84	10597	0			0	10[illegible]

Embankment is not overtopped

∴ The flood elevation u/s of the dam is:

$626.0 + 10.7 = \boxed{636.7}$

Spillway Calculation for 500 year storm

Q_{500} = 19000 cfs

Tailwater Elevation = 638.40

Since the Tailwater elevation submerges the underclearance of the enclosed spillway and critical depth on the spillw Pressure Flow will occur through the structure. Furtherm the embankment to the right side of the outlet structu will be overtopped by the tail water. Thus:

$$Q_{500} = \underbrace{C L H_3^{3/2} (Q/Q_1)}_{\text{Embankment Weir Flow}} + \underbrace{A\sqrt{2gH_1/K}}_{\text{Pressure Flow}}$$

(Q/Q_1) ↓ Flow Reduction Caused by Submergence

$\sqrt{2gH_1/K}$ ↓ From "HEC 2 Manual

* [For Diagram References and explanation of variables – see Pg. 4

$H_2 = 638.40_{TW} - 637.7_{\text{Top of Embankment}} = .70$

$K = 1.5$ (Short Culvert)

$L = 100'$

$A = 960\ ft^2$

$P = 18.7\ ft$

Elev.	H_3	$H_3^{3/2}$	H_2/H_3	Q/Q_1	P/H_3	C_3 (use Kings Handbook)	Q_3 (cfs)	H_1 (ft)	Q_1 (cfs)	Q TOT (cfs)
639.0	1.3	1.48	.54	.83	—	2.64	324	.60	4872	5197
641.0	3.3	6.0	.21	.96	—	2.63	1515	2.60	10142	11657
643.0	5.3	12.2	.13	.98	—	2.63	3144	4.60	13491	16636
643.5	5.8	13.97	.12	.99	—	2.63	3637	5.10	14205	17843
644.5	6.8	17.73	.10	.99	—	2.63	4616	6.10	15536	20152
644.2	6.5	16.57	.11	.99	—	2.63	4314	5.80	15148	19463
644.1	6.4	16.19	.11	.99	—	2.63	4216	5.7	15018	19234

∴ The flood elevation u/s of the dam is:

644.10

* See Summary Pg 1 for Conclusion

Thornapple River Dam Calculations Section 4460.0

[100 YR. STORM]

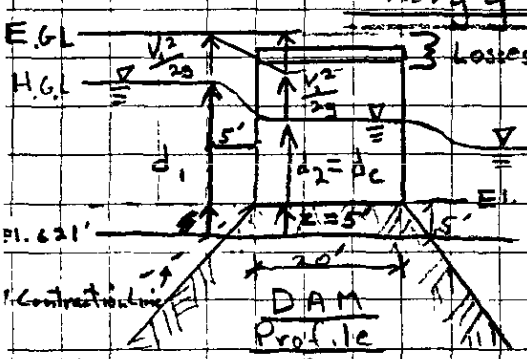
D/S Tailwater Elev. = 633.05 (From HEC-2 Printout)

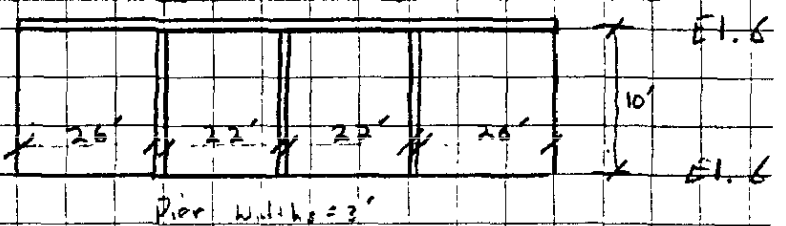
The following calculations will be performed to insure that the flood elevation produced by inlet control is not greater than that produced by Weir Flow:

1. Perform an energy balance with Critical Depth control just inside the inlet.
2. Perform an energy balance with the outlet structure flowing full at the inlet. Note: Preliminary HEC-2 runs indicate that the outlet structure may approach full flow conditions at the inlet even though flow will pass through critical depth (which is 3' ± below the underclearance) near the outlet.

Note: (Energy Balance Calculations should only be used as a check on Weir flow Calc

1.) Energy Balance with Critical Depth Control





DAM X-Section

$Q = 13000$ cfs, Inlet loss $K = .2$

$$D_c = \left(\frac{Q}{5.67\,b}\right)^{2/3} = 8.29'$$

$$V_c = \frac{13000}{8.29(96)} = 16.34 \text{ ft/sec}$$

(See Pg 2)

Energy Balance

$$d_1 + \frac{V_1^2}{2g} = d_c + \frac{V_c^2}{2g} + K\left(\frac{V_c - V_1}{2g}\right)^2 +$$

$$\therefore d_1 + (1.2)\frac{V_1^2}{2g} = d_c + (1.2)\frac{V_c^2}{2g} + 5$$

$$d_1 + (1.2)\frac{V_1^2}{2g} = 18.27'$$

El. 0

Continued

FORM NO CA-109

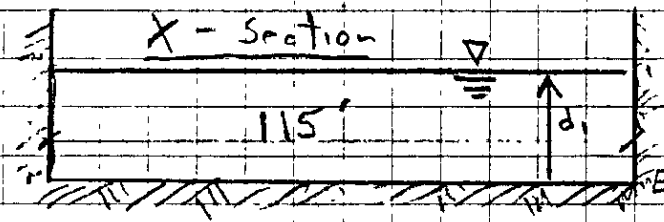
COMMONWEALTH ASSOCIATES INC.

BY WJW DATE ____ SUBJECT ____ SHEET NO. 8 OF 9

CHKD. BY ____ DATE 1/9/79 100 yr. Flow Calc. JOB NO. ____

(Continued) 100 yr Storm

U/S Channel (5' u/s of Inlet) using 1:1 contraction for both horiz. and vertical dimensions



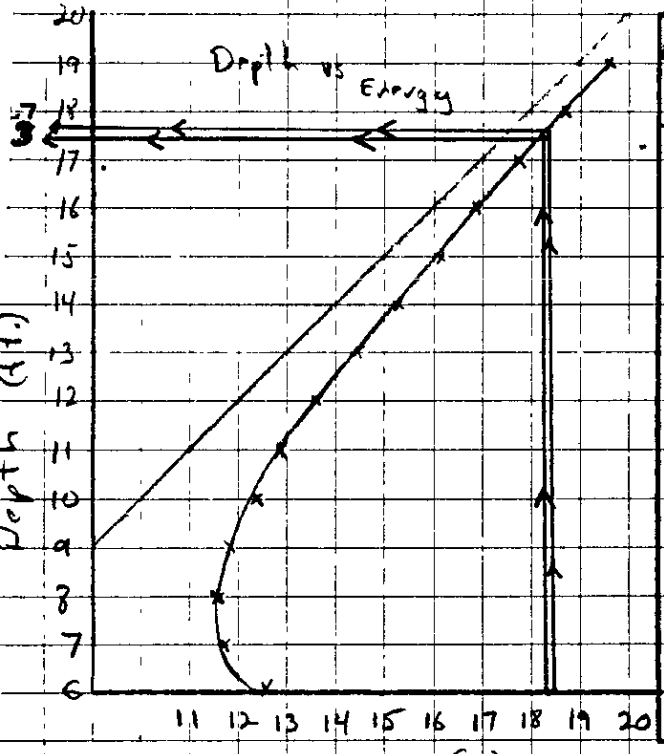


Table A.

Assumed d_1	A_1	U_1	$1.2\,U_1^2/2g$	$d_1 + 1.2\,U_1^2/2g$
7	805	16.15	4.86	11.86
8	920	14.13	3.72	11.72
9	1035	12.56	2.94	11.94
10	1150	11.30	2.38	12.38
11	1265	10.28	1.97	12.97
12	1380	9.42	1.65	13.65
13	1495	8.70	1.41	14.41
14	1610	8.08	1.21	15.21
15	1725	7.54	1.06	16.06
16	1840	7.07	.93	16.93
17	1955	6.65	.82	17.82
18	2070	6.28	.74	18.74
19	2185	5.95	.66	19.66

$d_1 + 1.2\frac{U_1^2}{2g} = 18.27$ (See pg. 1)

Using Critical Depth Control within the structure, the Headwater elevation = 621.0 + 17.5 = **638.5**

2.) Energy Balance for the full flow condition (at inlet)

$$d_1 + 1.2\frac{U_1^2}{2g} = 10 + \frac{\left(\frac{1300Q}{10(96)}\right)^2}{2g}(1.2) + 5' = 18.42$$

Using the Full Flow condition within the culvert, the Head elevation = 621.0 + 17.7 = **638.7**

(Note: These calculations do not include additional weir flow to the Right of the outlet structure)

Conclusion

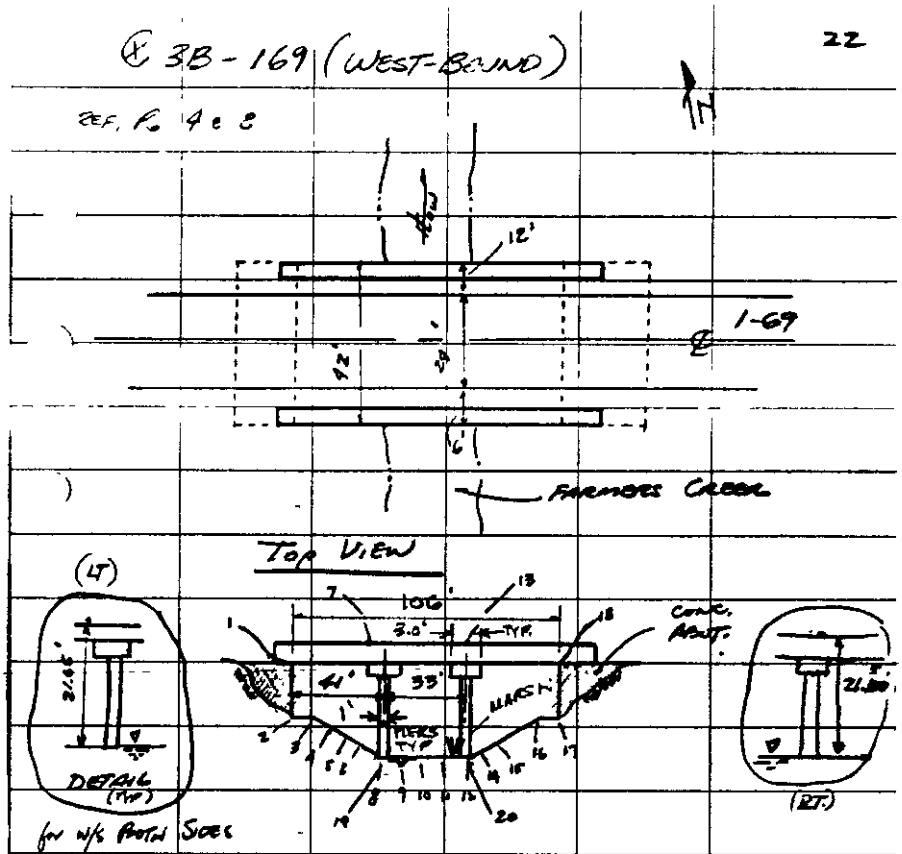
Energy balance calculations assuming an inlet control condition (Pgs. 7+8) indicate that analysis of this structure as a weir is satisfactory. The energy balance solutions are comparable to the weir flow calculations. Furthermore, the energy bal computation is conservative since it does not t additional embankment flow into account and exc inlet conditions are not known.

The structure was analyzed as a pressu flow conduit for the 500 yr. storm sin the outlet is submerged by the 500 year tai water. All other storm events produce a weir control situation at the dam.

The calculated flood elevations are as follows:

Storm Event (yr.)	Flood Elevation	Q
10	632.65	6,400
50	636.70	10,900
100	638.48	13,000
500	644.10	19,000

West-Bound I-96 over Farmers Creek
c.s. 3.739 and 3.747 on HEC-2 run



17	BTM of (RT.) ABUT	106'R	13.03	839.4
18	Top of (RT.) ABUT	106'R	9.76	842.6
19	U/S	33'R		826.0
20	U/S	73'R		826.0

22

	+	HI	−	ELEV	
TBM-7				849.81	
	2.56	852.37			
	DESC.	DIST	ROD	ELEV.	
1	Top of (LT) ABUT.	0'L	9.29	843.1	
2	ETM of (LT) ABUT.	0'L	12.56	839.8	
3	EDGE OF CONC SLOPE	5'R	12.64	839.7	
4	SLOPE	10'R	14.35	838.0	
5	"	20'R	19.56	832.8	
6	"	30'R	24.54	827.8	
7	Top of U/S FACE OF BRIDGE @ PIER	33'R	4.73	847.64	U/S 826.0
8	ETM of (SNDG) CONC. SLOPE	5 33'R	0.4	~~852.0~~	825.6
9	SNDG	43'R	0.9	~~851.5~~	825.1
10	"	53'R	1.0	~~851.4~~	825.0
11	SNDG	63'R	0.8	~~851.6~~	825.2
12	ETM of (SNDG) CONC SLOPE	5 73'R	0.5	~~851.9~~	825.5
13	Top of U/S FACE AT PT PIER	73'R	4.87	847.50	
14	SLOPE	83'R	21.52	830.8	
15.	"	93'R	16.0	836.4	
16	EDGE OF CONC. SLOPE	103'R	13.0	839.4	

29.

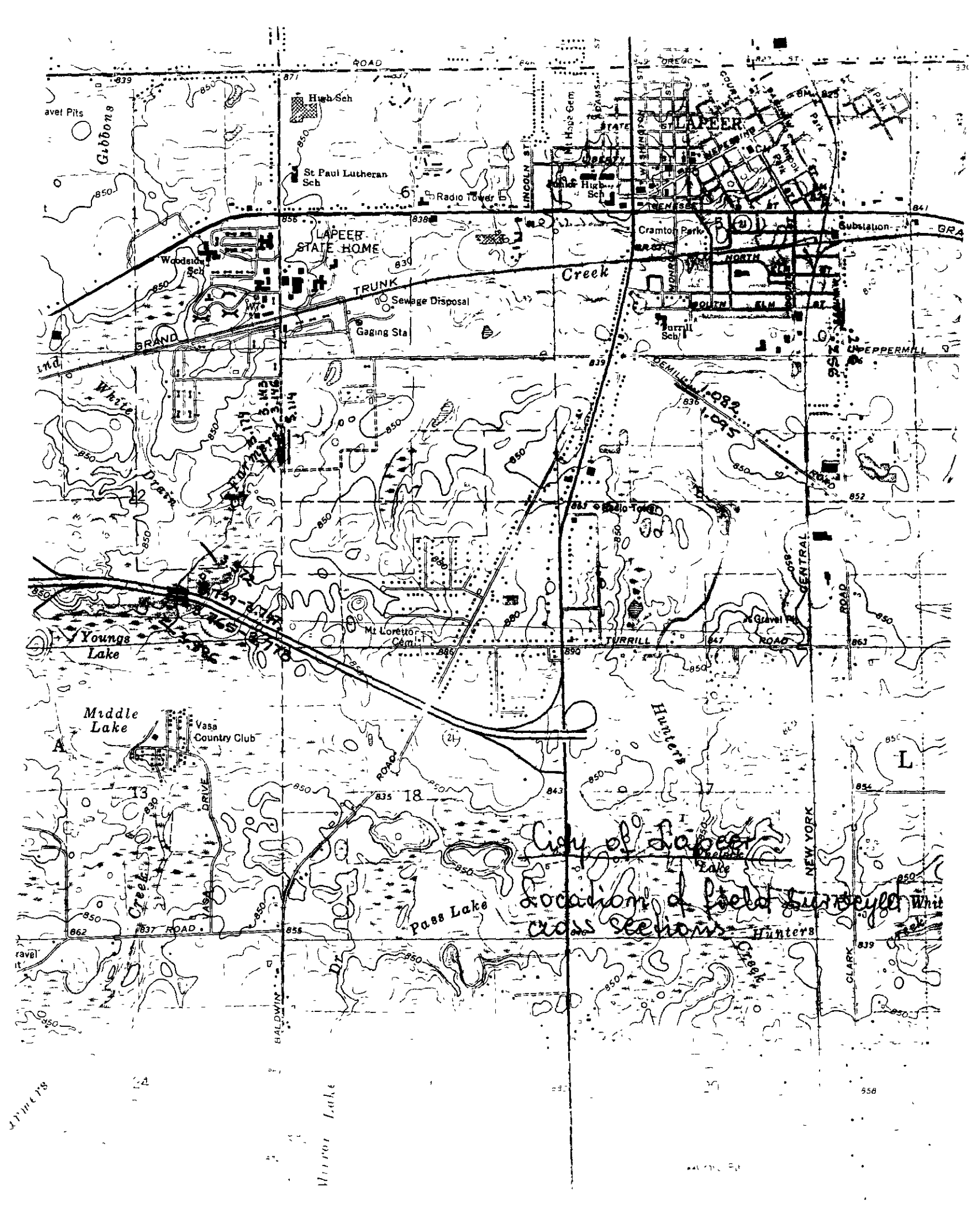
TBM-7				849.81	Ref. Pt. 4 & 8
	2.56	852.37			)
	DESC.	DIST.	ROD	ELEV.	
	FACE OF (C) ABUT.	0'L	5.47	846.90	)
	EDGE OF ROAD	25'L	5.24	847.13	
	"	50'L	5.27	847.10	
	"	75'L	5.07	847.30	)
	"	100'L	4.89	847.53	
	"	125'L	4.66	847.71	
	"	150'L	4.48	847.89	
	"	175'L	4.13	848.24	
	"	200'L	3.85	849.52	
	"	225'L	3.57	848.80	
	EDGE OF ROAD	250'L	3.22	849.15	)
	4/S ℄ LT ABUT	—	9.29	843.08	)
					)
					)

25 MAY 86

(X) 3B - 169 (WESTBOUND) 13 MAY 89

				849.81
	← (CONTINUED)			
)	2.56	852.37		
	DESC.	DIST	ROD	ELEV.
)	FACE OF (RT) ABUT	0'R	5.80	846.6
	EDGE OF ROAD	25'R	6.00	846.4
)	"	50'R	6.04	846.4
	"	75'R	6.18	846.2
	"	100'R	6.21	846.2
	"	125'R	6.22	846.2
	"	150'R	6.17	846.2
	"	175'R	6.23	846.2
	"	200'R	6.15	846.3
)	"	225'R	6.03	846.4
	EDGE OF ROAD	250'R	6.10	846.3
	L/S @ RT ABUT	~~255'R~~	9.57	842.8
)				
)				

25 May 89



City of Lapeer
Location of field surveyed
cross sections
LAPEER
LAPEER STATE HOME
High Sch
St Paul Lutheran Sch
Radio Tower
Cramton Park
Substation
Woodside Sch
Sewage Disposal
Gaging Sta
Turrill Sch
Mt Loretto Cem
Youngs Lake
Middle Lake
Vasa Country Club
Pass Lake
Hunters Creek
White Drain
Gibbons
Creek
TRUNK
GRAND
TURRILL ROAD
CENTRAL ROAD
NEW YORK
CLARK
BALDWIN
LINCOLN ST
PEPPERMILL
DEMILL

FARMERS CREEK

City of Lapeer, Michigan

RECEIVED
JUL 18 '77
WATER MANAGEMENT

Hydraulic Analysis

SECNO Chart

References

Bridge Sketches and Calculations

Project Manager, Dennis D. Cox

HYDRAULIC ANALYSIS

A. Introduction

Farmers Creek in the City of Lapeer, Lapeer County, Michigan, is the subject of this report. The study begins at the mouth of Farmers Creek (at its confluence with the South Branch of the Flint River) and continues upstream for approximately 3.1 river miles to the western corporate limits at Millville Road. The drainage area of Farmers Creek at the mouth is approximately 57 square miles. The 10-, 50-, 100-, and 500-year flood frequency flows used in this study were computed by the TR-20 computer program developed by the Soil Conservation Service. These discharges were approved by the Michigan Department of Natural Resources on March 16, 1977. The major floods on Farmers Creek occur in the spring months. The project manager for this study is Dennis Cox.

B. Method of Analysis

The flood profiles were calculated by the HEC-2 computer program developed by the U.S. Army Corps of Engineers. The M-24/Main Street, Grand Trunk Railroad, and DeMille Street bridges have been modeled for the requirements of the special bridge routine; all other bridges have been modeled for the requirements of the normal bridge routine.

C. Variables and Coefficients

The roughness factors (Manning's "n") were established by comparing the descriptions in Open-Channel Hydraulics (Reference 1) and Roughness Characteristics of Natural Channels (Reference 2) with photographs and field descriptions taken by survey crews in December, 1976 and April, 1977, and

field reconnaissance trips taken during the winter and spring months of 1977. Aerial photographs of the city of Lapeer taken in May, 1975 were also used to determine the roughness coefficients and their extent. These roughness factors were determined assuming that flooding would occur during the spring months. The Manning's "n" for the channel ranges from 0.035 in the downstream park and residential areas to 0.045 in the upstream reaches of the study. The channel bottom consists mainly of sand and gravel with medium-sized stones in the downstream reaches to large-sized stones in the upstream reaches. The Manning's "n" for the overbanks ranges from 0.030 in short grass park and residential areas to 0.080 in the areas of heavy brush with trees. The expansion and contraction coefficients chosen for this study were 0.5 and 0.3, respectively.

Weir flow discharge coefficients (COFQ) were chosen from charts published in Hydraulics of Bridge Waterways (Reference 3). The calculations for "XKOR" values used in the special bridge routines are shown on special forms in the back of this booklet.

D. Starting Point

A convergence trial method was used to obtain starting water-surface elevations for the 10-, 50-, 100-, and 500-year flood profiles at the mouth of Farmers Creek. The convergence trials began on the South Branch of the Flint River at the northern corporate limits of Lapeer (Section A), with variable starting water-surface elevations being assumed for each of the 10-, 50-, 100-, and 500-year flows. The flow used for each convergence trial was the flow occurring in the South Branch of the Flint River when the corresponding frequency flow in

Farmers Creek was at its peak at the mouth. Each of these flows was determined from the TR-20 computer program. The backwater profiles from these convergence trials were computed from Section A (17.576) to Section K (18.677) on the South Branch of the Flint River, and the elevation obtained at Section K was adopted as the starting water-surface elevation at the mouth of Farmers Creek. The results of these trials indicated a convergence at Section K in each case to a range of 0.03 foot for the 10-year and 100-year floods and 0.06 foot for the 50-year and 500-year floods.

E. Encroachments

In most cases, the encroachments for the 100-year natural floodway were based on a 1:1 convergence into bridges and a 1:4 expansion from the downstream sides of bridges or natural constrictions. However, in the downstream reaches of the stream this method was sometimes not feasible due to the meandering of the stream between bridges. In these cases, the 100-year natural floodway was based on the sweep and extent of moving floodwaters.

In the area between Genesee Street and Monroe Street, the floodway on the northwest side of Farmers Creek was encroached on a straight line between the west edge of the weir flow over Genesee Street and the downstream end of the Monroe Street bridge. For the portion of Farmers Creek upstream from Section AA (1.901), the 100-year natural floodway was allowed to expand to its full topwidth. The floodway was then encroached until a rise in water-surface elevation of 0.09 foot was realized for the 100-year flood.

F. Special Problems

In the area between Court Street and the mouth of Farmers Creek, there have been significant changes in topography from that shown on the May 1966 map due to the relocation of the channel. The new Saginaw Street bridge is located in the area designated "UC" (under construction) on the May 1966 City of Lapeer Topographic Map. The new channel was outlined based on recent aerial photography of the area. The area upstream of the Saginaw Street bridge and north of the relocated channel has been converted into an asphalt parking area; the area south of the channel to Horton Street is a city park area. Sections A, B, C, and D are field sections taken in the topographically changed area.

At the DeMille Street bridge in the Lapeer State Home complex, larger flows will pass not only through the main bridge, but also through a small culvert which exists just under the roadway about 60 feet north of the main bridge. The culvert is a combination of 8 feet of 48" R.C.P. and 27 feet of 3.5' x 6.0' box culvert, while the bridge area is approximately 19' x 5.2'. A hydraulic analysis was undertaken on the combined effects of the culvert and bridge for the 100-year flow in order to obtain the flow-carrying capacity of the culvert relative to the total flow. The analysis indicated that the culvert passed less than 4 percent of the total 100-year flow. Therefore, for the purposes of our study, the effect of the culvert was ignored.

Farmers Creek
Lapeer County
5670-05-1

Cross Section	SECNO	Description
	0.000	Section A repeated and adjusted for channel invert (at mouth of Farmers Creek)
A ✓	0.029	Field valley section
	0.048	Section A repeated and adjusted for channel invert
	0.053	Section C repeated and adjusted for channel invert
B ✓	0.054, 0.062	Saginaw Street bridge section
	0.063	Section C repeated and adjusted for channel invert
C ✓	0.069	Field valley section with overbanks extended from 2-foot contour maps
D ✓	0.127	Field valley section
	0.167	Section ~~B~~ D repeated and adjusted for channel invert
	0.189	Section ~~B~~ D repeated and adjusted for channel invert
	0.194	Section F repeated and adjusted for channel invert
E ✓	0.195, 0.206	Court Street bridge section
	0.207	Section F repeated and adjusted for channel invert
	0.208	Section F repeated and adjusted for channel invert
F ✓	0.213	Field valley section with overbanks extended from 2-foot contour maps
	0.258	Manufactured section; channel portion of Section F adjusted for channel invert with overbanks manufactured from 2-foot contour maps
	0.276	Manufactured section; channel portion of Section F adjusted for channel invert with overbanks manufactured from 2-foot contour maps
	0.295	Manufactured section; channel portion of Section F adjusted for channel invert with overbanks manufactured from 2-foot contour maps
	0.314	Manufactured section; channel portion of Section F adjusted for channel invert with overbanks manufactured from 2-foot contour maps

Cross Section	SECNO	Description
	0.325	Manufactured section; channel portion of Section F adjusted for channel invert with overbanks manufactured from 2-foot contour maps
	0.330	Section G repeated
G	0.331, 0.337	Fox Street bridge section
	0.338	Section G repeated
	0.339	Section H repeated and adjusted for channel invert
H	0.345	Field valley section with overbanks extended from 2-foot contour maps
	0.379	Manufactured section; channel portion of Section H adjusted for channel invert with overbanks manufactured from 2-foot contour maps
	0.405	Section 0.379 repeated and adjusted for channel invert
	0.408	Section J repeated and adjusted for channel invert
I	0.409, 0.415	Mason Street bridge section
	0.416	Section J repeated and adjusted for channel invert
J	0.429	Field valley section with overbanks extended from 2-foot contour maps
	0.453	Manufactured section; channel portion of Section K adjusted for channel invert with overbanks manufactured from 2-foot contour maps
K	0.489	Field valley section with overbanks extended from 2-foot contour maps
	0.494	Section K repeated and adjusted for channel invert
L	0.495, 0.507	M-21/Genesee Street bridge section; bridge skewed by approximately 20 degrees
	0.508	Section K repeated and adjusted for channel invert for channel and right overbank; left overbank manufactured from 2-foot contour maps
	0.518	Manufactured section; channel portion of Section K adjusted for channel invert with overbanks manufactured from 2-foot contour maps
M	0.550	Field valley section with overbanks extended from 2-foot contour maps

Cross Section	SECNO	Description
	0.554	Section M repeated and adjusted for channel invert for channel and right overbank; left overbank extended from 2-foot contour maps.
N	0.555, 0.559	Bentley Street bridge section
	0.560	Section M repeated and adjusted for channel invert for channel and right overbank; left overbank extended from 2-foot contour maps
	0.571	Manufactured section; channel portion of Section P adjusted for channel invert with overbanks manufactured from 2-foot contour maps
	0.594	Manufactured section; channel portion of Section P adjusted for channel invert with overbanks manufactured from 2-foot contour maps
	0.613	Section O repeated
O	0.614, 0.615	City park walkway bridge section
	0.616	Section O repeated
P	0.664	Field valley section with overbanks extended from 2-foot contour maps
	0.669	Section P repeated and adjusted for channel invert
Q	0.670, 0.672	Monroe Street bridge section
	0.673	Section P repeated and adjusted for channel invert for channel and right overbank; left overbank extended from 2-foot contour maps
	0.718	Manufactured section; channel portion of Section T adjusted for channel invert with overbanks manufactured from 2-foot contour maps
R	0.777	Field valley section with overbanks extended from 2-foot contour maps
	0.783	Section R repeated and adjusted for channel invert
S	0.785	Field valley section at crest of small dam in park; overbanks extended from 2-foot contour maps
	0.788	Section R repeated and adjusted for channel invert
T	0.823	Field valley section with overbanks extended from 2-foot contour maps
	0.832	Section T repeated and adjusted for channel invert

Cross Section	SECNO	Description
U	0.833, 0.853	M-24/Main Street bridge section
	0.854	Section T repeated and adjusted for channel invert
	0.856	Manufactured section; channel portion of Section V adjusted for channel invert with overbanks manufactured from 2-foot contour maps
V	0.909	Field valley section with overbanks extended from 2-foot contour maps
W	0.965	Field valley section with overbanks extended from 2-foot contour maps
	0.969	Section W repeated and adjusted for channel invert
X	0.970, 0.979	Grand Trunk Railroad bridge section
	0.980	Section W repeated and adjusted for channel invert
	0.981	Manufactured section; channel portion of Section Y repeated and slightly compressed to match channel bank width; overbanks manufactured from 2-foot contour maps
Y	1.057	Field valley section with overbanks extended from 2-foot contour maps
	1.241	Manufactured section; channel portion of Section Y adjusted for channel invert with overbanks manufactured from 2-foot contour maps
	1.330	Manufactured section; channel portion of Section Z adjusted for channel invert with overbanks manufactured from 2-foot contour maps
	1.371	Manufactured section; channel portion of Section Z adjusted for channel invert with overbanks manufactured from 2-foot contour maps
Z	1.400	Field valley section with overbanks extended from 2-foot contour maps
	1.626	Manufactured section; channel portion of Section AA adjusted for channel invert with overbanks manufactured from 2-foot contour maps

Cross Section	SECNO	Description
AA	1.901	Field valley section with overbanks extended from 2-foot contour maps
AB	2.226	Field valley section with overbanks extended from 2-foot contour maps
AC	2.376, 2.377	Small concrete dam section
	2.378	Section AD repeated and adjusted for channel invert
AD	2.419	Field valley section with overbanks extended from 2-foot contour maps
AE	2.486	Field valley section with overbanks extended from 2-foot contour maps
	2.490	Section AE repeated and adjusted for channel invert
AF	2.491, 2.494	DeMille Street bridge section through the Lapeer State Home grounds
	2.495	Manufactured section; channel and left overbank portion of Section AF repeated to small culvert, with remaining left overbank and all of right overbank manufactured from 2-foot contour maps
AG	2.600	Field valley section with overbanks extended from 2-foot contour maps
	2.601	Manufactured section. Section AG repeated to right bank; right bank lowered to Elev. 826.0 and assumed horizontal across lake area to eliminate lake storage, with remaining right overbank extended from 2-foot contour maps
	2.666	Manufactured section. Channel portion of Section AG adjusted for channel invert with overbanks manufactured from 2-foot contour maps; lake portion of right overbank filled to Elev. 826.0 to eliminate lake storage
	2.732	Manufactured section. Channel portion of Section AH adjusted for channel invert and shortened between banks, with overbanks manufactured from 2-foot contour maps; lake portion of right overbank filled to Elev. 826.0 to eliminate lake storage
	2.733	Section 2.732 repeated
AH	2.936	Field valley section with overbanks extended from 2-foot contour maps

Cross Section	SECNO	Description
	2.992	Manufactured section; channel portion of Section AH adjusted for channel invert with overbanks manufactured from 2-foot contour maps
	3.091	Manufactured section. Channel portion of field valley section taken approximately 50 feet upstream of Millville Road was adjusted for channel invert, with overbanks manufactured from 2-foot contour maps
	3.142	Field valley section taken approximately 50 feet upstream of Millville Road was repeated and adjusted for channel invert

References

1. Chow, V. T., Open-Channel Hydraulics, McGraw-Hill, 1959.

2. Barnes, Harry H., Jr., Roughness Characteristics of Natural Channels, Geological Survey Water-Supply Paper 1849, 1967.

3. U.S. Department of Transportation, Federal Highway Administration, Hydraulics of Bridge Waterways, Hydraulic Design Series, No. 1, 1973.

Johnson & Anderson, Inc., Hydraulics Booklet for South Branch of the Flint River, City of Lapeer Flood Insurance Study, May 1977.

Topographic Map of City of Lapeer, 2-Foot Contour Interval, Scale 1 inch = 200 feet, Photography and Mapping, 1966.

U.S. Army Corps of Engineers, Hydrologic Engineering Center, Application of the HEC-2 Bridge Routines, Training Document No. 6. June 1974.

U.S. Army Corps of Engineers, Hydrologic Engineering Center, HEC-2 Water Surface Profile Users Manual, 1973.

U.S. Department of the Interior, Measurement of Peak Discharge at Dams by Indirect Methods, Techniques of Water-Resources Investigations of the United States Geological Survey, Book 3, Chapter A5, 1976.

JOB NAME: CITY OF LAPEER, F.I.S. JOB NO: 56701 05 1

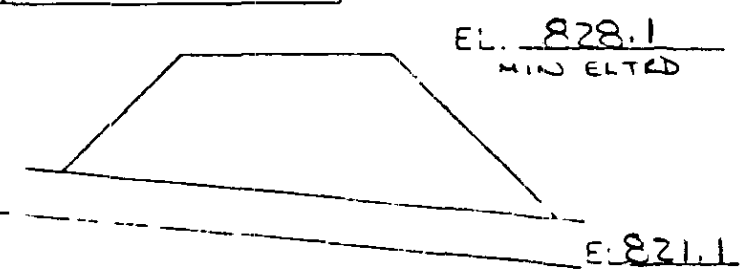
WATERCOURSE: HUNTER'S CREEK CULVERT LOCATION: FARM RD BRIDGE @ BSR

CULVERT DESCRIPTION:

FARM LANE BRIDGE, NO WINGWALLS

WOOD PLANKING w/ FIELDS IN OB'S

BY SLW DATE



A = 106.4 D = ____

WP = 64.5 Ke = 0.5

$\frac{29.1}{R^{4/3}}$ = 14.9699 r. = 0.039

So = 0.00

L = 16'

Sta. 7301 Sta. 7317

CALCULATIONS AND COMMENTS:

Station 1.521

MANNING'S "n"

CHANNEL n = 0.04, OB 0.045, ≈14' OF PLANK WALLS 0.025

$$n = \left[\frac{1}{64.5}\left((30)(0.04)^2 + 14(0.025)^2 + 20.5(0.045)^2\right)\right]^{1/2}$$

n = 0.039

$$XKOR = 1 + K_e + \frac{29.1 n^2 L}{R^{2/3}} = 1 + 0.5 + 14.9699(0.039)^2(16)$$

$$= 1.864$$

COFQ =

ASSUME h = 2.5' (AS PER RUN 3)

$\frac{h}{L} = \frac{2.5}{16} = 0.156 > 0.15$ ∴ USE FIG 22 (ALSO USING GRAVEL)

COFQ = 2.57

X1 [illegible]00 13 200.00 230.00 39.) 39.00 39.00 1.000)

BT 0.00 0.00 835.30 0.00 100.00 832.20 0.00 200.00 828.90 826.70

BT 230.00 828.10 825.90 300.00 827.90 0.00 400.00 830.50 0.00

GR 835.30 0.00 832.20 160.00 828.90 200.00 826.90 200.00 823.10 205.00
GR 821.10 210.00 821.30 215.00 821.40 220.00 822.70 225.00 826.90 230.00
GR 828.10 230.00 827.90 300.00 830.50 400.00

**********LISTING OF TOP AND BOTTOM SECTIONS OF ORIFICE**********

200.00 826.70 230.00 825.90

200.00 828.90 200.00 826.90 205.00 823.10 210.00 821.10 215.00 821.30
220.00 821.40 225.00 822.70 230.00 826.90 230.00 828.10

********** LISTING OF COORDINATES OF ORIFICE**********

200.00 826.70 230.00 825.90 230.00 826.90 225.00 822.70 220.00 821.40
215.00 821.30 210.00 821.10 205.00 823.10 200.00 826.90 200.00 826.70

ORIFICE AREA 106.4 WETTED PERIMETER 64.5 29.1/P**1.333 14.9699

```
**********************************************
HEC2 VERSION UPDATED JAN 1976
ERROR CORRECTIONS 01,02,03,04,05,06,07,08,09
MODIFICATIONS 52,53,54,55,56,57,58
**********************************************



T1       FARMERS CREEK - CITY OF LAPEER F.I.S. - PROJECT MANAGER, DENNIS COX
T2       100-YEAR FLOW = 1430 CFS
T3       FARMERS CREEK - CITY OF LAPEER F.I.S. - JOB NO. 5670-05

J1   ICHECK     INQ        NINV       IDIR       STRT       METRIC     HVINS      Q          WSEL       FQ

       -10.        4.         0.         0.  0.000000       0.00       0.0        0.   817.120      0.000

J2   NPROF      IPLOT      PRFVS      XSECV      XSECH      FN         ALLOC      IBW        CHNIM      ITRACE

      3.000      0.000     -1.000      0.000      0.000      0.000      0.000      0.000      0.000      0.000

CCHV=    .300 CEHV=    .500
     SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS    BANK ELEV
     Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA    LEFT/RIGHT
     TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
     SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


3470 ENCROACHMENT STATIONS=      111.0      324.0  TYPE=      1  TARGET=     -111.000
          MOUTH OF FARMERS CREEK (AT ITS CONFLUENCE WITH THE SOUTH BRANCH OF

          THE FLINT RIVER).

          THE STARTING WATER SURFACE ELEVATIONS FOR THE VARIOUS FREQUENCY

          FLOODS ON FARMERS CREEK WERE DETERMINED BY COMPUTING BACKWATER

          PROFILES FOR THE CORRESPONDING FLOWS OCCURRING IN THE SOUTH BRANCH OF

          THE FLINT RIVER WHEN FARMERS CREEK IS AT ITS PEAK.

        0.00      10.62     817.12       0.00     817.12     817.16        .04       0.00       0.00     810.20
        1430.       509.       921.         0.       427.       492.         0.         0.         0.     820.00
        0.00       1.19       1.87       0.00       .050       .035       .040      0.000     806.50     111.00
     .000138         0.         0.         0.          0          0          1       0.00     133.11     244.11

3470 ENCROACHMENT STATIONS=      150.0      370.0  TYPE=      1  TARGET=     -150.000
          SECTION A

         .03       9.62     817.12       0.00       0.00     817.22        .10        .03        .03     811.20
        1430.       277.      1153.         0.       164.       429.         0.         3.         0.     821.00
         .02       1.69       2.69       0.00       .050       .035       .025       .036     807.50     150.00
```

Fo[illegible] Creek

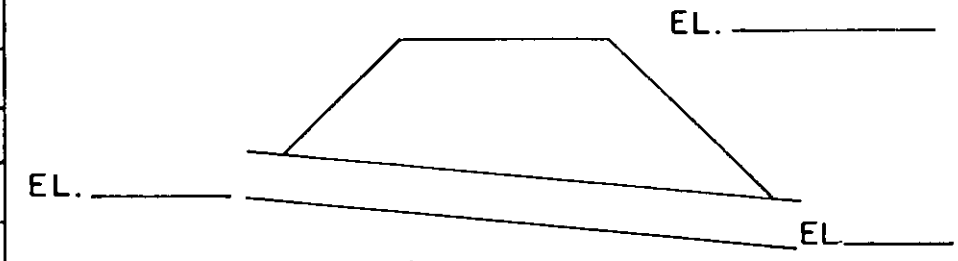
JOB NAME: CITY OF LAPEER F.I.S JOB NO. 5670 | 05 | 1

WATERCOURSE: Farmers Creek CULVERT LOCATION: Main St bridge M-24

CULVERT DESCRIPTION: Concrete arch with natural channel bottom

BY RCD DATE 6/28/77

WEIR DESCRIPTION: paved roadway



R = 3.052 A = 140.4 sq. ft. D = _____

$R^{4/3}$ = 4.427 WP = 46.0 ft. Ke = 0.5

$\frac{29.1}{R^{4/3}}$ = _____ n = 0.025

So = _____

L = 109 ft

Sta. Sta.

CALCULATIONS AND COMMENTS:

$K_e = 0.5 \rightarrow$ wingwalls parallel to embankment

$K_f = \frac{29.2\ n^2 L}{R^{4/3}}$ where $n = 0.025$, $L = 109$ ft., $R^{4/3} = 4.427$

$K_f = \frac{29.2\ (0.025)^2 (109)}{4.427} = 0.45$

$XKOR = 1 + K_e + K_f = 1 + 0.5 + 0.45 = 1.95$

1 8

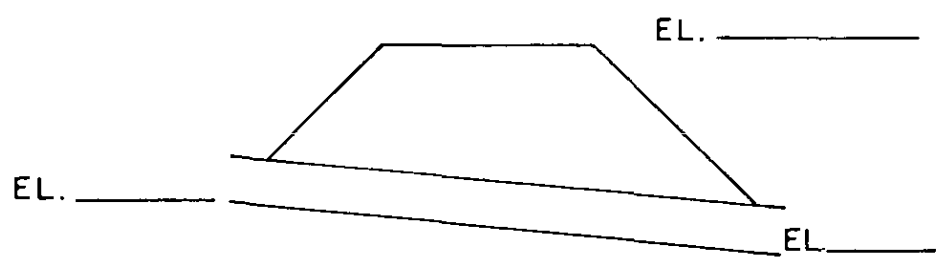
JOB NAME: CITY OF LAPLER FTS JOB NO. [illegible]

WATERCOURSE: Farmers Creek CULVERT LOCATION: Grand [illegible]

CULVERT DESCRIPTION: Concrete arch with natural channel bottom

BY RCD DATE 6/28/77

WEIR DESCRIPTION: paved roadway



R = 2.873 A = 115.8 sq. ft. D = _____

$R^{4/3}$ = 4.085 WP = 40.3 ft Ke = 0.4

$\frac{29.1}{R^{4/3}}$ = _____ n = 0.025

So = _____

L = 52 ft.

Sta. Sta.

CALCULATIONS AND COMMENTS:

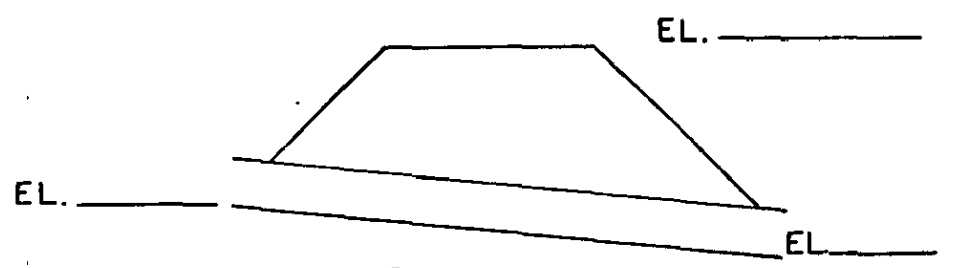
$K_e = 0.4 \rightarrow$ wingwalls @ 30° to 75° to barrel

$K_f = \frac{29.2\ n^2 L}{R^{4/3}}$ where $n = 0.025$, $L = 52$ ft., $R^{4/3} = 4.085$

$$K_f = \frac{29.2\,(0.025)^2(52)}{4.085} = 0.23$$

$$XKOR = 1 + K_e + K_f = 1 + 0.4 + 0.23 = 1.63$$

JOB NAME: City of Lapeer FIS -			JOB NO.	5670	05	1
WATERCOURSE: Farmers Creek	CULVERT LOCATION: DeMille St. bridge in Lap				
CULVERT DESCRIPTION: Concrete bridge	BY RCD	DATE 7/6/77	State Home complex		
with natural channel bottom					
WEIR DESCRIPTION: dirt road					



R = 2.023 A = 98.5 sq. ft. D = _____

$R^{4/3}$ = 2.558 WP = 48.7 ft. Ke = 0.4

$\frac{29.1}{R^{4/3}}$ = _____ n = 0.025

CALCULATIONS AND COMMENTS:

$K_e = 0.4$ → wingwalls @ 30° - 75° to barrel (with square edge at crown)

$K_f = \frac{29.2\ n^2 L}{R^{4/3}}$ where $n = 0.025$, $L = 25$ ft, $R^{4/3} = 2.558$

$K_f = \frac{29.2\ (0.025)^2 (20)}{2.558} = 0.14$

$\Sigma K_0 R = 1 + K_e + K_f = 1 + 0.4 + 0.14 = 1.54$

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HYDRAULIC STRUCTURAL DATA

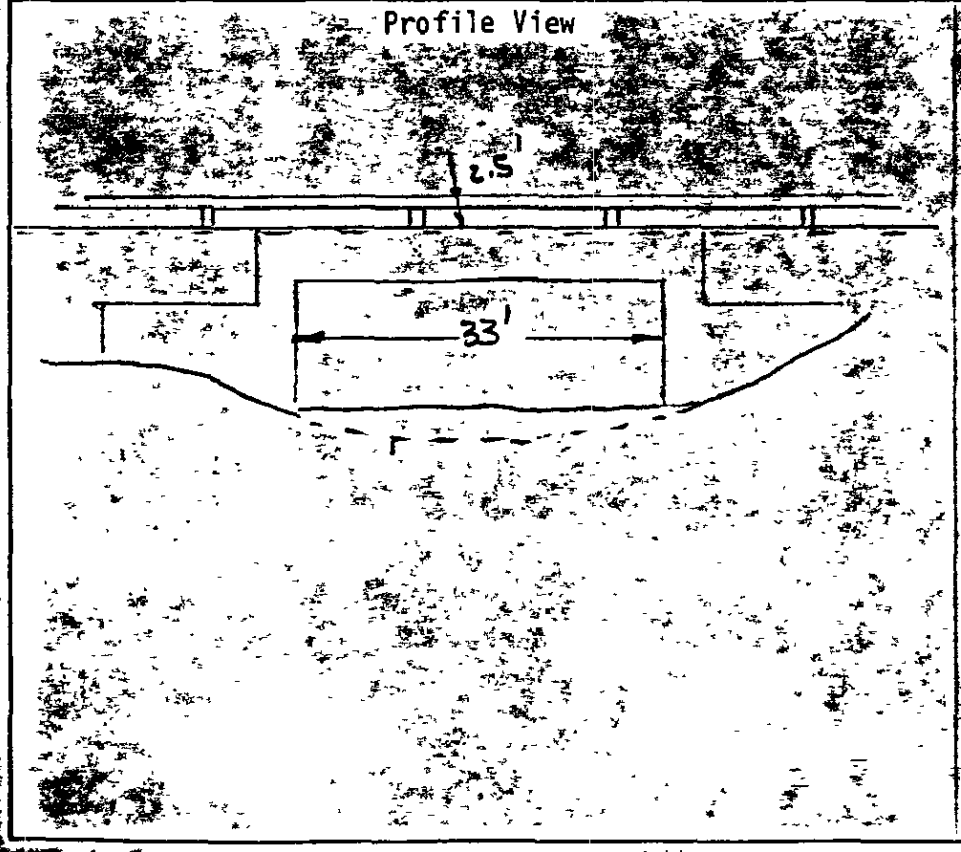
B.S. # 1

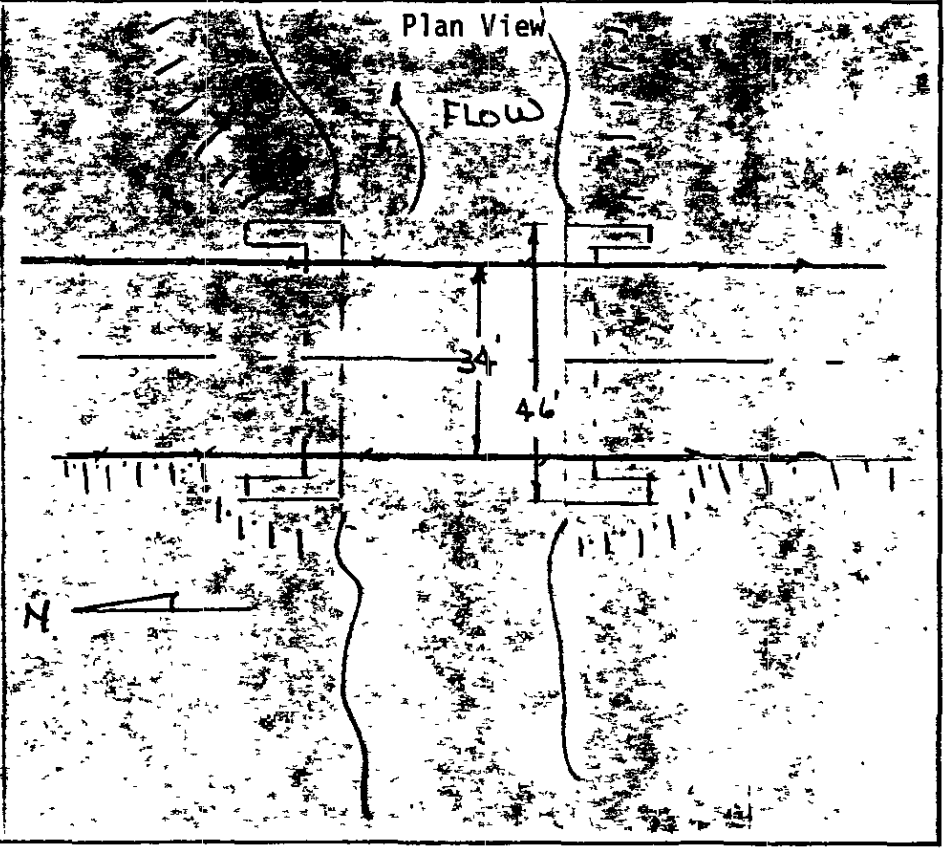
Code No. 5670-05-#1

Job Name: CITY OF LAPEER F.I.S.		By: R. MOSES
Date: 12-6-76	Feature: CONC BOX CULVERT	Water Course: FARMER CREEK
Remarks: BRIDGE ON (1) SAGINAW ST		
LEFT: COMMERICAL PARKING & BUILDINGS		CHANNEL BOTTOM: GRAVEL /
RIGHT: PARKS & HOMES		WITH MED SIZE STONES

Width of Piers: —	Pier Shape: —	No. of Piers: —	Area: —
Water Elevation: 809.2	Length: 33'	Width of Deck: 34'	Skew: —

FIELD SKETCH





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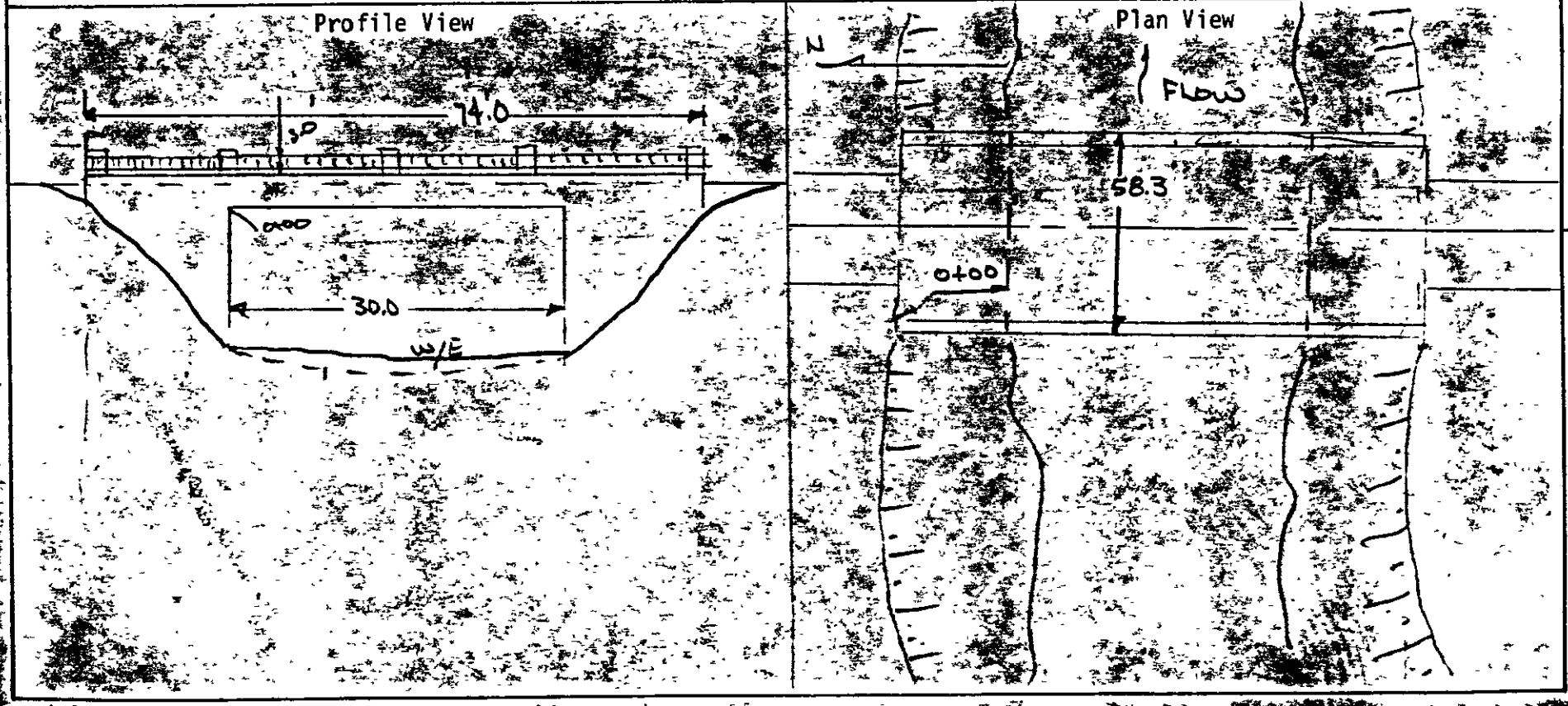
HYDRAULIC STRUCTURAL DATA

B.S. #3

Code No. 5670-05-#3

Job Name: CITY OF LAPEER F.I.S.			By: R. MOSES
Date: 12-6-76	Feature: CONC BRIDGE		Water Course: FARMER CREEK
Remarks: BUILDINGS — 60' LEFT — 158' RIGHT — Court St			
RIGHT: HOMES-LAWN-SHRUBS		UPSTREAM — LARGE SCATTERED TREES	
LEFT: COMMERICAL PROP — TOWN		DNSTREAM — PARK AREA	
Width of Piers: —	Pier Shape: —	No. of Piers: —	Area: —
Water Elevation: 810.13	Length: 30.0'	Width of Deck: 58.3	Skew: —

FIELD SKETCH



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HYDRAULIC STRUCTURAL DATA

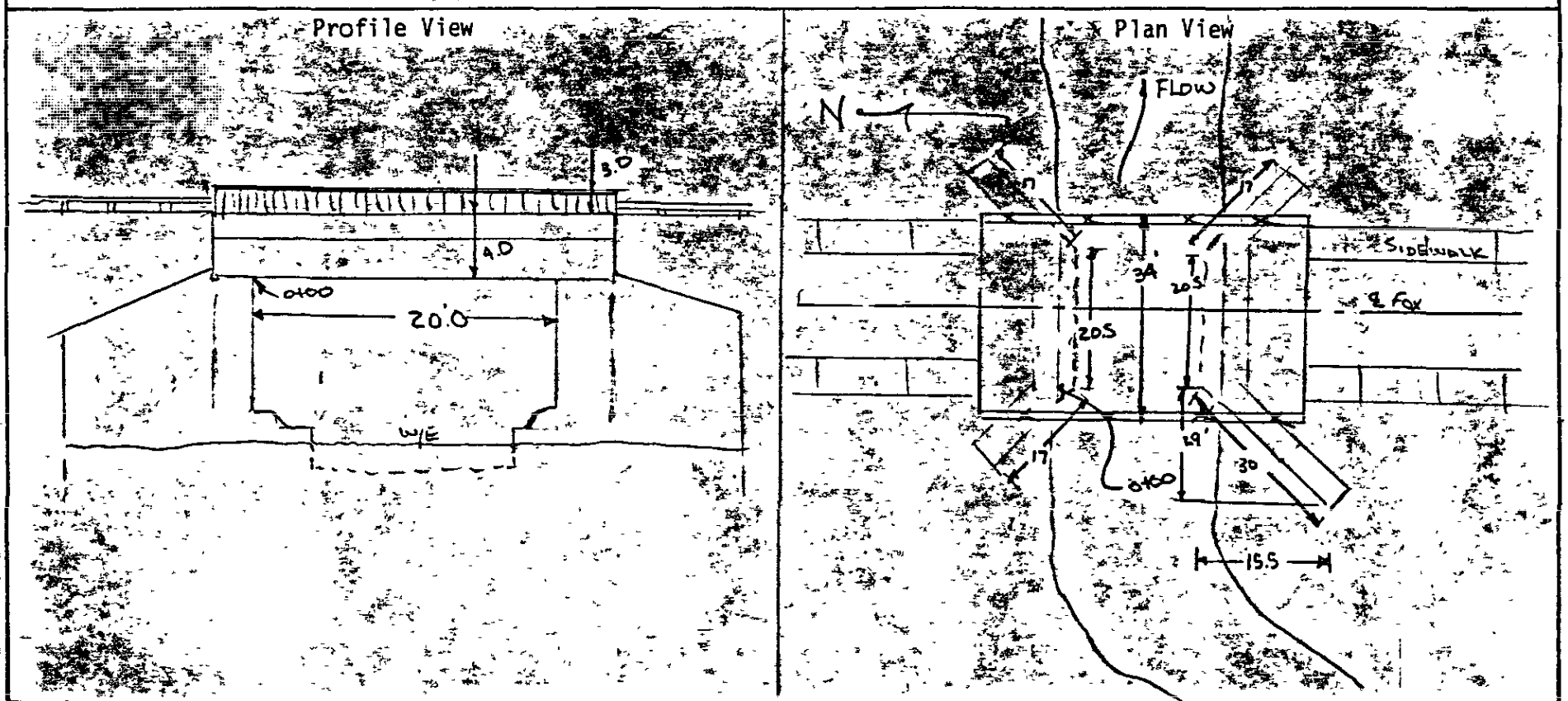
B.S. ⇄ S

Code No. 5670-05-05

Job Name: City of Lapeer F.I.S.		By: R. Moses
Date: 12-6-76	Feature: Stone & Oak Bridge	Water Course: Farmers Creek
Remarks: Bridge is on Fox St. - Large Willow Trees Scattered Along Bank Up & Dn		
Homes & Lawns Both Right & Left		

Width of Piers: —	Pier Shape: —	No. of Piers: —	Area: —
Water Elevation: 810.6	Length: 20.0	Width of Deck: 34.0	Skew: —

FIELD SKETCH



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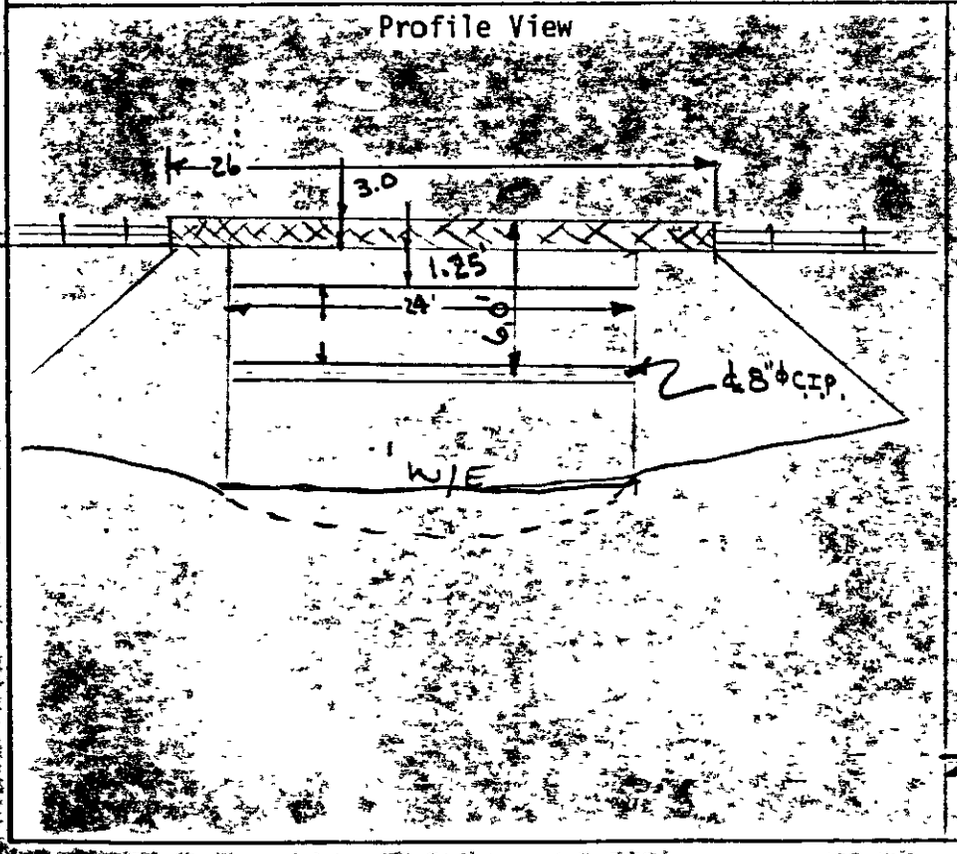
HYDRAULIC STRUCTURAL DATA

B.S. #7

Code No. 5670-05-07

Job Name: CITY OF LAPEER F.I.S			By: R. MOSES
Date: 12-6-76	Feature: CONC. BRIDGE		Water Course: FARMER CREEK
Remarks: BRIDGE IS ON MASON ST - SCATTERED LARGE TREES UP & DN FROM BRIDGE			
HOMES & LAWN AREAS RIGHT & LEFT			
Width of Piers: —	Pier Shape: —	No. of Piers: —	Area: —
Water Elevation:	Length: 24.0	Width of Deck: 40.0	Skew: —

FIELD SKETCH





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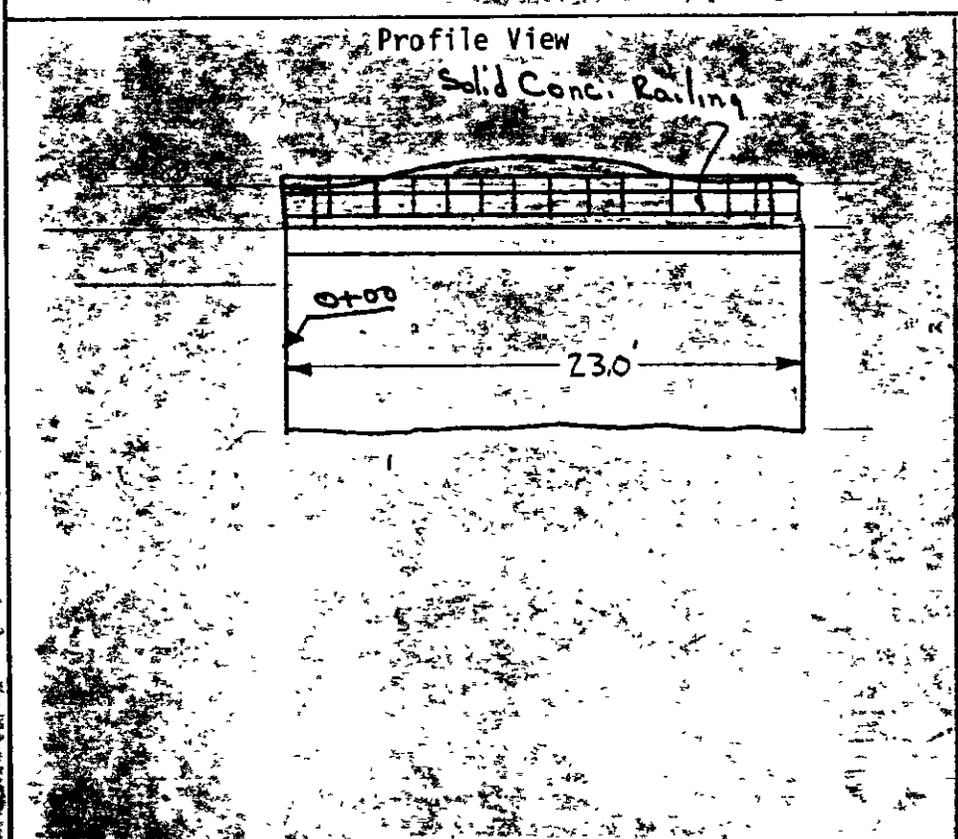
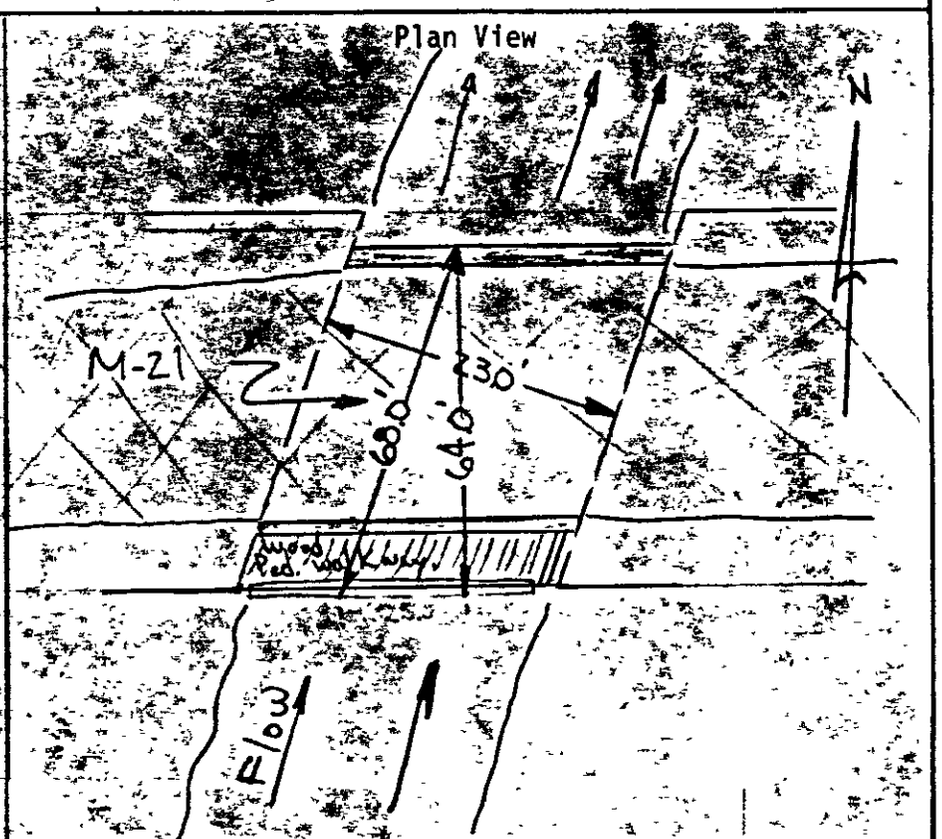
HYDRAULIC STRUCTURAL DATA

Code No. 5670-05-BS

Job Name: City of Lapeer FIS			By: C. Mapley C. Huggins R. Moses
Date: 12-7-76	Feature: Genesee St./ M-21 Conc. bridge		Water Course: Farmers Crk.
Remarks: Rt. Bank - comm'l properties		CHANNEL BOTTOM - SAND W/ MED SIZE STONES (8" ± DIA.)	
Lt. Bank - comm'l properties			
Width of Piers: —	Pier Shape: —	No. of Piers: —	Area:
Water Elevation: 811.1	Length: 23.0'	Width of Deck: 68.0'	Skew:

FIELD SKETCH





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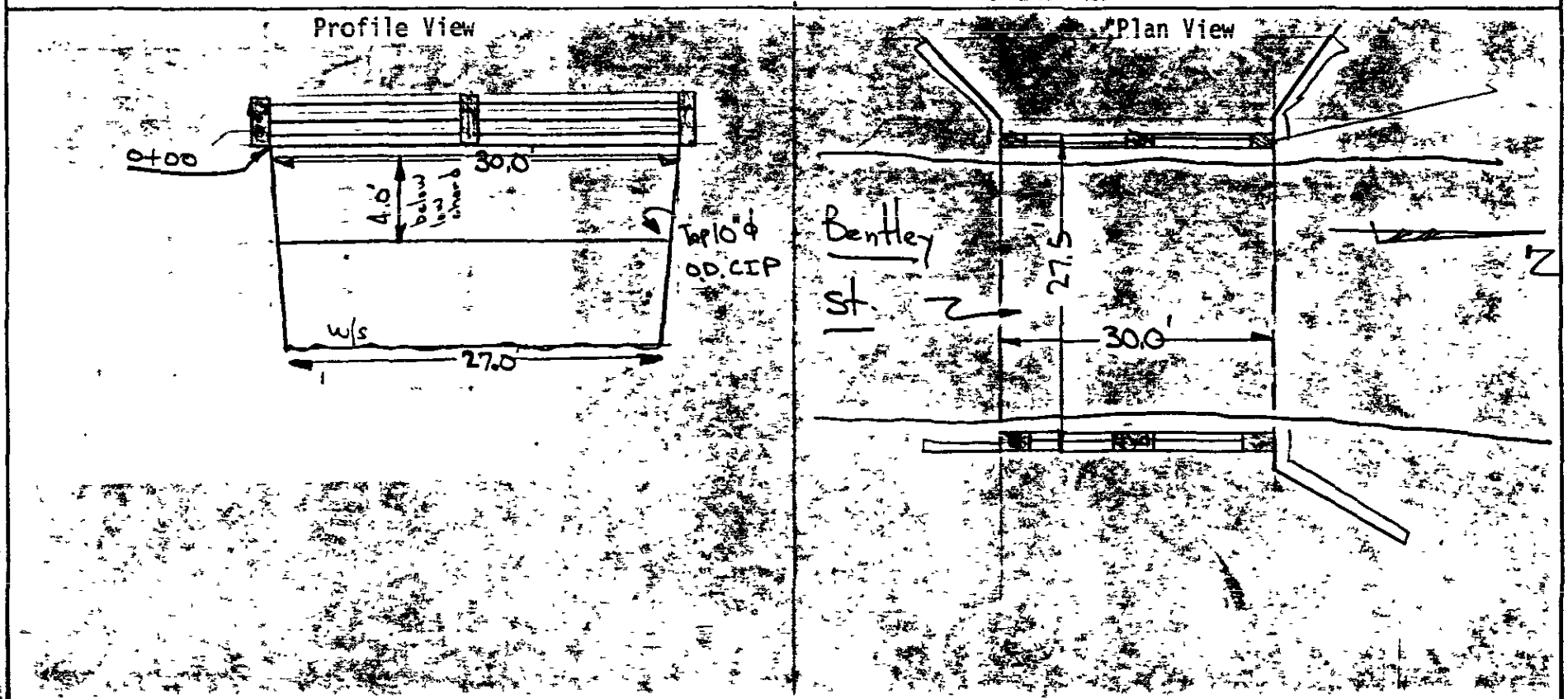
HYDRAULIC STRUCTURAL DATA

B.S. #12

Code No. 5670-05 - B.S./2

Job Name: City of Lapeer F.I.S.			By: C. Mapley, C. Huggins, R. Moses
Date: 12-7-76	Feature: Bentley St. bridge conc & stone		Water Course: FARMERS CREEK
Remarks: Park upstream from bridge			
Width of Piers: —	Pier Shape: —	No. of Piers: —	Area:
Water Elevation: 811.7	Length: 30.0	Width of Deck: 27.5'	Skew:

FIELD SKETCH



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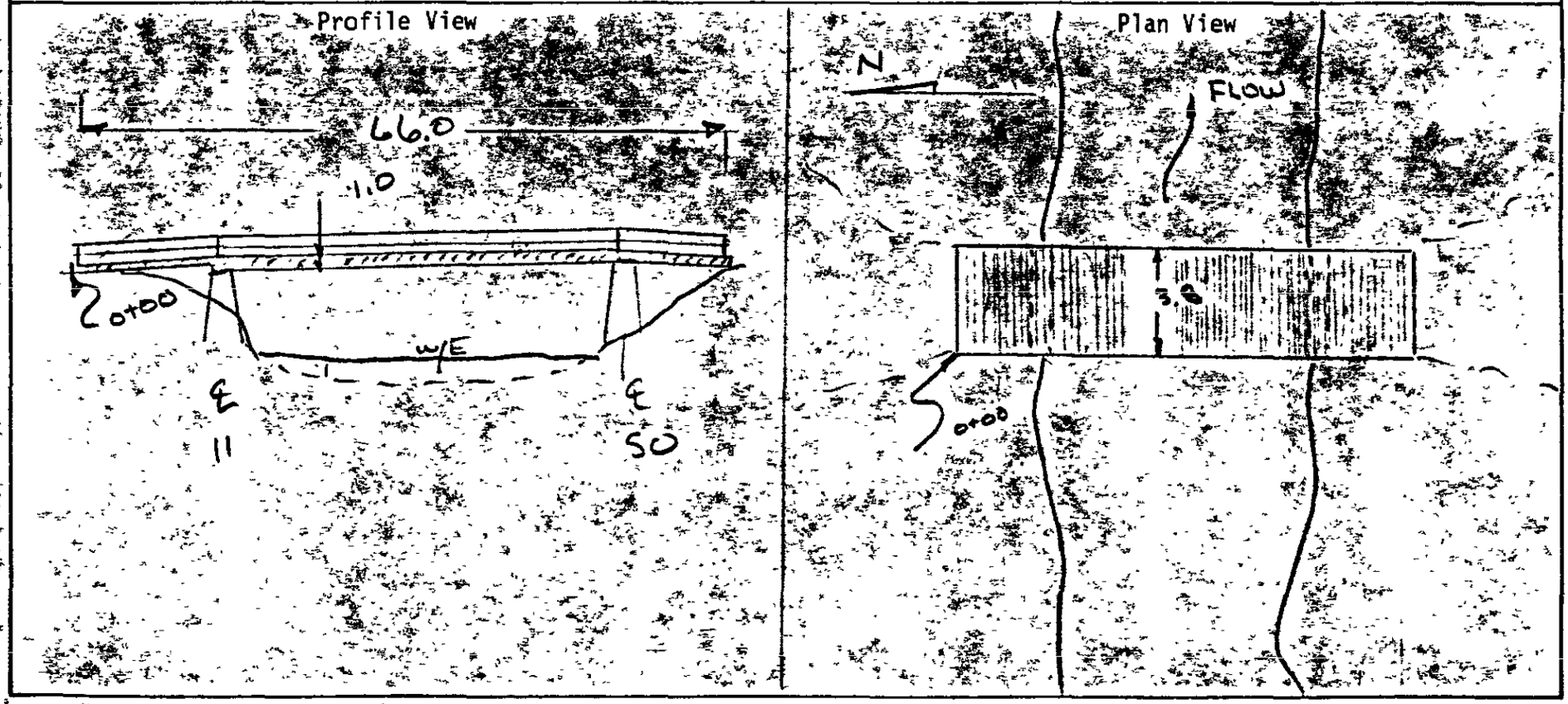
HYDRAULIC STRUCTURAL DATA

B.S. # 12-A

Code No. 5670-05-12-A

Job Name: City of Lapeer F.I.S			By: R. Moses
Date: 12-7-76	Feature: I-Beam & Wood Plank		Water Course: Farmer Creek
Remarks: Park Bridge about 250'± downstream of Monroe Bridge. Not for Motorized Vehicle			
Width of Piers: 2.0	Pier Shape:	No. of Piers: 2	Area:
Water Elevation:	Length: 66	Width of Deck: 38'	Skew:

FIELD SKETCH



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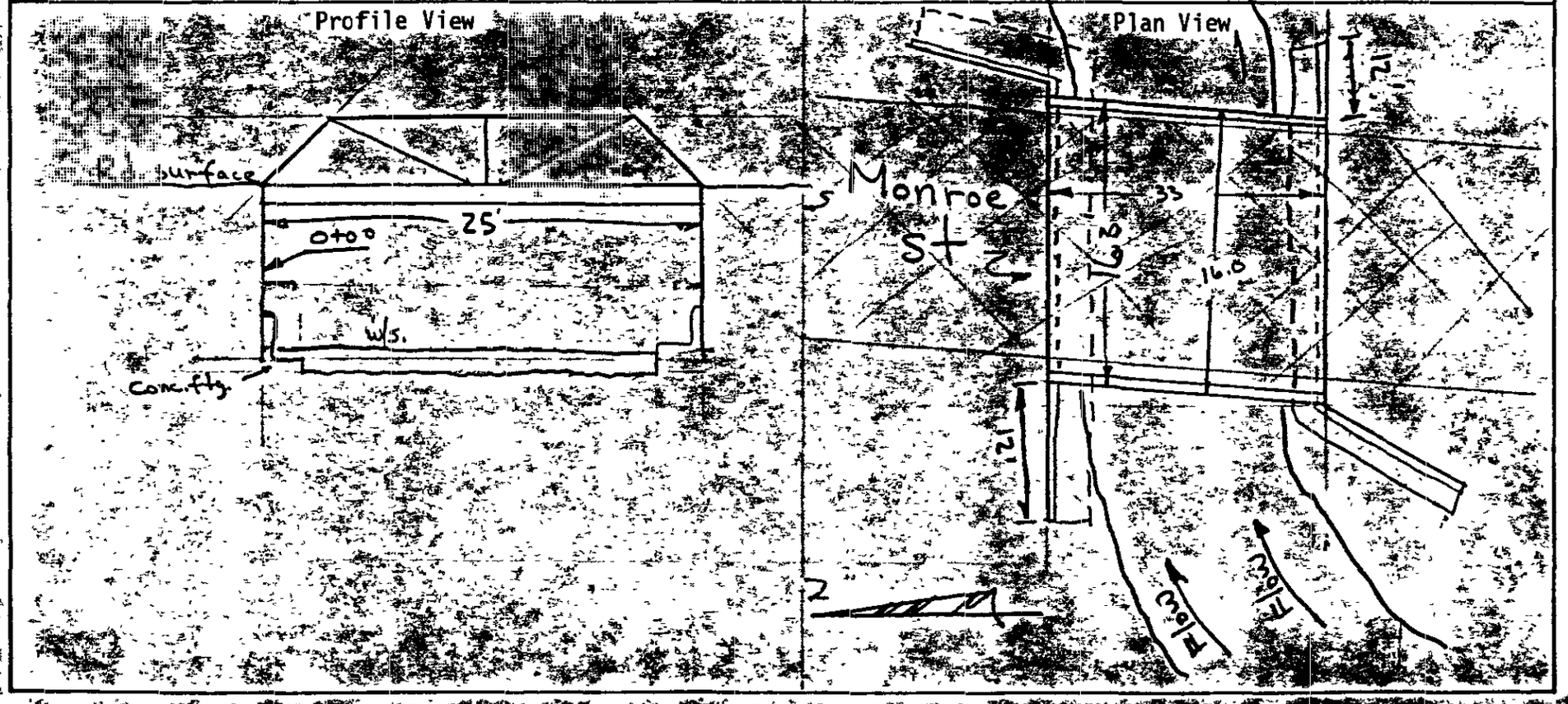
HYDRAULIC STRUCTURAL DATA

Code No. 5670-05- BS#

Job Name: City of Lapeer FIS			By: C. Mapley, C. Huggins, R. Moses
Date: 12-7-76	Feature: Monroe St. bridge conc. 4 s+l.		Water Course: Farmers Crk.
Remarks: UPSTREAM ALONG RIGHT BANK - MED. BRUSH w/ SCATTERED LARGE TREES			
LEFT BANK - PARK - TENNIS COURTS			
Width of Piers: —	Pier Shape: —	No. of Piers: —	Area:
Water Elevation: 811.8	Length: 25.0	Width of Deck: 16.0	Skew:

FIELD SKETCH



Johnson & Anderson, Inc
Consulting Engineers
O Box 1166 2300 Dixie Highway Pontiac, Michigan 48056

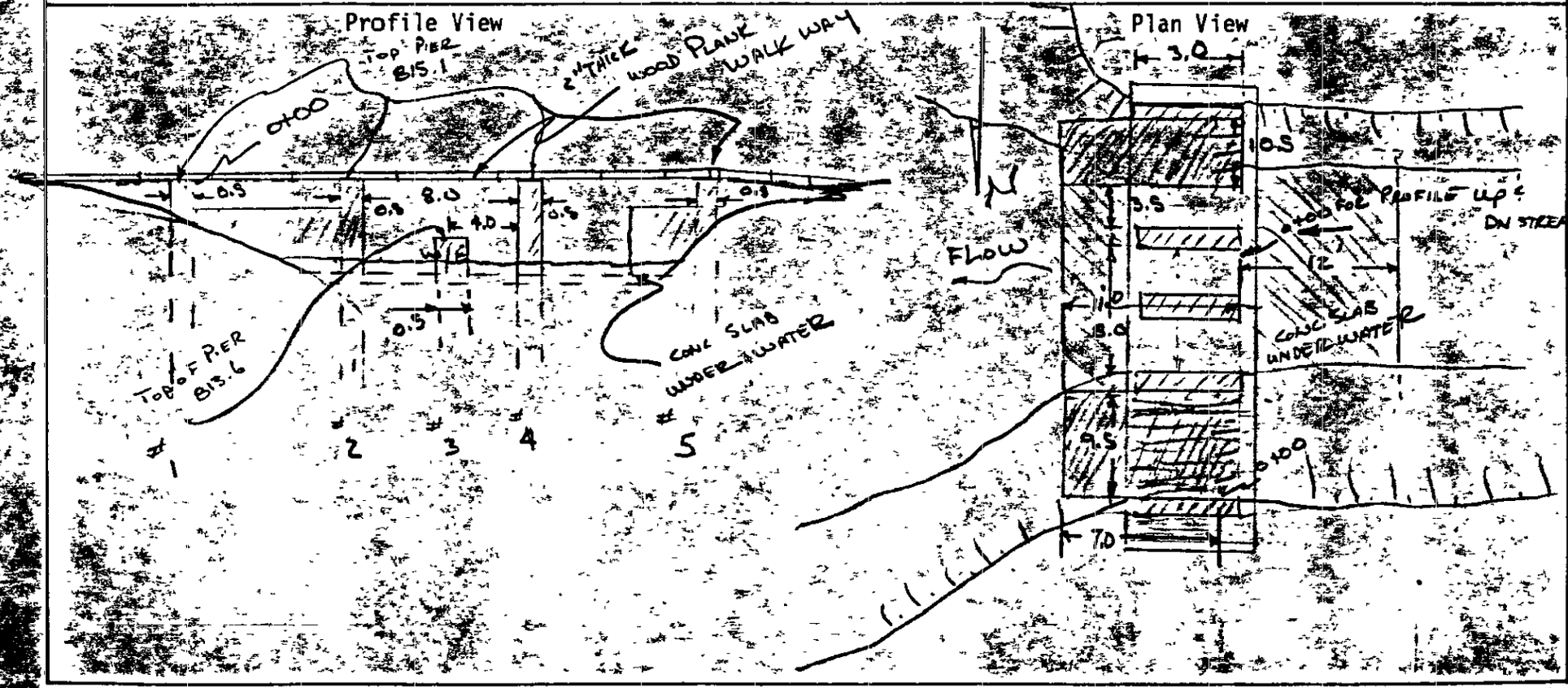
HYDRAULIC STRUCTURAL DATA

DAM #16

Code No. 9670-05-16

Job Name: City of Lapeer F.I.S			By: R. Moses
Date: 12-8-76	Feature: Conc. Dam		Water Course: Farmers Creek
Remarks: Wood Deck would Float Away in Flood. Dam is 150' Dnstream of M-24			
Width of Piers: 0.5'	Pier Shape: -[]	No. of Piers: 5	Area: —
Water Elevation: 812.0 DN 812.8 UP	Length: 32.5	Width of Deck: 3.0	Skew: —

FIELD SKETCH



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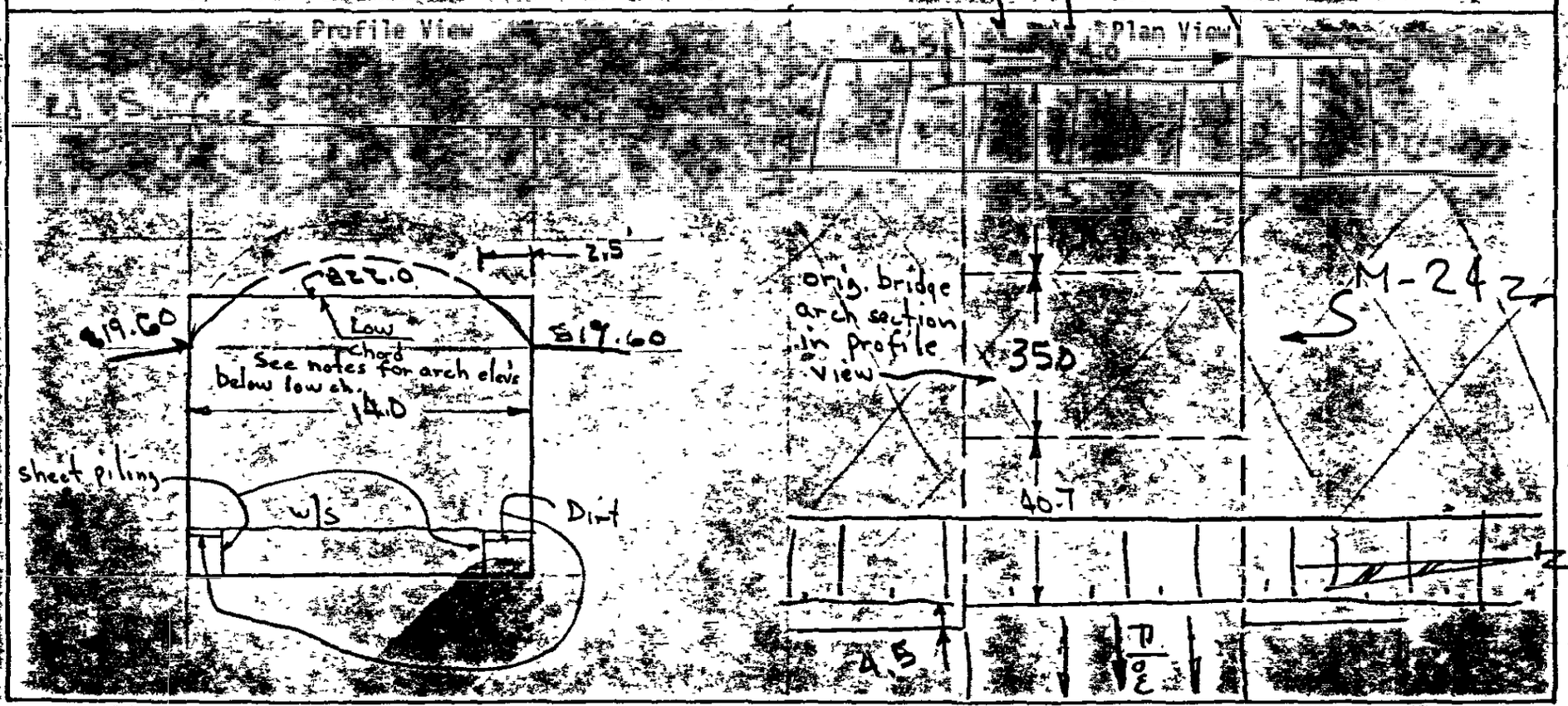
P. O. Box 1166 2300 Dixie Highway Pontiac, Michigan 48056

HYDRAULIC STRUCTURAL DATA

Code No. 5670-05-BS

Job Name: City of Lapeer - FIS Main Street			By: C. Mapley, R. Moses, C. Huggins
Date: 12-8-76	Feature: M-24 bridge		Water Course: Farmers Crk.
Remarks: Bottom of channel has scattered 2" cu. stones w/gravel			
Width of Piers: —	Pier Shape: —	No. of Piers: —	Area: —
Water Elevation: 813.5	Length: 114.0	Width of Deck: 119'	Skew: —

FIELD SKETCH



Johnson & Anderson, Inc.
Consulting Engineers
P.O. Box 1166 2300 Dixie Highway Pontiac, Michigan 48056

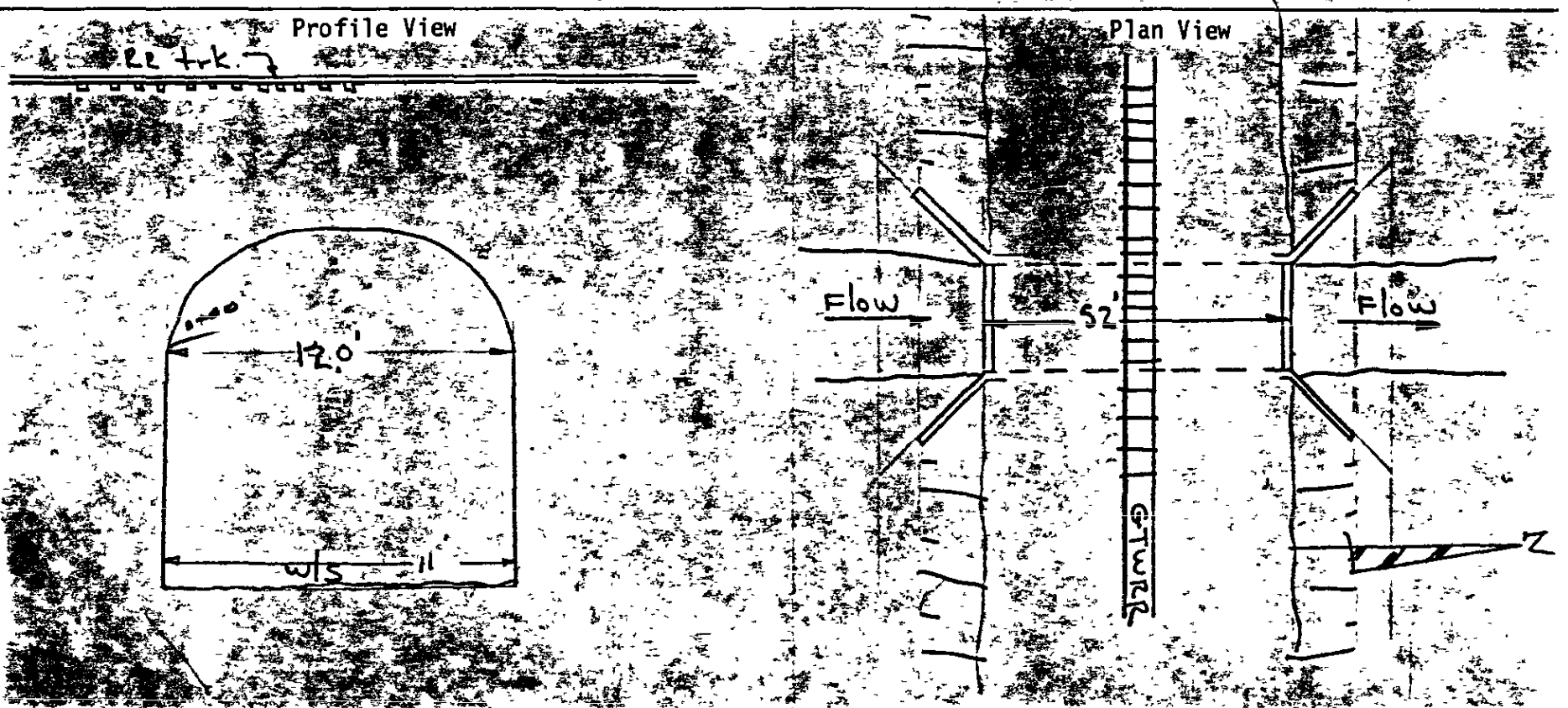
HYDRAULIC STRUCTURAL DATA

Code No. 5670-05-B5

Job Name: City of Lapeer FIS		By: C. Mapley, R. Moses, C. Huggins
Date: 12-9-76	Feature: GTRR conc. bridge	Water Course: Farmers Crk
Remarks: Heavy brush upstream of G.T.R.R. Bridge with high slope on Right Bank & open field left bank		

Width of Piers: —	Pier Shape: —	No. of Piers: —	Area: —
Water Elevation: 815.6	Length: 52'	Width of Deck: 12' at Top, 11' at Bottom	Skew:

FIELD SKETCH



D.S.T 26-A

HYDRAULIC STRUCTURAL DATA

Anderson, Inc.
Consulting Engineers
2300 Dixie Highway Pontiac, Michigan 48056

Code No. 5670-03-175

Name: City of Lapeer FIS		By: C. Mapley, J. Bennett, C. Huggins
Date: 12-13-76	Feature: Conc. dam	Water Course: Farmers Crk.

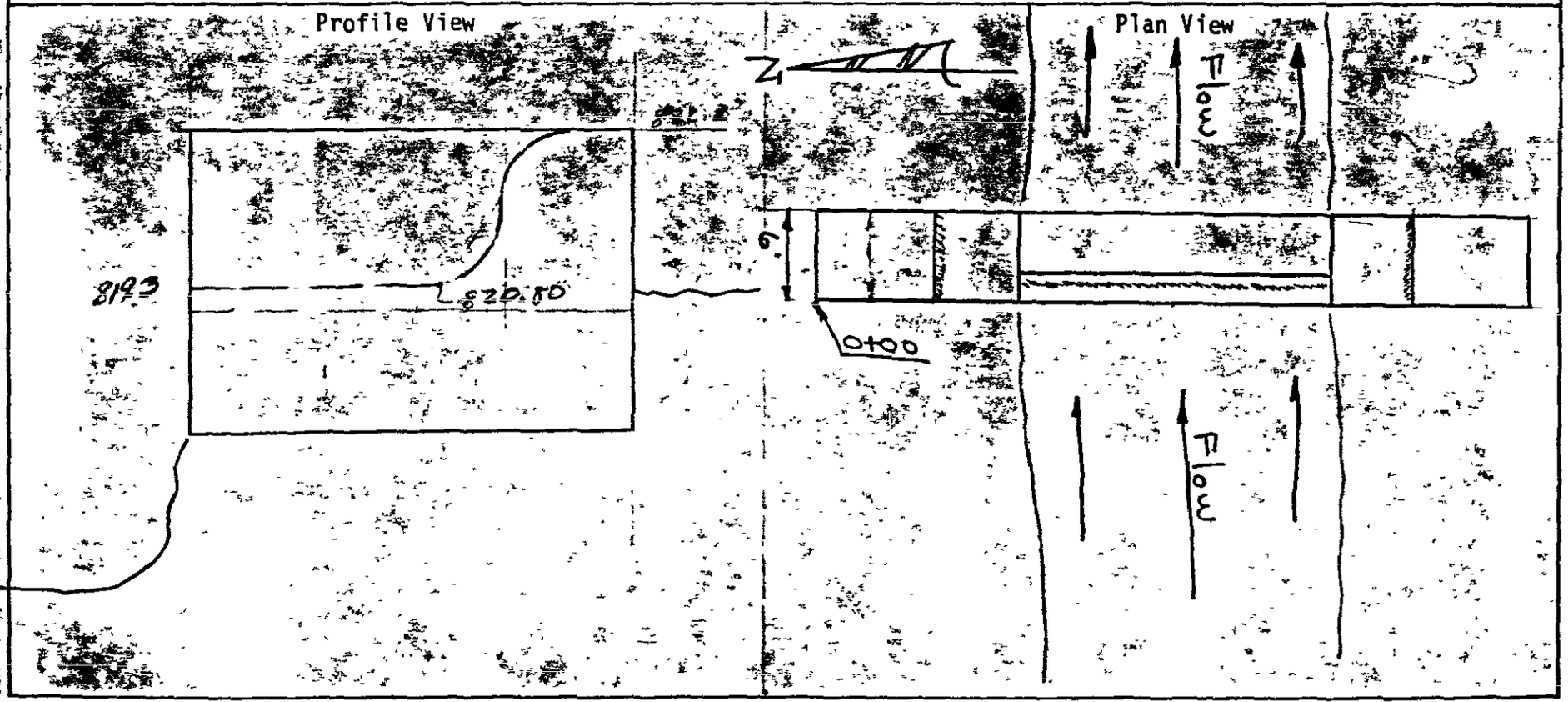
Remarks: Dam is 250'± D/s from XS #26 XSEC AC 2.37c & 2,377

Left bank- open mowed field (sewage treatment plant)

Rt. bank- med. brush on bank- open corn field

Width of Piers: —	Pier Shape: —	No. of Piers: —	Area:
Water Elevation: 821.3	Length: 45'	Width of Deck: —	Skew: —

FIELD SKETCH



Johnson & Anderson, Inc.
Consulting Engineers
P.O. Box 1166 2300 Dixie Highway Pontiac, Michigan 48056

HYDRAULIC STRUCTURAL DATA

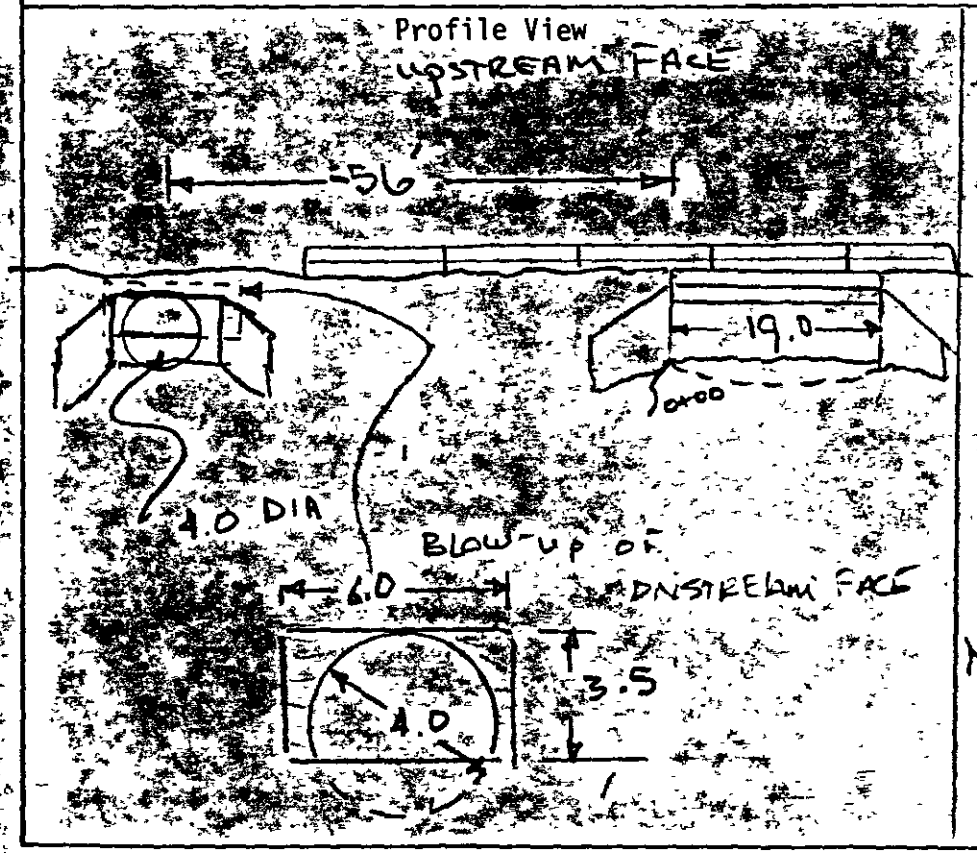
B.S. # 28

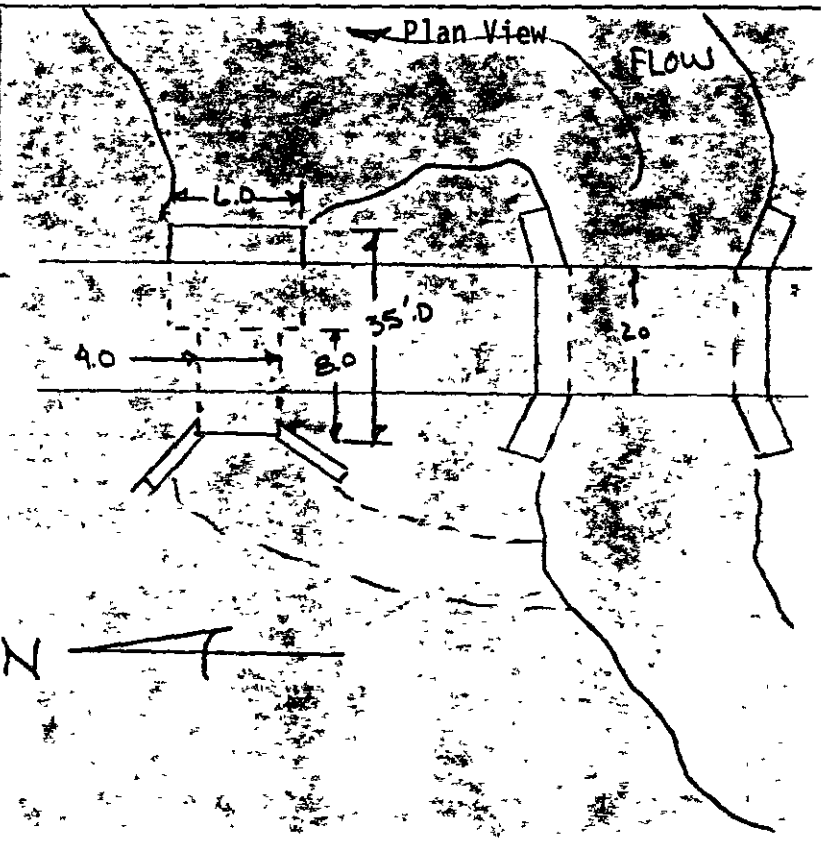
Code No. 5670-

Job Name: CITY OF LAPEER F.I.S.		By: R. MOSES
Date: 12-8-76	Feature: CONC. BOX CULVERT	Water Course: FARMER CR
Remarks: BRIDGE IS IN LAPEER STATE HOME COMPLEX - DEMILLE ST		
UPSTREAM: LOW AREA - SWAMP GRASS ALONG BANKS		
DNSTREAM: CHANNEL IS CLEAR OF OBSTRUCTION		

Width of Piers: —	Pier Shape: —	No. of Piers: —	Area: —
Water Elevation: 822.3	Length: 19'	Width of Deck: 20	Skew: —

FIELD SKETCH





J. Bolthouse

DEPARTMENT OF THE ARMY
DETROIT DISTRICT, CORPS OF ENGINEERS
BOX 1027
DETROIT, MICHIGAN 48231-1027

IN REPLY REFER TO

September 19, 1989

Engineering Division
Great Lakes Hydraulics and Hydrology Branch

Mr. Dennis Hall, Chief
Land and Water Management Division
Michigan Department of Natural Resources
P.O. Box 30028
Lansing, Michigan 48909

Dear Mr. Hall:

Submitted for your review and approval is a copy of the hydraulic calculations for the City of Lapeer, Michigan Flood Insurance Restudy. Enclosed are the HEC-2 multiple profile and encroached runs, a map showing the location of the field surveyed cross sections, bridge drawings, and a brief write-up dealing with items that will assist the review process.

Since FEMA has requested the submittal of this report as soon as possible, a response from your office within two weeks would be appreciated. If you have any questions regarding the enclosed data, please contact Ms. Hanna Kobylinski at (313) 226-4761.

Sincerely,

R. Wilshaw, P.E
Acting Chief, Engineering Division

RECEIVED
SEP 20 1989
NATURAL RESOURCES
LAND & WATER MGMT

CITY OF LAPEER, MICHIGAN
FLOOD INSURANCE RESTUDY
HYDRAULIC COMPUTATION BACKGROUND INFORMATION

The Flood Insurance Restudy for the City of Lapeer, Michigan includes a restudy of Farmers Creek from the new corporate limits (near I-96) to Millville Road and Hunters Creek from corporate limits to confluence with the South Branch Flint River.

A segment of Farmers Creek (from confluence with the South Branch Flint River to the western corporate limits near Millville Road) and a segment of Hunters Creek (from its confluence with the South Branch Flint River to the southern corporate limits) were studied in detail in a previous study. For this study, Farmers Creek from the old corporate limits (Millville Road) to the new corporate limits (near I-96) was studied by detailed methods as a new study. Hunters Creek was restudied by detailed methods for the above mentioned segment.

The hydrology for the City of Lapeer was approved previously.

Manning's "n" values for the study area were estimated by field inspection, quadrangle map information, and survey photographs.

The starting water surface elevations, for all streams studied, were determined by the slope-area method.

The segment of the HEC-2 program input data for Farmers Creek from the mouth of the South Branch Flint River to downstream of Millville Road was provided by the Michigan Department of Natural Resources. Cross section geometry for the segment of Farmers Creek from Millville Road to the new corporate limits was developed by field survey and used as a part of the HEC-2 input. The segment of the HEC-2 program input data for Hunters Creek from the mouth of the South Branch Flint River to the corporate limits was provided by the Michigan Department of Natural Resources. However, cross section geometry for two bridges (Saginaw Street and De Mill Road) was developed by recent field survey and used as a part of the HEC-2 input.

For the encroached run, the computations were begun using the results from 100-year profile run.

5 October 1989

Dear Bruce:

This is in response of the telephone conversation between you and Bruce Holbrook dated 3 October, 1989 regarding hydraulics for Hunters Creek and Farmers Creek in the City of Lapeer, Michigan.

Resubmitted for your review and approval is a copy of the hydraulic calculations for the City of Lapeer, MI Flood Insurance Study.

If you have any questions regarding the enclosed data, please feel free to call me at (313) 226-4761.

Sincerely,

Hanna Kobylinski

JOHNSON & ANDERSON, INC.
Consulting Engineers
P.O. Box 1066 • 2300 Dixie Highway
Pontiac, Michigan 48056

Phone (313) 334-9901

LETTER OF TRANSMITTAL

DATE	JOB NO.
July 18, 1977	5670-05-1
RE: Lapeer Flood Insurance Study	
Hydraulics Review, Farmers Creek	

If enclosures are not as noted, kindly notify us at once.

TO: Mr. Dan Morgan, Chief
Flood Insurance Unit
MDNR-Water Management Division
5th Floor, Mason Building
Lansing, Michigan 48909

RECEIVED
JUL 18 1977
WATER MANAGEMENT

GENTLEMEN:

WE ARE SENDING YOU ☒ Attached ☐ Under separate cover via _____ the following items:

☐ Shop drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications

☐ Copy of letter ☐ Change order ☐

COPIES	DATE	NO.	DESCRIPTION
1			Hydraulics Booklet for Farmers Creek
1			Encroached HEC-2 Run and J&A IPLOT
1			Unencroached HEC-2 Rus
1			Plan View with Floodway and Flooded Outline
1			Profile for Farmers Creek

THESE ARE TRANSMITTED as checked below:

☐ For approval ☐ Approved as submitted ☐ Resubmit_____copies for approval

☐ For your use ☐ Approved as noted ☐ Submit_____copies for distribution

☐ As requested ☐ Returned for corrections ☐ Return_____corrected prints

☒ For review and comment ☐ _____

REMARKS:

This creek is tributary to the South Branch of the Flint River.

SIGNED:

Dennis D. Cox, Project Manager

Copy to: File

(Yellow copy to File) DDC/dp
JM GU-030 (11-72)

JOHNSON & ANDERSON, INC.
Consulting Engineers
P.O. Box 1066 • 2300 Dixie Highway
Pontiac, Michigan 48056

Phone (313) 334-9901

LETTER OF TRANSMITTAL

DATE	JOB NO.
May 25, 1977	5670-05-1
RE: Lapeer Flood Insurance Study	
Hydraulics Review, Hunters Creek	

If enclosures are not as noted, kindly notify us at once.

TO: Mr. Dan Morgan, Acting Chief
Flood Insurance Unit
MDNR-Water Management Division
Mason Building, 5th Floor, East Wing
P. O. Box 30028
Lansing, Michigan 48909

GENTLEMEN:

WE ARE SENDING YOU ☒ Attached ☐ Under separate cover via _____ the following items:

☐ Shop drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications

☐ Copy of letter ☐ Change order ☐

COPIES	DATE	NO.	DESCRIPTION
1			Hydraulics Booklet for Hunters Creek
1			Encroached HEC-2 Run and J&A IPLOT
1			Unencroached HEC-2 Run
1			Plan View with Floodway and Flooded Outline
1			Profile for Hunters Creek

THESE ARE TRANSMITTED as checked below:

☐ For approval ☐ Approved as submitted ☐ Resubmit _____ copies for approval

☐ For your use ☐ Approved as noted ☐ Submit _____ copies for distribution

☐ As requested ☐ Returned for corrections ☐ Return _____ corrected prints

☒ For review and comment ☐ _____

Hunters Creek 10/89
Revised Floodway
Floodplain Delineation has changed

REMARKS:

This creek is tributary to the South Branch of the Flint River.

SIGNED:

Dennis D. Cox

Dennis D. Cox, Project Manager

Copy to: File

(Yellow copy to File)
FORM GU-030 (11-72) DDC/dp

1) COUNTY: LAPEER

2) STUDY NAME: LAPEER, CITY OF

3) WATERCOURSE: FARMERS CREEK

4) DOCUMENT TYPE: 1977 100-YEAR ENCROACHED

00BREAK00

.05	9.42	817.02	0.00	0.00	817.44	.43	.02	.13100000.00	
1430.	0.	1430.	0.	0.	273.	0.	4.	1. 100000.00	
.03	0.00	5.23	0.00	.050	.035	.085	.036	807.60	255.00
.001403	25.	29.	35.	2	0	1	0.00	33.00	288.00

NORMAL BRIDGE,NRD=15 MIN ELTRD= 817.30 MAX ELLC= 818.20

SAGINAW STREET BRIDGE - DOWNSTREAM FACE - SECTION B

.05	9.48	817.08	0.00	0.00	817.46	.38	.00	.01	820.60
1430.	0.	1430.	0.	0.	291.	0.	4.	1.	820.10
.03	0.00	4.91	0.00	.020	.025	.020	.036	807.60	417.00
.000648	1.	1.	1.	2	0	1	0.00	33.00	450.00

NORMAL BRIDGE,NRD=15 MIN ELTRD= 817.30 MAX ELLC= 818.20

SAGINAW STREET BRIDGE - UPSTREAM FACE - SECTION B

.06	9.52	817.12	0.00	0.00	817.49	.37	.03	.00	820.60
1430.	0.	1430.	0.	0.	292.	0.	4.	1.	820.10
.03	0.00	4.89	0.00	.020	.025	.020	.034	807.60	417.00
.000639	46.	46.	46.	1	0	1	0.00	33.00	450.00

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3470 ENCROACHMENT STATIONS= 365.0 400.0 TYPE= 1 TARGET= 35.000

.06	9.51	817.11	0.00	0.00	817.49	.38	.00	.00	100000.00
1430.	0.	1430.	0.	0.	289.	0.	4.	1.	100000.00
.03	0.00	4.95	0.00	.020	.035	.030	.034	807.60	365.00
.001214	1.	1.	1.	1	0	1	0.00	35.00	400.00

3470 ENCROACHMENT STATIONS= 332.0 433.0 TYPE= 1 TARGET= 101.000

SECTION C

.07	10.16	817.46	0.00	0.00	817.59	.13	.02	.08	815.30

3470 ENCROACHMENT STATIONS= 392.0 502.0 TYPE= 1 TARGET= 110.000

.17	9.02	817.62	0.00	0.00	817.74	.13	.03	.05	814.60
1430.	271.	802.	358.	94.	261.	156.	16.	3.	809.00
.13	2.89	3.07	2.29	.020	.035	.030	.034	808.60	392.00
.000378	210.	210.	210.	2	0	1	0.00	110.00	502.00

3470 ENCROACHMENT STATIONS= 420.0 470.0 TYPE= 1 TARGET= 50.000

.19	8.68	817.58	0.00	0.00	817.91	.33	.07	.10	814.90
1430.	98.	1168.	204.	13.	249.	50.	16.	4.	809.30
.13	4.35	4.69	4.05	.020	.035	.030	.034	808.90	420.00
.000933	120.	120.	120.	2	0	1	0.00	50.00	470.00

CCHV= .600 CEHV= .800

3470 ENCROACHMENT STATIONS= 100.0 130.0 TYPE= 1 TARGET= 30.000

.19	8.57	817.57	0.00	0.00	818.17	.60	.04	.22	814.50
1430.	0.	1430.	0.	0.	230.	0.	16.	4.	100000.00
.14	0.00	6.20	0.00	.030	.035	.030	.034	809.00	100.00
.002224	30.	29.	30.	2	0	1	0.00	30.00	130.00

NORMAL BRIDGE,NRD=14 MIN ELTRD= 821.20 MAX ELLC= 821.00

COURT STREET BRIDGE - DOWNSTREAM FACE - SECTION E

.20	8.36	817.56	0.00	0.00	818.21	.65	.00	.05	822.00
1430.	0.	1430.	0.	0.	220.	0.	16.	4.	821.70
.14	0.00	6.49	0.00	.025	.025	.025	.034	809.20	305.00
.001323	1.	1.	1.	1	0	1	0.00	30.00	335.00

NORMAL BRIDGE,NRD=14 MIN ELTRD= 821.20 MAX ELLC= 821.00

COURT STREET BRIDGE - UPSTREAM FACE - SECTION E

.21	8.03	817.63	0.00	0.00	818.35	.72	.08	.05	822.00
1430.	0.	1430.	0.	0.	210.	0.	17.	4.	821.70
.14	0.00	6.80	0.00	.025	.025	.025	.034	809.60	305.00
.001514	58.	58.	58.	2	0	1	0.00	30.00	335.00

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV

TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	VOL	TWA	LEFT/RIGHT
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	ELMIN	SSTA
								TOPWID	ENDST
70 ENCROACHMENT STATIONS=			100.0	132.0	TYPE=	1	TARGET=	32.000	
.21	8.78	817.98	0.00	0.00	818.48	.50	.00	.13	814.70
1430.	0.	1430.	0.	0.	251.	0.	17.	4.	100000.00
.14	0.00	5.69	0.00	.030	.035	.030	.034	809.20	100.00
.001775	1.	1.	1.	2	0	1	0.00	32.00	132.00
70 ENCROACHMENT STATIONS=			84.0	148.0	TYPE=	1	TARGET=	64.000	
.21	9.47	818.47	0.00	0.00	818.67	.20	.01	.18	814.50
1430.	179.	1133.	119.	62.	298.	44.	17.	4.	814.50
.14	2.86	3.80	2.72	.030	.035	.030	.034	809.00	84.00
.000542	11.	11.	11.	2	0	1	0.00	64.00	148.00
70 ENCROACHMENT STATIONS=			66.0	166.0	TYPE=	1	TARGET=	100.000	
SECTION F									
.21	10.04	818.64	0.00	0.00	818.74	.10	.01	.06	814.10
1430.	325.	890.	215.	149.	318.	111.	17.	4.	814.10
.14	2.18	2.80	1.94	.030	.035	.030	.034	808.60	66.00
.000268	23.	23.	23.	2	0	1	0.00	100.00	166.00
CHV= .300 CEHV= .500									
.80 CROSS SECTION			.26 EXTENDED		1.77 FEET				
70 ENCROACHMENT STATIONS=			130.0	435.0	TYPE=	1	TARGET=	305.000	
.26	10.47	818.77	0.00	0.00	818.79	.01	.02	.03	813.80
1430.	574.	374.	482.	634.	334.	582.	23.	5.	813.80
.22	.91	1.12	.83	.030	.035	.030	.034	808.30	130.00
.000040	300.	240.	200.	2	0	1	0.00	305.00	435.00
80 CROSS SECTION			.28 EXTENDED		2.78 FEET				
70 ENCROACHMENT STATIONS=			55.0	305.0	TYPE=	1	TARGET=	250.000	
.28	10.59	818.77	0.00	0.00	818.79	.02	.00	.00	813.68
1430.	707.	442.	281.	669.	339.	306.	26.	5.	813.68

```
   .27      1.82      2.23      1.85      .030      .035      .030      .034    807.92     90.00
.000152     100.      100.      105.         2         0         1      0.00    105.00    195.00


HV=     .600 CEHV=     .800
 SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS   BANK ELEV
 Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA   LEFT/RIGHT
 TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN      SSTA
 SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID     ENDST


70 ENCROACHMENT STATIONS=      65.0      120.0  TYPE=      1  TARGET=      55.000
    .33     10.92    818.76      0.00      0.00    818.92       .17       .01       .08    813.34
  1430.      184.     1185.       61.       71.      350.       22.       31.        6.    813.34
    .27      2.59      3.38      2.83      .030      .035      .030      .034    807.84     65.00
.000346       60.       60.       65.         1         0         1      0.00     55.00    120.00


301 HV CHANGED MORE THAN HVINS

    .33     10.81    818.61      0.00      0.00    819.63      1.02       .03       .68    823.30
  1430.        0.     1430.        0.        0.      177.        0.       31.        6.    823.40
    .27      0.00      8.10      0.00      .030      .035      .030      .034    807.80    351.00
.004839       30.       30.       30.         2         0         1      0.00     20.00    371.00


RMAL BRIDGE,NRD= 8 MIN ELTRD=  822.20 MAX ELLC=  819.40

        FOX STREET BRIDGE - DOWNSTREAM FACE - SECTION G

    .33     10.82    818.62      0.00      0.00    819.63      1.02       .00       .00    823.30
  1430.        0.     1430.        0.        0.      177.        0.       31.        6.    823.40
    .27      0.00      8.10      0.00      .025      .025      .025      .034    807.80    351.00
.002467        1.        1.        1.         0         0         1      0.00     20.00    371.00


ORMAL BRIDGE,NRD= 8 MIN ELTRD=  822.20 MAX ELLC=  819.40

        FOX STREET BRIDGE - UPSTREAM FACE - SECTION G

    .34     10.94    818.74      0.00      0.00    819.73       .99       .08       .02    823.30
  1430.        0.     1430.        0.        0.      179.        0.       31.        6.    823.40
    .28      0.00      7.98      0.00      .025      .025      .025      .034    807.80    351.00
 002375       3[illegible].       34.       34.         0         0         1      0.00     20.00    371.00
```

.000687	10.	7.	10.	3	0	1	0.00	33.00	153.00

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

70 ENCROACHMENT STATIONS= 90.0 183.0 TYPE= 1 TARGET= 93.000

SECTION H

.35	11.63	820.23	0.00	0.00	820.30	.07	.01	.11	812.10
1430.	528.	769.	133.	233.	340.	110.	32.	6.	813.60
.28	2.27	2.26	1.21	.030	.035	.035	.034	808.60	90.00
.000136	30.	30.	30.	2	0	1	0.00	93.00	183.00

CHV= .300 CEHV= .500

70 ENCROACHMENT STATIONS= 25.0 100.0 TYPE= 1 TARGET= 75.000

.38	11.25	820.25	0.00	0.00	820.35	.10	.03	.01	812.50
1430.	233.	877.	319.	102.	328.	156.	35.	7.	814.00
.30	2.29	2.68	2.04	.030	.035	.035	.034	809.00	25.00
.000201	175.	180.	200.	2	0	1	0.00	75.00	100.00

70 ENCROACHMENT STATIONS= 43.0 74.0 TYPE= 1 TARGET= 31.000

.41	10.81	820.17	0.00	0.00	820.53	.35	.05	.13	100000.00
1430.	0.	1430.	0.	0.	300.	0.	36.	7.	100000.00
.31	0.00	4.77	0.00	.030	.035	.035	.034	809.36	43.00
.001068	145.	140.	120.	2	0	1	0.00	31.00	74.00

470 ENCROACHMENT STATIONS= 117.0 141.0 TYPE= 1 TARGET= 24.000

.41	10.71	820.11	0.00	0.00	820.64	.53	.02	.09	100000.00
1430.	0.	1430.	0.	0.	245.	0.	36.	7.	100000.00
.31	0.00	5.05	0.00	.030	.035	.035	.034	809.40	117.00
.001877	15.	14.	15.	2	0	1	0.00	24.00	141.00

ORMAL BRIDGE,NRD= 6 MIN ELTRD= 820.60 MAX ELLC= 822.80

[illegible] DOWNSTREAM FACE - SECTION I

.31	0.00	5.80	0.00	.020	.025	.020	.034	80[illegible].50	[illegible].0
.000932	40.	40.	40.	2	0	1	0.00	24.00	85.00

70 ENCROACHMENT STATIONS= 116.0 142.0 TYPE= 1 TARGET= 26.000

.42	10.75	820.25	0.00	0.00	820.70	.46	.00	.02	100000.00
1430.	0.	1430.	0.	0.	264.	0.	36.	7.	100000.00
.31	0.00	5.42	0.00	.030	.035	.030	.034	809.50	116.00
.001515	1.	1.	1.	2	0	1	0.00	26.00	142.00

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	QLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

70 ENCROACHMENT STATIONS= 45.0 166.0 TYPE= 1 TARGET= 121.000

SECTION J

.43	11.80	820.80	0.00	0.00	820.84	.04	.02	.12	812.40
1430.	641.	626.	163.	421.	358.	124.	37.	7.	813.10
.32	1.52	1.75	1.31	.030	.035	.030	.034	809.00	45.00
.000077	110.	69.	35.	2	0	1	0.00	121.00	166.00

CHV= .600 CEHV= .800

70 ENCROACHMENT STATIONS= 15.0 200.0 TYPE= 1 TARGET= 185.000

.45	11.94	820.84	0.00	0.00	820.86	.02	.01	.01	814.00
1430.	656.	606.	168.	612.	462.	151.	40.	7.	814.00
.35	1.07	1.31	1.11	.030	.035	.030	.034	808.90	15.00
.000046	90.	125.	150.	2	0	1	0.00	185.00	200.00

490 NH CARD USED

470 ENCROACHMENT STATIONS= .0 515.0 TYPE= 1 TARGET= 514.999

SECTION K

.49	12.07	820.87	0.00	0.00	820.88	.00	.01	.01	814.00
1430.	1135.	295.	0.	2071.	466.	0.	55.	10.	100000.00
.51	.55	.63	0.00	.030	.035	.030	.032	808.80	88.04
.000010	420.	190.	165.	1	0	1	0.00	426.96	515.00

M-21/GENESEE STREET BRIDGE - DOWNSTREAM FACE - SECTION L. BRIDGE IS

SKEWED BY APPROXIMATELY 20 DEGREES.

$\overline{.5(.01-.21)} = .1$

drawdown

.50	11.67	820.77	0.00	0.00	820.98	.21	.00	.10	821.90
1430.	358.	1072.	0.	243.	258.	0.	57.	10.	822.10
.53	1.47	4.16	0.00	.020	.025	.020	.032	809.10	225.05
.000468	1.	1.	1.	2	0	1	0.00	312.95	728.90

65 DIVIDED FLOW

RMAL BRIDGE,NRD=24 MIN ELTRD= 819.70 MAX ELLC= 821.90

M-21/GENESEE STREET BRIDGE - UPSTREAM FACE - SECTION L. BRIDGE IS

SKEWED BY APPROXIMATELY 20 DEGREES.

.51	11.20	820.80	0.00	0.00	821.01	.21	.03	.00	821.90
1430.	386.	1044.	0.	250.	247.	0.	58.	11.	822.10
.53	1.55	4.33	0.00	.020	.025	.020	.032	809.60	224.18
.000498	68.	68.	68.	1	0	1	0.00	314.30	728.90

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

70 ENCROACHMENT STATIONS= .0 727.0 TYPE= 1 TARGET= 726.999

.51	11.41	821.01	0.00	0.00	821.06	.06	.00	.05	820.00
1430.	446.	984.	0.	475.	446.	0.	58.	11.	100000.00
.53	.94	2.21	0.00	.025	.035	.035	.032	809.60	216.16
.000227	1.	1.	1.	2	0	1	0.00	510.84	727.00

90 NH CARD USED

470 ENCROACHMENT STATIONS= .0 530.0 TYPE= 1 TARGET= 529.999

.52	11.43	821.03	0.00	0.00	821.07	.05	.01	.00	814.00
1430.	199.	873.	358.	285.	443.	258.	59.	11.	814.00
.54	.78	1.97	1.39	.033	.035	.035	.032	809.60	215.63
.000103	1.	55.	60.	0	0	1	0.00	314.37	530.00

90 NH CARD USED

'65 DIVIDED FLOW

70 ENGROACHMENT STATIONS= .0 510.0 TYPE= 1 TARGET= 509.999

.55	10.92	821.02	0.00	0.00	821.13	.11	.00	.01	822.70
1430.	296.	1134.	0.	291.	393.	0.	61.	11.	100000.00
.56	1.02	2.89	0.00	.025	.035	.035	.033	810.10	78.86
.000253	1.	24.	24.	1	0	1	0.00	329.65	510.00

65 DIVIDED FLOW

RMAL BRIDGE,NRD=12 MIN ELTRD= 819.70 MAX ELLC= 822.70

BENTLEY STREET BRIDGE - DOWNSTREAM FACE - SECTION N

.56	10.90	821.00	0.00	0.00	821.15	.15	.00	.02	823.90
1430.	376.	1054.	0.	284.	302.	0.	61.	11.	824.30
.56	1.32	3.49	0.00	.020	.025	.020	.033	810.10	91.14
.000294	1.	1.	1.	2	0	1	0.00	315.99	529.62

65 DIVIDED FLOW

)RMAL BRIDGE,NRD=12 MIN ELTRD= 819.70 MAX ELLC= 822.70

BENTLEY STREET BRIDGE - UPSTREAM FACE - SECTION N

.56	10.20	821.00	0.00	0.00	821.16	.16	.01	.00	823.90
1430.	407.	1023.	0.	285.	281.	0.	61.	11.	824.30
.56	1.43	3.64	0.00	.020	.025	.020	.033	810.80	90.95
.000340	1.	28.	28.	0	0	1	0.00	316.17	529.70

490 NH CARD USED

265 DIVIDED FLOW

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SL E	YLOB	YLCH	YLOBR	ITRIAL	IDC	I T	CORAR	TOPWID	ENDST

)0066	50.	60.	75.	2	0	1	0.00	496.58	695.00

= .600 CEHV= .800
NH CARD USED

ENCROACHMENT STATIONS= 240.0 750.0 TYPE= 1 TARGET= 510.000

.59	11.21	821.21	0.00	0.00	821.22	.01	.01	.01	812.70
1430.	562.	348.	521.	837.	325.	887.	68.	13.	814.60
.63	.67	1.07	.59	.030	.035	.045	.033	810.00	245.35
00031	120.	120.	140.	0	0	1	0.00	504.65	750.00

NH CARD USED

0 ENCROACHMENT STATIONS= 260.0 670.0 TYPE= 1 TARGET= 410.000

.61	11.61	821.21	0.00	0.00	821.22	.01	.00	.00	816.40
1430.	395.	498.	537.	718.	586.	733.	73.	14.	815.60
.67	.55	.85	.73	.030	.035	.030	.033	809.60	260.00
000023	110.	108.	110.	0	0	1	0.00	410.00	670.00

MAL BRIDGE,NRD= 8 MIN ELTRD= 815.60 MAX ELLC= 816.20

70 ENCROACHMENT STATIONS= 260.0 670.0 TYPE= 1 TARGET= 410.000

CITY PARK WALKWAY BRIDGE - DOWNSTREAM FACE - SECTION 0

.61	11.61	821.21	0.00	0.00	821.23	.01	.00	.00	816.40
1430.	749.	375.	307.	718.	530.	356.	73.	14.	815.60
.67	1.04	.71	.86	.030	.035	.030	.033	809.60	260.00
.000082	1.	1.	1.	0	0	1	-431.81	410.00	670.00

DRMAL BRIDGE,NRD= 8 MIN ELTRD= 815.60 MAX ELLC= 816.20

470 ENCROACHMENT STATIONS= 260.0 670.0 TYPE= 1 TARGET= 410.000

CITY PARK WALKWAY BRIDGE - UPSTREAM FACE - SECTION 0

.62	11.61	821.21	0.00	0.00	821.23	.01	.00	.00	816.40
1430.	749.	375.	307.	718.	530.	356.	73.	15.	815.60
.67	1.04	.71	.86	.030	.035	.030	.033	809.60	260.00
000082	4.	4.	4.	0	0	1	-431.82	410.00	670.00

70 ENCROACHMENT STATIONS= 510.0 602.0 TYPE= 1 TARGET= 92.000

SECTION P

.66	12.52	821.22	0.00	0.00	821.31	.09	.01	.07	818.70
1430.	68.	1362.	0.	56.	549.	0.	81.	16.	100000.00
.70	1.20	2.48	0.00	.025	.035	.030	.033	808.70	510.00
.000177	240.	254.	280.	1	0	1	0.00	92.00	602.00

70 ENCROACHMENT STATIONS= 570.0 595.0 TYPE= 1 TARGET= 25.000

.67	11.76	821.16	0.00	0.00	821.58	.42	.01	.26	100000.00
1430.	0.	1430.	0.	0.	274.	0.	81.	16.	100000.00
.70	0.00	5.21	0.00	.025	.035	.030	.033	809.40	570.00
.000633	1.	29.	30.	2	0	1	0.00	25.00	595.00

IRHAL BRIDGE.NRD=12 MIN ELTRD= 821.30 MAX ELLC= 822.10

MONROE STREET BRIDGE - DOWNSTREAM FACE - SECTION Q

.67	11.86	821.16	0.00	0.00	821.60	.44	.00	.02	822.70
1430.	0.	1430.	0.	0.	268.	0.	81.	16.	822.80
.70	0.00	5.34	0.00	.025	.025	.025	.033	809.30	580.00
.000794	1.	1.	1.	0	0	1	0.00	25.00	605.00

IRHAL BRIDGE.NRD=12 MIN ELTRD= 821.30 MAX ELLC= 822.10

MONROE STREET BRIDGE - UPSTREAM FACE - SECTION Q

.67	11.46	821.16	0.00	0.00	821.64	.48	.01	.03	822.70
1430.	0.	1430.	0.	0.	258.	0.	81.	16.	822.80
.70	0.00	5.54	0.00	.025	.025	.025	.033	809.70	580.00
.000878	16.	16.	16.	0	0	1	0.00	25.00	605.00

470 ENCROACHMENT STATIONS= 504.0 531.0 TYPE= 1 TARGET= 27.000

.67	11.62	821.32	0.00	0.00	821.70	.38	.00	.06	100000.00
1430.	0.	1430.	0.	0.	290.	0.	81.	16.	100000.00
.70	0.00	4.94	0.00	.030	.035	.050	.033	809.70	504.00
.001162	1.	1.	1.	2	0	1	0.00	27.00	531.00

.000040	290.	309.	275.	2	0	1	0.00	185.00	555.00

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

70 ENCROACHMENT STATIONS= 370.0 550.0 TYPE= 1 TARGET= 180.000

.78	11.44	821.94	0.00	0.00	821.96	.02	.00	.00	816.70
1430.	57.	968.	405.	52.	715.	562.	98.	18.	816.90
.86	1.09	1.35	.72	.030	.035	.050	.033	810.50	370.00
.000053	35.	32.	35.	0	0	1	0.00	180.00	550.00

70 ENCROACHMENT STATIONS= 430.0 600.0 TYPE= 1 TARGET= 170.000

SECTION S - CREST OF SMALL DAM IN CITY PARK

.79	10.73	821.93	0.00	0.00	821.97	.04	.00	.02	815.20
1430.	266.	560.	595.	163.	267.	653.	98.	18.	815.10
.86	1.64	2.13	.91	.030	.020	.050	.033	811.20	430.00
.000090	12.	12.	12.	0	0	1	0.00	170.00	600.00

470 ENCROACHMENT STATIONS= 380.0 540.0 TYPE= 1 TARGET= 160.000

.79	9.93	821.93	0.00	0.00	821.98	.04	.00	.00	818.20
1430.	0.	1086.	344.	0.	600.	374.	98.	18.	818.40
.86	0.00	1.81	.92	.030	.035	.050	.033	812.00	380.00
.000128	13.	13.	13.	0	0	1	0.00	160.00	540.00

470 ENCROACHMENT STATIONS= 198.0 236.0 TYPE= 1 TARGET= 38.000

SECTION T

.82	12.84	821.94	0.00	0.00	822.14	.20	.04	.12	814.50
1430.	49.	1381.	0.	15.	387.	0.	101.	19.	100000.00
.88	3.31	3.56	0.00	.035	.035	.040	.033	809.10	198.00
.000420	175.	187.	200.	1	0	1	0.00	38.00	236.00

CHV= .600 CEHV= .800

301 HV CHAN D E TH^N HVINS

.002495 1. 1. 1. 2 0 1 0.00 14. 11.00

ECIAL BRIDGE

XK	XKOR	COFQ	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
0.00	1.95	3.00	0.00	14.00	0.00	140.40	0.00	811.30	809.80

ESSURE FLOW

EGPRS	EGLWC	H3	QWEIR	QPR	BAREA	ELLC	ELTRD	CLASS
825.23	824.71	0.00	0.	1430.	140.	822.00	830.70	10.00

M-24/MAIN STREET BRIDGE - UPSTREAM FACE - SECTION U

.85	12.93	824.23	0.00	0.00	825.23	1.00	2.03	0.00	830.70
1430.	0.	1430.	0.	0.	178.	0.	102.	19.	830.70
.88	0.00	8.04	0.00	.020	.025	.020	.033	811.30	100.00
.002457	109.	109.	109.	2	0	1	0.00	14.00	114.00

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	QLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

70 ENCROACHMENT STATIONS= 209.0 225.0 TYPE= 1 TARGET= 16.000

.85	13.21	824.51	0.00	0.00	825.34	.83	.00	.10	100000.00
1430.	0.	1430.	0.	0.	195.	0.	102.	19.	100000.00
.88	0.00	7.32	0.00	.045	.040	.045	.033	811.30	209.00
.004513	1.	1.	1.	2	0	1	0.00	16.00	225.00

301 HV CHANGED MORE THAN HVINS

70 ENCROACHMENT STATIONS= 55.0 101.0 TYPE= 1 TARGET= 46.000

.86	14.30	825.70	0.00	0.00	825.79	.09	.01	.45	813.80
1430.	21.	1394.	14.	12.	579.	10.	102.	19.	815.40
.88	1.83	2.41	1.46	.045	.040	.045	.033	811.40	55.00
.000140	15.	15.	15.	2	0	1	0.00	46.00	101.00

SECTION *

.97	14.71	825.71	0.00	0.00	826.00	.28	.03	.13100000.00	
1430.	0.	1430.	0.	0.	335.	0.	116.	20.	100000.00
.99	0.00	4.27	0.00	.045	.040	.065	.034	811.00	128.00
.001048	310.	295.	250.	2	0	1	0.00	24.00	152.00

CHV= .600 CEHV= .800

01 HV CHANGED MORE THAN HVINS

TO ENCROACHMENT STATIONS= 134.0 146.0 TYPE= 1 TARGET= 12.000

.97	13.68	825.58	0.00	0.00	826.80	1.22	.05	.75100000.00	
1430.	0.	1430.	0.	0.	181.	0.	116.	20.	100000.00
.99	0.00	8.86	0.00	.045	.040	.065	.034	811.90	134.00
.008342	25.	24.	25.	2	0	1	0.00	12.00	146.00

GRAND TRUNK RAILROAD BRIDGE - DOWNSTREAM FACE - SECTION X

.97	13.67	825.57	0.00	0.00	826.87	1.30	.01	.07	837.60
1430.	0.	1430.	0.	0.	156.	0.	116.	20.	837.60
.99	0.00	9.17	0.00	.030	.025	.030	.034	811.90	180.00
.003534	1.	1.	1.	1	0	1	0.00	12.00	192.00

SPECIAL BRIDGE

XK	XKOR	COFQ	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
0.00	1.63	3.00	0.00	12.00	0.00	115.80	0.00	813.80	811.90

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

PRESSURE FLOW

EGPRS	EGLWC	H3	QWEIR	QPR	BAREA	ELLC	ELTRD	CLASS
829.43	828.75	0.00	0.	1430.	116.	826.00	837.40	10.00

GRAND TRUNK RAILROAD BRIDGE - UPSTREAM FACE - SECTION X

01 HV CHANGED MORE THAN HVINS

70 ENCROACHMENT STATIONS= 133.0 167.0 TYPE= 1 TARGET= 34.000

.98	16.13	829.93	0.00	0.00	830.05	.12	.01	.37	815.20
1430.	0.	1430.	0.	0.	515.	0.	116.	20.	100000.00
.99	0.00	2.78	0.00	.045	.045	.060	.034	813.80	133.00
.000432	10.	10.	10.	2	0	1	0.00	34.00	167.00

HV= .300 CEHV= .500

70 ENCROACHMENT STATIONS= 355.0 795.0 TYPE= 1 TARGET= -355.000

SECTION Y

1.06	16.30	830.10	0.00	0.00	830.10	.00	.01	.04	817.20
1430.	861.	372.	197.	2345.	634.	550.	133.	22.	816.20
1.24	.37	.59	.35	.060	.045	.060	.035	813.80	355.00
.000009	340.	398.	410.	2	0	1	0.00	313.99	668.99

70 ENCROACHMENT STATIONS= 200.0 545.0 TYPE= 1 TARGET= -200.000

1.24	15.60	830.10	0.00	0.00	830.11	.00	.01	.00	817.90
1430.	111.	423.	896.	360.	769.	2443.	195.	27.	818.00
1.76	.31	.55	.37	.060	.045	.060	.037	814.50	200.00
.000008	490.	970.	900.	2	0	1	0.00	320.51	520.51

70 ENCROACHMENT STATIONS= .0 290.0 TYPE= 1 TARGET= 289.999

1.33	15.31	830.11	0.00	0.00	830.12	.01	.01	.00	817.30
1430.	777.	302.	351.	1225.	276.	625.	228.	31.	817.30
1.96	.63	1.09	.56	.060	.045	.060	.037	814.80	16.08
.000033	660.	470.	450.	0	0	1	0.00	273.92	290.00

1.37	15.22	830.12	0.00	0.00	830.12	.00	.00	.00	818.00
1430.	123.	304.	1004.	347.	428.	2119.	240.	32.	817.70
2.07	.35	.71	.47	.060	.045	.060	.038	814.90	20.78
.000014	180.	220.	210.	0	0	1	0.00	286.45	307.22

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

70 ENCROACHMENT STATIONS= .0 830.0 TYPE= 1 TARGET= 829.999

SECTION AA

1.90	13.06	830.16	0.00	0.00	830.16	.00	.02	.00	819.70
1430.	1153.	256.	21.	3210.	512.	99.	389.	50.	825.30
3.40	.36	.50	.21	.050	.045	.045	.042	817.10	195.39
.000010	970.	1450.	1220.	1	0	1	0.00	634.61	830.00

70 ENCROACHMENT STATIONS= 350.0 700.0 TYPE= 1 TARGET= 350.000

SECTION AB

2.23	12.38	830.18	0.00	0.00	830.18	.01	.02	.00	824.70
1430.	827.	281.	322.	1354.	441.	721.	498.	67.	824.20
4.12	.61	.64	.45	.040	.045	.045	.043	817.80	350.00
.000018	1425.	1720.	1640.	0	0	1	0.00	350.00	700.00

70 ENCROACHMENT STATIONS= 85.0 375.0 TYPE= 1 TARGET= 290.000

SMALL CONCRETE DAM - DOWNSTREAM END - SECTION AC

2.38	10.89	830.19	0.00	0.00	830.20	.02	.02	.01	823.30
1430.	208.	670.	552.	396.	443.	1004.	539.	73.	820.70
4.34	.53	1.51	.55	.030	.020	.050	.041	819.30	85.00
.000020	740.	790.	880.	0	0	1	0.00	290.00	375.00

70 ENCROACHMENT STATIONS= 85.0 375.0 TYPE= 1 TARGET= 290.000

SMALL CONCRETE DAM - UPSTREAM END - SECTION AC

2.38	9.38	830.18	0.00	0.00	830.21	.02	.00	.00	824.80
1430.	223.	605.	602.	377.	376.	955.	539.	73.	822.20
4.35	.59	1.61	.63	.030	.020	.050	.041	820.80	85.00
.000028	6.	6.	6.	0	0	1	0.00	290.00	375.00

70 ENCROACHMENT STATIONS= 85.0 375.0 TYPE= 1 TARGET= 290.000

2.38	10.69	830.19	0.00	0.00	830.21	.02	.00	.00	827.20
1430.	254.	544.	632.	287.	401.	671.	539.	73.	824.30
4.35	.88	1.36	.94	.030	.045	.050	.041	819.50	85.00

TYPE	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

470 ENCROACHMENT STATIONS= .0 275.0 TYPE= 1 TARGET= 274.999

SECTION AE

2.49	14.13	830.23	0.00	0.00	830.24	.01	.01	.00	821.40
1430.	93.	872.	465.	187.	1060.	893.	562.	76.	823.00
4.55	.50	.82	.52	.040	.045	.050	.042	816.10	.00
.000024	360.	355.	350.	0	0	1	0.00	275.00	275.00

470 ENCROACHMENT STATIONS= .0 275.0 TYPE= 1 TARGET= 274.999

2.49	12.03	830.23	0.00	0.00	830.24	.02	.00	.00	823.50
1430.	64.	976.	390.	102.	866.	613.	563.	77.	825.10
4.56	.63	1.13	.64	.040	.045	.050	.042	818.20	19.78
.000060	25.	24.	25.	1	0	1	0.00	255.22	275.00

80 CROSS SECTION 2.49 EXTENDED 1.03 FEET

PARKSIDE DRIVE BRIDGE IN LAPEER STATE HOME GROUNDS - DOWNSTREAM FACE

SECTION AF - SMALL CULVERT TO NORTH OF MAIN BRIDGE WAS IGNORED. SEE

HYDRAULICS BOOKLET FOR EXPLANATION (SPECIAL PROBLEMS SECTION).

2.49	11.96	830.25	0.00	0.00	830.25	.01	.00	.00	818.30
1430.	369.	179.	883.	688.	223.	1457.	563.	77.	819.10
4.56	.54	.88	.61	.030	.025	.030	.042	818.30	100.00
.000007	1.	1.	1.	0	0	1	0.00	250.00	350.00

ECIAL BRIDGE

XK	XKOR	COPG	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
0.00	1.54	2.88	0.00	19.00	0.00	98.50	0.00	821.30	818.30

80 CROSS SECTION 2.49 EXTENDED 1.39 FEET

ESSURE AND WEIR FLOW

HYDRAULICS BOOKLET FOR EXPLANATION (SPECIAL PROBLEMS SECTION).

2.49	9.28	830.58	0.00	0.00	830.60	.01	.35	0.00	821.30
1430.	327.	194.	909.	450.	173.	1084.	564.	77.	822.10
4.56	.73	1.12	.84	.030	.025	.030	.042	821.30	100.00
.000020	20.	20.	20.	1	0	4	0.00	250.00	350.00

80 CROSS SECTION 2.50 EXTENDED 2.59 FEET

70 ENCROACHMENT STATIONS= 80.0 330.0 TYPE= 1 TARGET= 250.000

2.50	9.28	830.58	0.00	0.00	830.60	.01	.00	.00	821.30
1430.	342.	185.	903.	465.	173.	1014.	564.	77.	822.10
4.57	.74	1.07	.89	.050	.045	.050	.042	821.30	80.00
.000059	1.	1.	1.	0	0	1	0.00	250.00	330.00

70 ENCROACHMENT STATIONS= 320.0 655.0 TYPE= 1 TARGET= 335.000

SECTION AG - JUST DOWNSTREAM FROM RECREATIONAL LAKE IN LAPEER STATE

HOME GROUNDS.

2.60	10.31	830.61	0.00	0.00	830.62	.01	.02	.00	821.90
1430.	892.	455.	83.	1450.	707.	225.	586.	80.	827.00
4.79	.62	.64	.37	.050	.045	.050	.042	820.30	320.00
.000026	530.	559.	375.	0	0	1	0.00	335.00	655.00

490 NH CARD USED

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

470 ENCROACHMENT STATIONS= 320.0 655.0 TYPE= 1 TARGET= 335.000

MANUFACTURED SECTION THROUGH DOWNSTREAM END OF RECREATIONAL LAKE IN

LAPEER STATE HOME GROUNDS. LAKE AREA FILLED TO ELEV. 826 (ESTIMATED

TOP OF DAM EMBANKMENT) TO ELIMINATE RESERVOIR STORAGE.

2.67	9.81	830.61	0.00	0.00	830.64	.03	.01	.1	822.0
1430.	496.	398.	536.	552.	317.	327.	601.	82.	824.00
4.86	.90	1.26	1.64	.050	.045	.025	.042	820.80	580.74
.000078	360.	345.	360.	0	0	1	0.00	219.26	800.00

90 NH CARD USED

70 ENCROACHMENT STATIONS= 290.0 560.0 TYPE= 1 TARGET= 270.000

MANUFACTURED SECTION THROUGH UPSTREAM END OF RECREATIONAL LAKE. LAKE

AREA FILLED TO ELEV. 826 (ESTIMATED TOP OF DAM EMBANKMENT) TO ELIMI-

NATE RESERVOIR STORAGE.

2.73	9.33	830.63	0.00	0.00	830.65	.02	.01	.00	823.00
1430.	479.	375.	576.	935.	579.	377.	614.	84.	823.00
4.96	.51	.65	1.53	.050	.045	.013	.042	821.30	290.00
.000021	430.	350.	210.	0	0	1	0.00	270.00	560.00

470 ENCROACHMENT STATIONS= 290.0 560.0 TYPE= 1 TARGET= 270.000

MANUFACTURED SECTION JUST UPSTREAM OF LAKE

2.73	9.34	830.64	0.00	0.00	830.65	.01	.00	.00	823.00
1430.	602.	532.	216.	936.	579.	377.	614.	84.	823.00
4.96	.73	.92	.57	.050	.045	.050	.042	821.30	290.00
.000043	5.	5.	5.	1	0	1	0.00	270.00	560.00

SECTION AH

2.94	8.01	830.71	0.00	0.00	830.73	.03	.07	.01	825.10
1430.	485.	945.	0.	740.	616.	0.	649.	90.	837.90
5.17	.66	1.54	0.00	.080	.045	.050	.043	822.70	116.54
.000170	770.	1070.	1160.	2	0	1	0.00	272.68	389.23

2.99	7.75	830.75	0.00	0.00	830.80	.04	.05	.01	824.00
1430.	250.	998.	183.	286.	519.	193.	656.	91.	823.40
5.22	.87	1.92	.95	.070	.045	.070	.043	823.00	158.83
.000234	195.	300.	325.	1	0	1	0.00	199.90	358.72

1430.	178.	1181.	71.	531.	1050.	228.	688.	98.	828.00
5.53	.33	1.12	.31	.070	.045	.070	.043	823.70	480.00
.000100	200.	270.	250.	2	0	1	0.00	614.58	1150.00

UC ALAKUU

1) COUNTY: KENT

2) STUDY NAME: CALEDONIA TOWNSHIP

3) WATERCOURSE: THORNAPPLE RIVER

4) DOCUMENT TYPE: 100 YEAR ENCROACHMENT

~~UPSTREAM OF LA BARGE DAM~~

00BREAK00

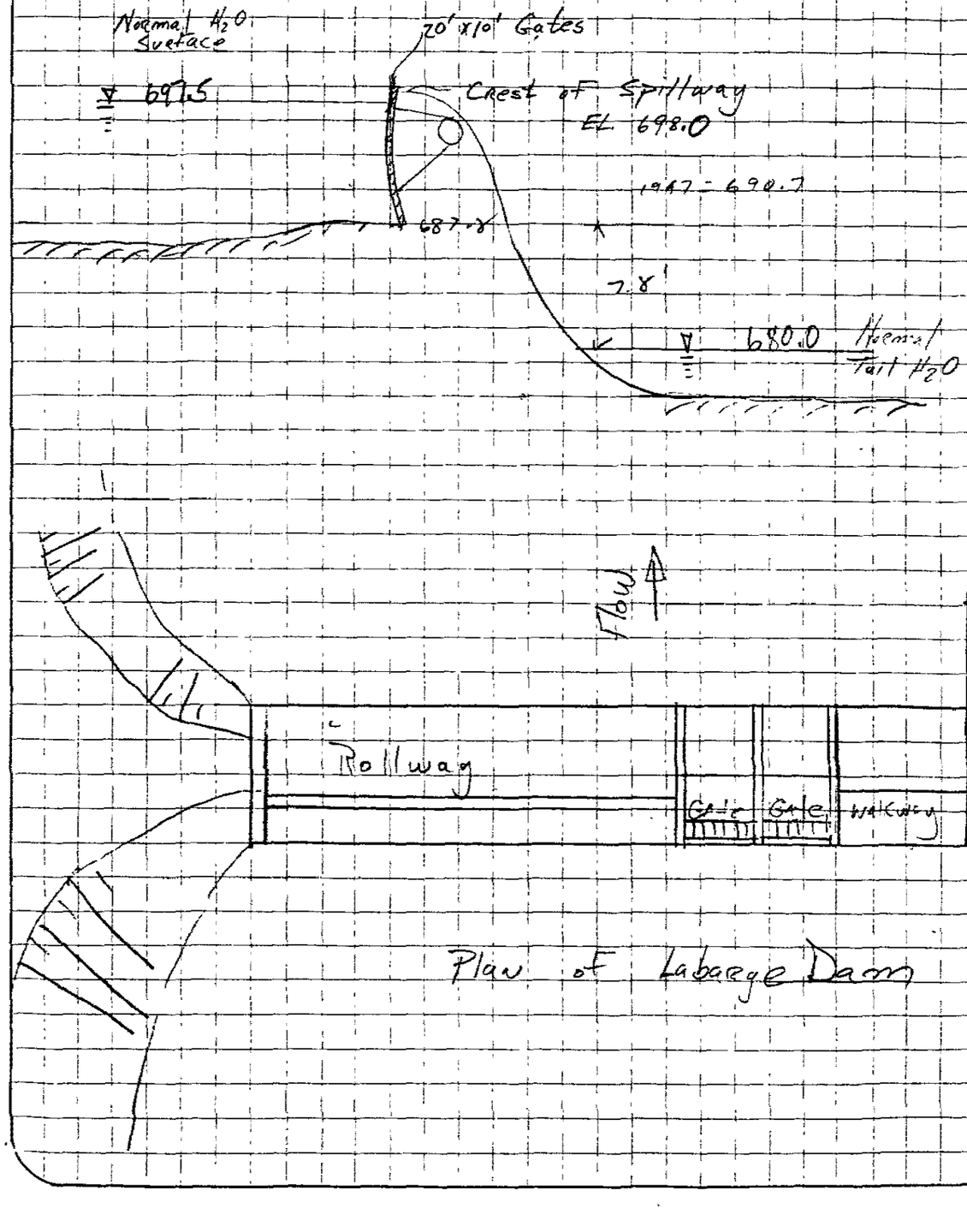


Gilbert/Commonwealth
ENGINEERS/CONSULTANTS Reading,PA/Jackson,MI

CALCULATION SHEET

REV.

CLIENT/OWNER Flood Insurance Study Caledonia - Kent ; Labarge Dam Thornapple River	FILING CODE
CALC. BY/DATE M. Guisfredi 5-22-79	JOB NO. 62-0147-
REVIEW BY/DATE	SUBJECT
	SHEET 1 OF
	BOOK NO.



Plan of Labarge Dam

References.

#2 Design of Small Dams, U.S. Dept of Interior, Bureau of Reclamation

#3 Open Channel Flow F. M. Henderson

#4 Survey Notes

Gilbert/Commonwealth
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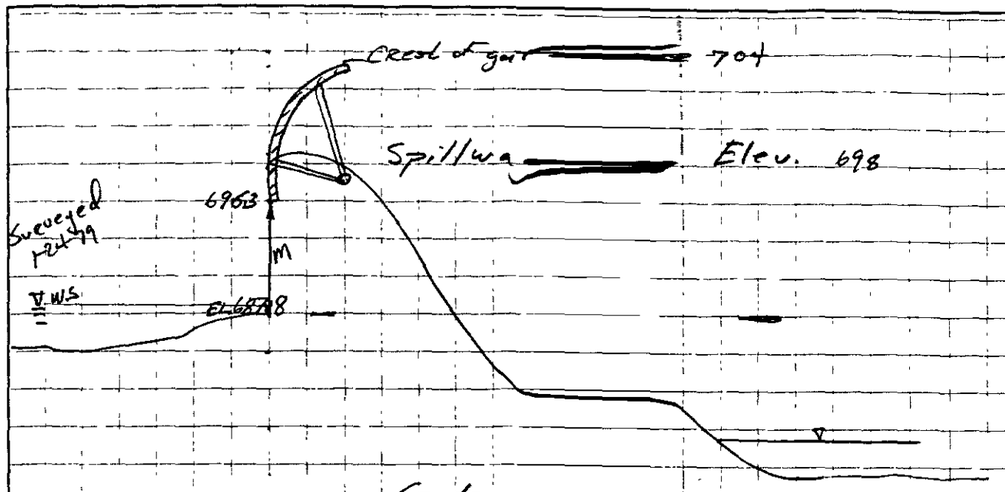
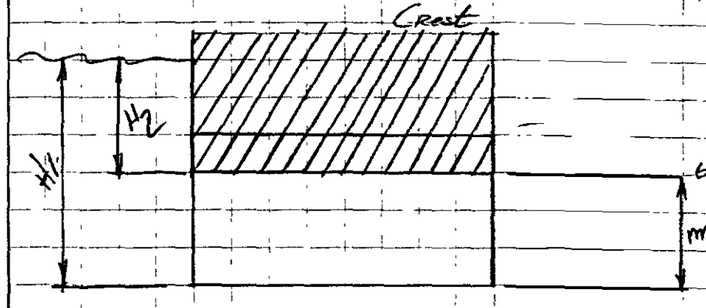
CALCULATION SHEET

REV.

CLIENT/OWNER		FILING CODE / JOB NO.
CALC. BY/DATE M. Guistredi 5-25-79	SUBJECT Labarge Dam	SHEET 2 OF
REVIEW BY/DATE		BOOK NO.





$\frac{2}{3}\sqrt{2g}\,C = \frac{2}{3}\sqrt{64.4} \times 20 = 106.8$

Reference 1 p 38 Fig. 257

$Q = \frac{2}{3}\sqrt{2g}\,C \quad L\left(H_1^{\frac{3}{2}} - H_2^{\frac{3}{2}}\right)$ $Q = 0.665 \times 150 \sqrt{64.4} \times 1.7$ $19 = 20 - 1$ $Q_2 = 4144$

Use $m = 7.5$ Gate wide open & W.S. 702

$Q = \frac{2}{3}(20)\sqrt{2(32.2}\,)\left[(702-687.8)^{\frac{3}{2}} - (702-695.3)^{\frac{3}{2}}\right]C$

$53.51 \quad 17.31$

$\times(36.12) \leftarrow$

$Q = 3869\,C$

$Q_6 = 2 \times 3869 \quad \times .665 = 5146$

$Q_S = CLH^{\frac{3}{2}}$

$= 3.94(118)(702 - 698)^{\frac{3}{2}} = 3719$

Ref. 1 p. 378 Fig. 249

$Q_T = 8865$ cfs

W.S. 701

$Q_6 = 2 \times 3675 \times .658 = 4836$

$Q_S = 3.95(118)\,3^{\frac{3}{2}} = 2422$

$Q_T = 7258$

W.S. 700

$Q_6 = 2 \times 3469 \times .655 = 4544$

$Q_S = 3.95(118)\,2^{\frac{3}{2}} = 1318$

$Q_T = 5862$

W.S. 699

$Q_6 = 2 \times 3249 \times .648 = 4211$

$Q_S = 466$

$Q_T = 4677$

W.S. 703

$Q_6 = 2 \times 4055 \times .667 = 5409$

$Q_S = CLH^{\frac{3}{2}} + C(L)(H^3)$

$= 3.94(118)\,5^{\frac{3}{2}} + (3.95)35(703 - 701.5)^{\frac{3}{2}}$

$= 5198 - 254 = 5452$

$Q_T = 10861$

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CALCULATION SHEET

REV.

CLIENT/OWNER		FILING CODE / JOB NO.
CALC. BY/DATE M. Guisfredi 5-29-79	SUBJECT Laboage Dam	SHEET 3 OF
REVIEW BY/DATE		BOOK NO.

w.s. 704

$Q_1 = 4231 \times 2 \times .672 = 5686$

$Q_2 = 3.93\,(118)\,6^{\frac{3}{2}} + 3.95\,(35)\,(2.5)^{\frac{3}{2}} = 7362$

(6×16) (547)

$Q_T = 13048$

w.s. 705

$Q_1 = 4400 \times 2 \times .674 = 5931$

$Q_2 = 3.92\,(118)\,(7)^{\frac{3}{2}} + 3.95\,(35)\,(3.5)^{\frac{3}{2}} = 9472$

$Q_T = 15403$

w.s. 706

$Q_1 = 4562 \times 2 \times .675 = 6159$

$Q_2 = 11760$

$Q_T = 17919$ c.f.s

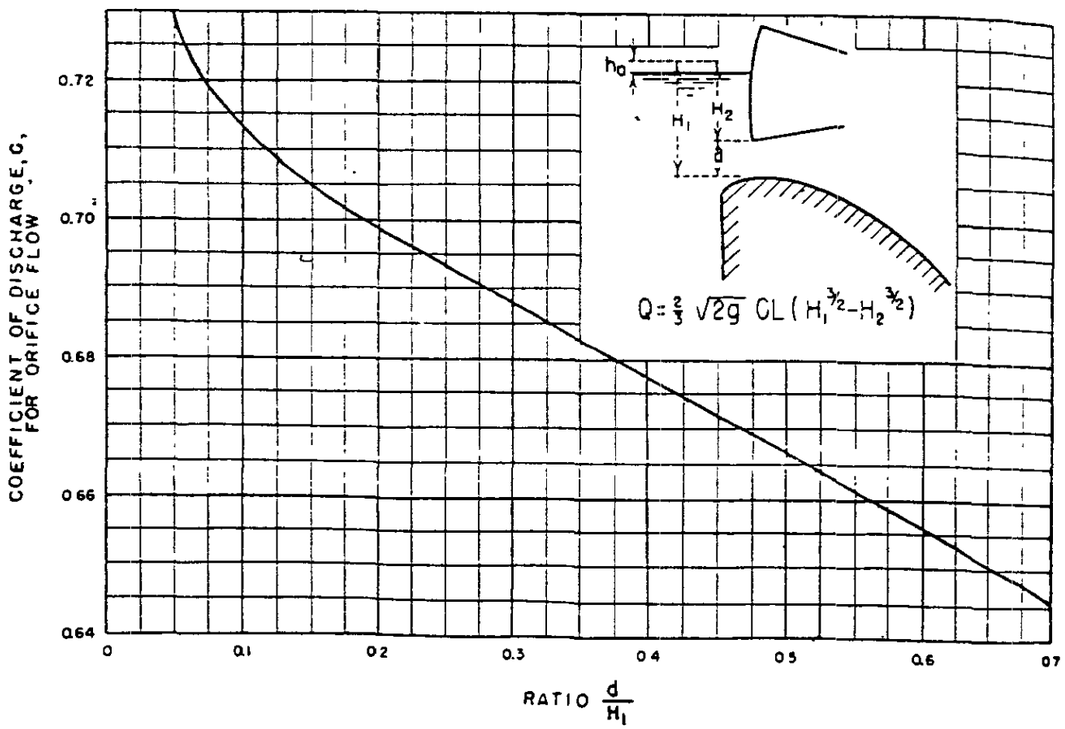

Figure 257. Coefficient of discharge for flow under gates. 288–D–2417.

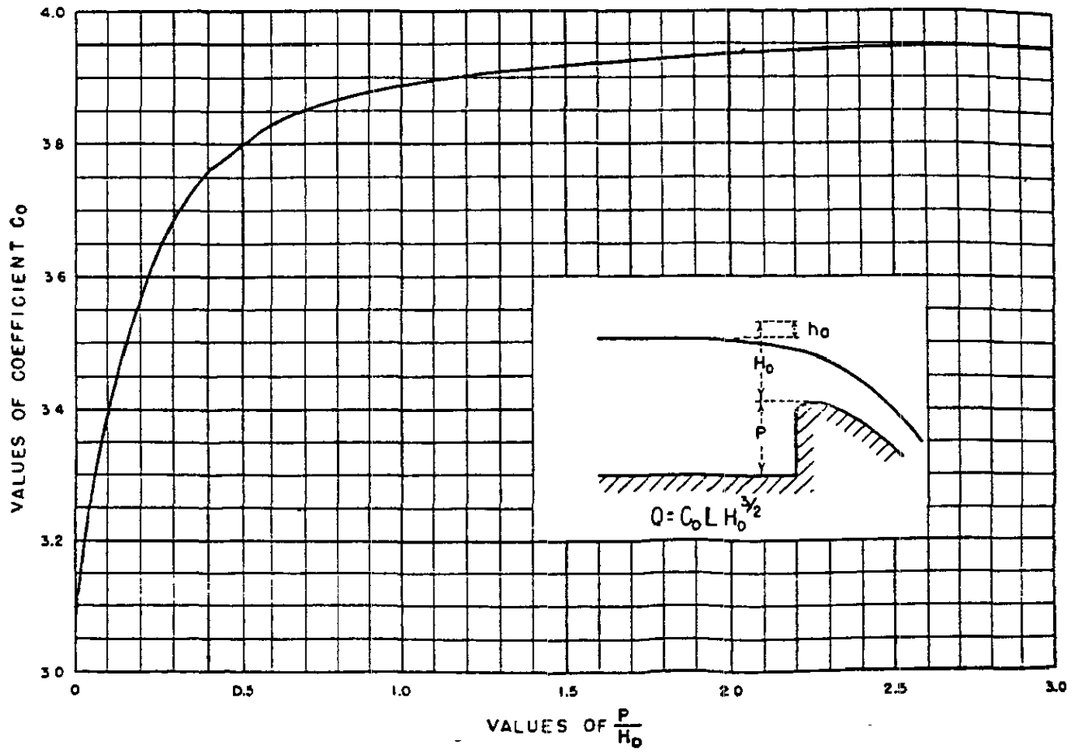

Figure 249. Discharge coefficients for vertical-faced ogee crest. 288–D–2409.

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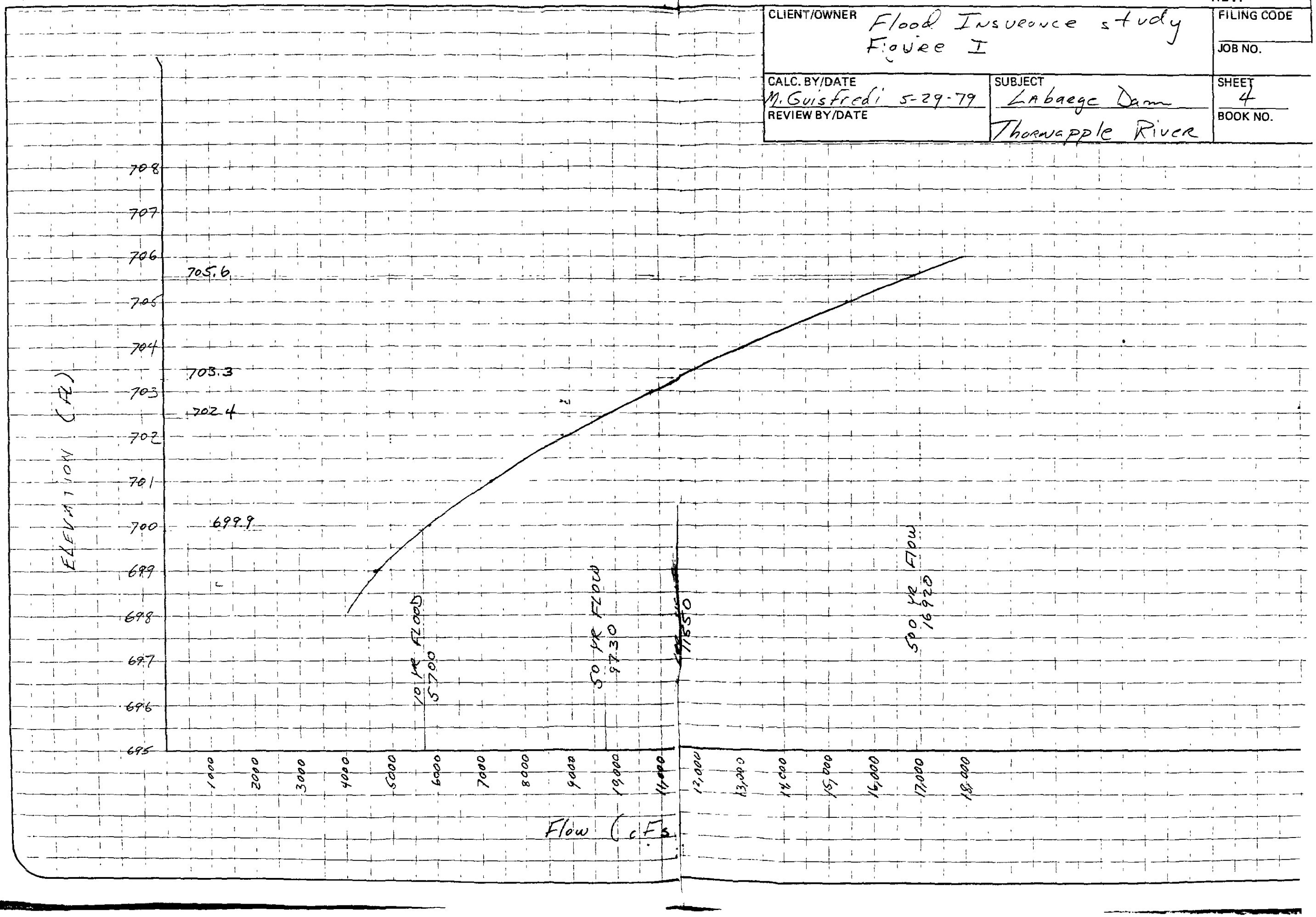
CALCULATION SHEET

REV.

CLIENT/OWNER Flood Insurance study Figure I	FILING CODE / JOB NO.
CALC. BY/DATE M. Guisfredi 5-29-79 / REVIEW BY/DATE	SUBJECT Labaege Dam Thornapple River
	SHEET 4 / BOOK NO.



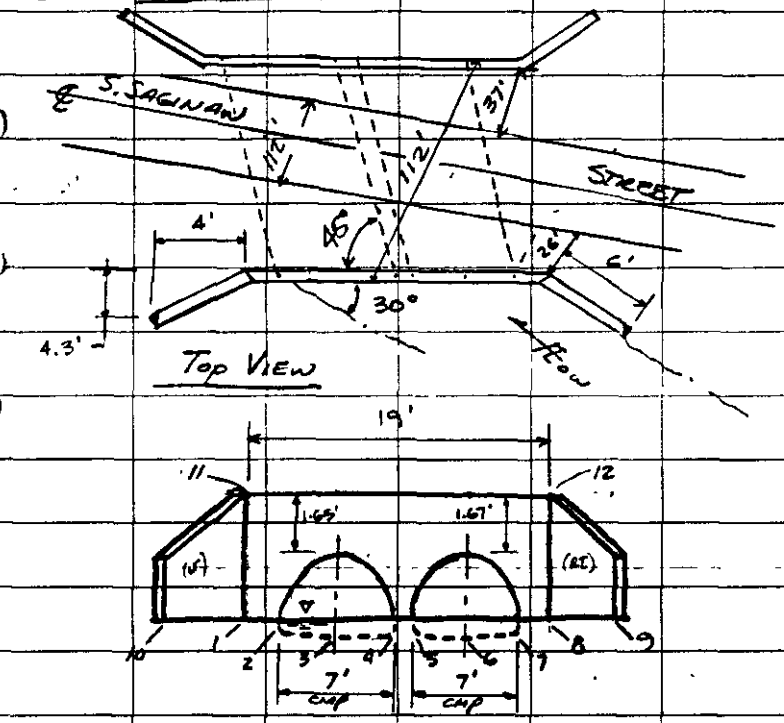
APPENDIX B

APPENDIX D

Saginaw Street over Hunters Creek
Cross sections .236 and .256 on HEC-2 run

18	+	HI	-	ELEV.	
TBM-A				818.219	REF. P2.4 & 7
	6.524	824.743			
	DESC.	DIST	ROD	ELEV.	
1	BTM HEADWALL	0'L	12.6	812.6	
2	EDGE (LT.) CULVERT	1'R	12.6	812.1	
3	℄ (LT.) CULVERT	4.6'R	12.8	811.9	ON RUBBLE
4	EDGE (LT.) CULVERT	8'R	12.9	811.8	
5	EDGE (RT.) CULVERT	11'R	12.6	812.1	
6	℄ (RT.) CULVERT	15'R	12.6	812.1	ON RUBBLE
7	EDGE (RT.) CULVERT	18'R	13.0	812.1	
8	BTM HEADWALL	19'R	13.0	811.7	
9	EDGE (RT) WINGWALL		12.1	812.6	
10	EDGE (LT) WINGWALL		12.0	812.7	
11	TOP OF HEADWALL	0'L	6.50	818.2	
12	TOP OF HEADWALL	19'R	6.53	818.2	
	W/S	0'L	1.6	813.1	
	W/S	19'R	11.6	813.1	
				✓EJ 17 MAY 89	

BRIDGE "A" - SAGINAW ST.



U/S FACE LOOKING D/S

N.T.S.

SKEW 45°

25

44

82974

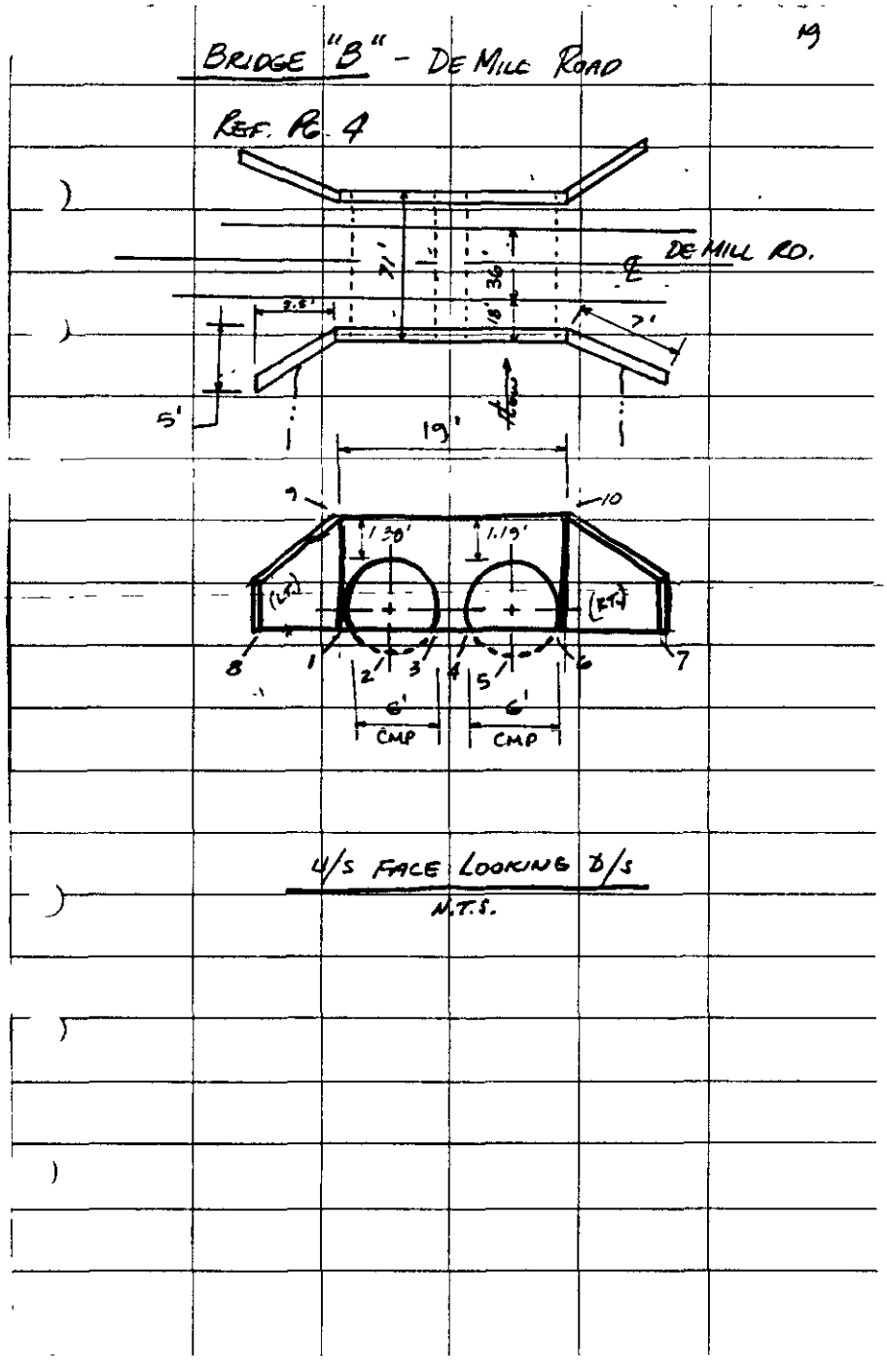
REF R 18

	DESC	DIST	ROD	ELEV.
RT. CULVERT	4/S	4.6 LT 75'R	2.16	816.38
@ E OF RT CULVERT	℄ OF ROAD	0'R	5.64	819.10
	"	25'R	[illegible]	819.01
	"	50'R	5.27	818.87
	"	75'R	5.54	819.20
	"	100'R	5.28	819.46
	"	125'R	4.86	819.88
	"	150'R	4.50	820.24
	"	175'R	3.98	820.76
	"	200'R	[illegible]	821.93
	"	225'R	2.67	822.07
	℄ OF ROAD	250'R	1.95	822.79
				VEJ 17MAY89

BRIDGE "A" - SAGINAN ST.

	DESC.	DIST	ROD	ELEV.
LT. CULVERT	4/S	4.6'R	8.08	816.66
℄ OF LT. CULVERT	℄ OF ROAD	0'L	5.58	819.16
	"	25'L	5.94	818.80
	"	50'L	6.10	818.64
	"	75'L	5.91	818.83
	"	100'L	5.71	819.03
	"	125'L	5.59	819.15
	"	150'L	5 37	819.37
	"	175'L	5.10	819.64
	"	200'L	4.74	820.00
	"	225'L	4.11	820.63
	℄ OF ROAD	250'L	3.75	820.99
				VEJ 17 MAY 89
		CHK	6.523	

De Mill Road over Hunters Creek
C.S. 1.082 and 1.095 on HEC-2 run



19

	—	HI	—	ELEV.	
RM-13				835.37	
	0.62	835.99			
	DESC.	DIST.	RDG.	ELEV.	
1	BTM & EDGE HEADWALL	0'L	17.6	818.4	
2	℄ CULVERT	3'R	18.2	817.8	ON RUBBLE
3	EDGE CULVERT	6'R	18.6	817.4	
4	EDGE CULVERT	13'R	18.5	817.5	
5	℄ CULVERT	15'R	17.3	818.7	ON RUBBLE
6	BTM & EDGE HEADWALL	19'R	16.5	819.5	
7	EDGE (LT.) WINGWALL		16.0	820.0	
8	EDGE (RT.) WINGWALL		16.9	819.1	
9	TOP OF HEADWALL	0'L	11.42	824.6	
10	TOP OF HEADWALL	19'R	11.53	824.5	
	W/S	0'L	16.2	819.8	
	W/S	19'R	16.2	819.8	
				✓EJ 17 MAY 89	

HI

835.99

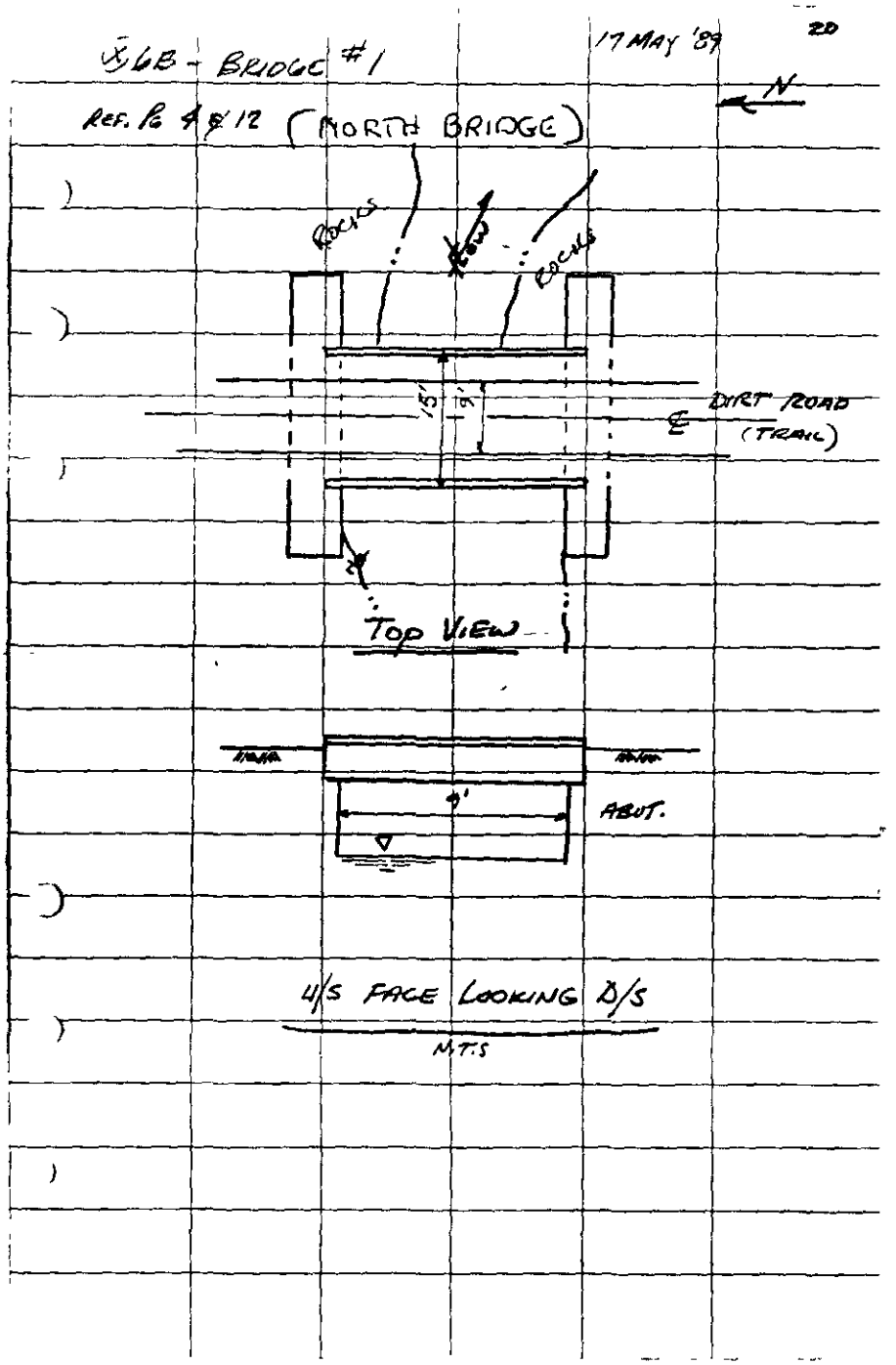
REF. PG. 19

DESC.	DIST	ROD	ELEV.
4/S	3'R		823.27
℄ OF ROAD	0'L	7.52	828.47
"	25'L	7.28	828.71
"	50'L	6.77	829.22
"	75'L	6.55	829.44
"	100'L	6.23	829.76
"	125'L	5.95	830.04
"	150'L	5.59	830.40
"	175'L	5.43	830.56
"	200'L	5.36	830.63
"	225'L	5.32	830.67
℄ OF ROAD	250'L	5.34	830.65
			✓ EJ 17 MAY 09

BRIDGE "B" - DE MILL ROAD

DESC.	DIST.	ROD	ELEV.
4/S	15'R		829.27
℄ OF ROAD	0'R	7.58	828.41
"	25'R	7.66	828.33
"	50'R	6.98	829.01
"	75'R	6.40	829.59
"	100'R	5.81	830.18
"	125'R	5.32	830.67
"	150'R	4.91	831.08
"	175'R	4.38	831.61
"	200'R	3.86	832.13
"	225'R	3.68	832.31
℄ OF ROAD	250'R	2.96	833.03
CK (BM)		0.61	
			VEJ 17MAY89

Millville Road (north bridge) over Farmers Creek
c.s. 3.143 and 3.146 on HEC-2 run.



20	+	HI	−	ELEV.	
TBM - 28A				830.358	
	4.28	834.638			
	DESC.	DIST.	ROD	ELEV	
	BTM FACE ABUT	0'L	10.0	824.6	
	TOP OF ABUT	0'L	3.63	831.01	
	w/s	2'R	10.2	824.4	
	℄ OF BRIDGE	4.6'R	10.4	824.3 ~~830.0~~	
	w/s	8'R	10.2	824.4	
	BTM FACE ABUT.	9'R	10.1	824.5	
	TOP OF ABUT	9'R	3.65	830.99	
	CK		4.28		
25 Mar 89					

TBM-23A				830.358
	4.28	834.64		
	DESC.	DIST	ROD	ELEV
	℄ of Grid #1	0'L	5.0	829.6
	℄ of Dirt Road	25'L	5.1	829.5
	"	50'L	5.4	829.2
	"	75'L	5.7	828.9
	"	100'L	5.5	829.1
	"	125'L	5.4	829.2
	"	150'L	5.5	829.1
	"	175'L	5.7	828.9
	"	200'L	5.7	828.9
	"	225'L	5.8	828.8
	℄ of Dirt Road	250'L	6.1	828.5
	L/S (LT.)	0'L	6.28	828.36
	L/S (RT.)	9'R	6.43	828.21

25 May 89

(X) GB - #1 & #2 17 MAY '89

REF PG. 4 & 12

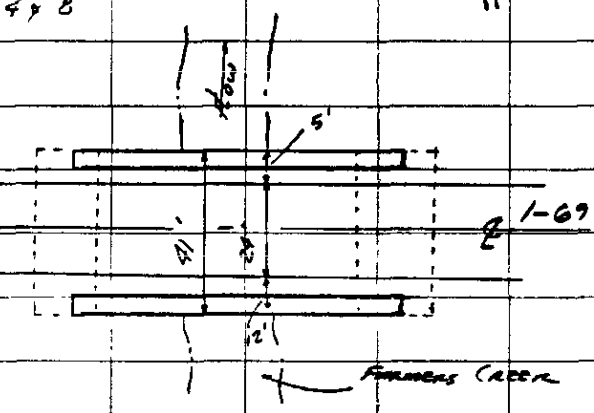
DESC.	DIST.	ROD	ELEV.
℄ OF BRIDGE #2	0'R	4.52	830.12
℄ OF DIRT ROAD	25'R	5.1	829.5
"	50'R	5.5	829.1
"	75'R	5.9	828.7
"	100'R	6.2	828.4
"	125'R	5.9	828.7
"	150'R	5.5	829.1
"	175'R	5.1	829.5
"	200'R	5.0	829.6
"	225'R	4.8	829.8
"	250'R	4.4	830.2
BETW. (GE) BR #1 & #2	-	4.9	829.7
L/S (LT)	0'L	6.68	827.96
L/S (RT)	26'R	6.80	827.84

[illegible] 25 May 89

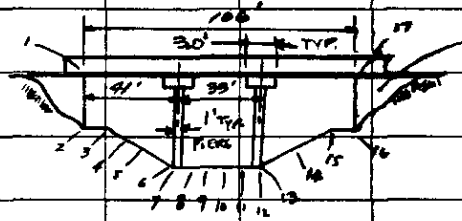
East-Bound I-96 over Farmers Creek
c.s. 3.765 and 3.773 on HEC-2 run.

℄ 2B-169 (EAST-BOUND)

REF. FIG 4 & 8



TOP VIEW



U/S FACE LOOKING D/S

DISTANCE BETWEEN
BRIDGES 2B-169 EAST BD & WEST BD
97.0'
MEASUREMENTS TAKEN FROM
RT. SIDE OF W.BD BRG OUTSIDE FACE ABUT.
TO LT. SIDE FACE OF ABUT. E.BD BRIDGE

23

TBM: -7				849.81	
	1.22	851.03			)
	DESC.	DIST.	Rod	ELEV.	
1	Top of (LT) ABUT	0'L	11.21	839.82	Bottom)
2	BTM of (LT) ABUT	0'L	8.93	842.10	Top
3	Top EDGE of Slope	5'R	11.36	839.67	
4	Slope	15'R	16.08	834.95	
5	Slope	25'R	20.86	830.17	
6	Top of Slope	35'R	24.55	~~825.5~~ ~~826.5~~ 826.48	
7	w/s ℄	38 3/4 'R	25.0	826.0	
8	Slope	40'R	0.4	~~850.6~~	825.6
9	"	50'R	0.6	~~850.4~~	825.4
10	"	60'R	0.6	~~850.4~~	825.4
11	"	70'R	0.4	~~850.6~~	825.6)
12	w/s ℄	73'R	25.0	826.0	
13	Top of Slope	83'R	20.56	830.47	
14	"	93'R	14.83	836.20	
15	EDGE of Slope	103'R	11.68	839.35	)
16	BTM of (RT) ABUT.	106'R	11.64	839.39	
17	Top of (RT.) ABUT.	106'R	9.47	841.56	

TBM - 7				849.81
	2.56	852.37		
	DESC.	DIST.	ROD	ELEV.
	FACE OF (LT.) ABUT	0'L	5.72	846.65
	EDGE OF ROAD	25'L	5.50	846.87
	"	50'L	5.34	847.03
	"	75'L	5.15	847.22
	"	100'L	4.87	847.50
	"	125'L	4.59	847.78
	"	150'L	4.28	848.09
	"	175'L	3.92	848.45
	"	200'L	3.63	848.74
	"	225'L	3.25	849.12
	EDGE OF ROAD	250'L	2.90	849.47
	4/S (LT)		9.77	842.60

25 May 89

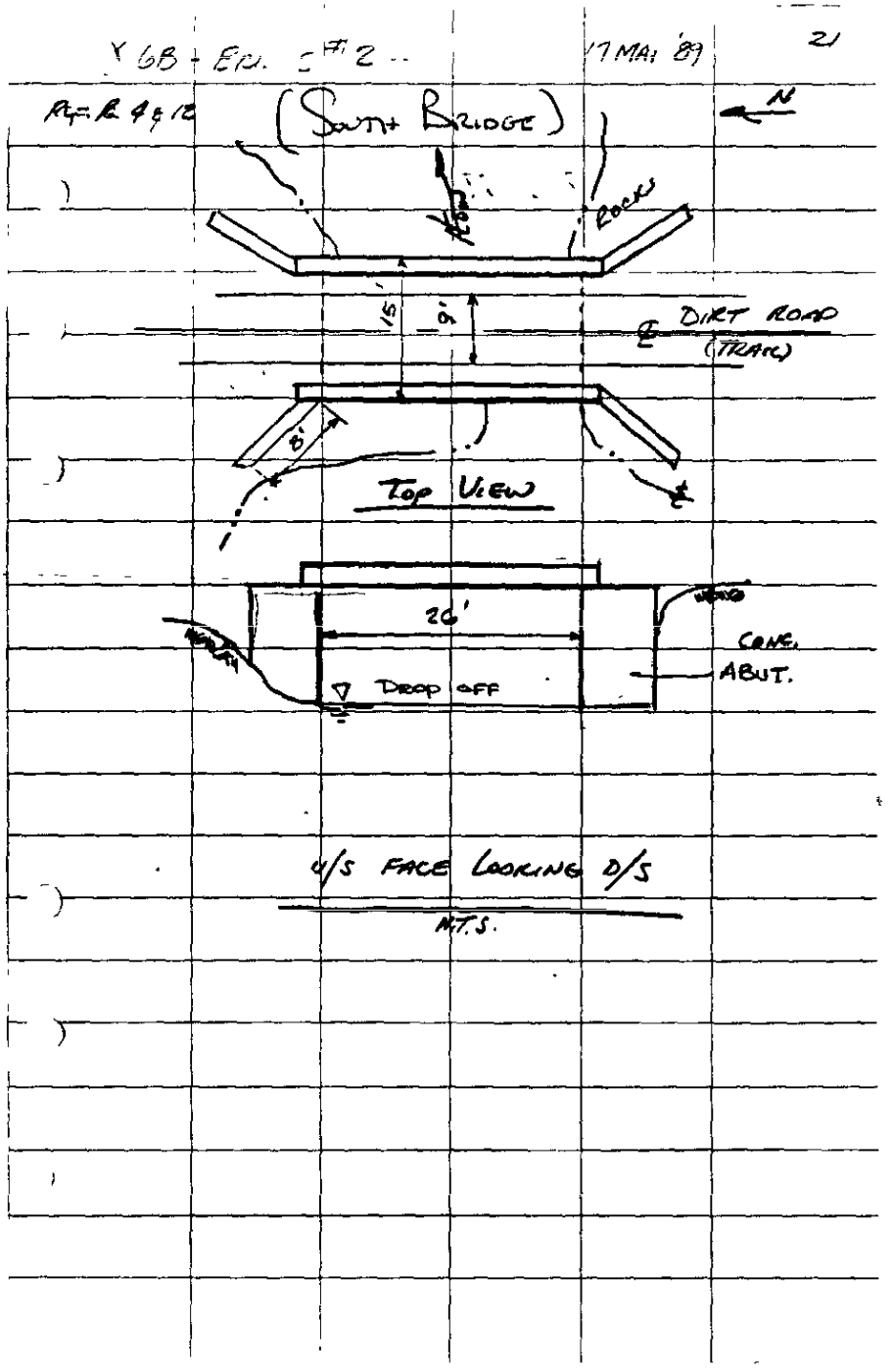
X 2E-1-69 (EASTBOUND) 18 MAY 89

REF. PG. 16 & 9

DESC	DIST.	ROD	ELEV.
FACE OF (RT) ABUT.	0'R	6.19	846.18
EDGE OF ROAD	25'R	6.35	846.02
"	50'R	6.50	845.87
"	75'R	6.68	845.69
"	100'R	6.70	845.67
"	125'R	6.72	845.65
"	150'R	6.79	845.58
"	175'R	6.85	845.52
"	200'R	6.80	845.57
"	225'R	6.65	845.72
EDGE OF ROAD	250'R	6.57	845.80
4/S (RT.)	~~100'R~~	9.88	842.39

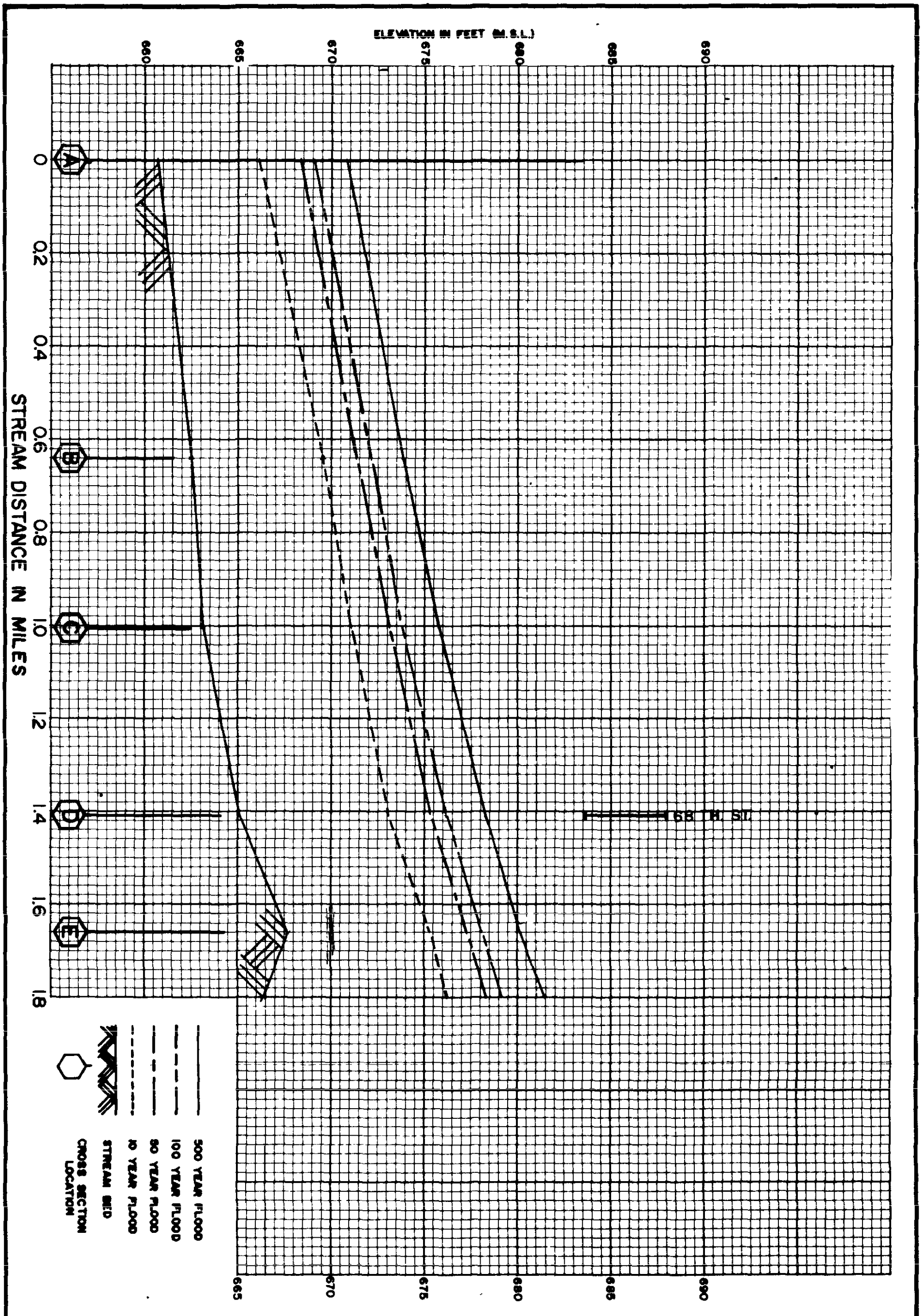
25 May 89

Millville Road (south bridge) over Farmers Creek
c.s. 3.143 and 3.146 on HEC-2 run.



21	+	HI	−	ELEV.	
TBM-28A				830.358	
	4.67	835.028			
	DESC.	DIST.	ROD	ELEV.	
	BTM OF ABUT (PIER)	0'L	10.9	824.1	
	TOP OF ABUT.	0'L	6.73	828.3	
	W/S	0'L	10.3	824.7	
	TOP OF ROCK	5'R	11.0	824.0	
	"	10'R	11.0	824.0	
	"	15'R	11.3	823.7	
	"	20'R	11.1	823.9	
	W/S	26'R	10.3	824.7	
	TOP OF ABUT	26'R	6.81	828.2	
	BTM OF ABUT.	26'R	11.0	824.0	
	CK		4.67		

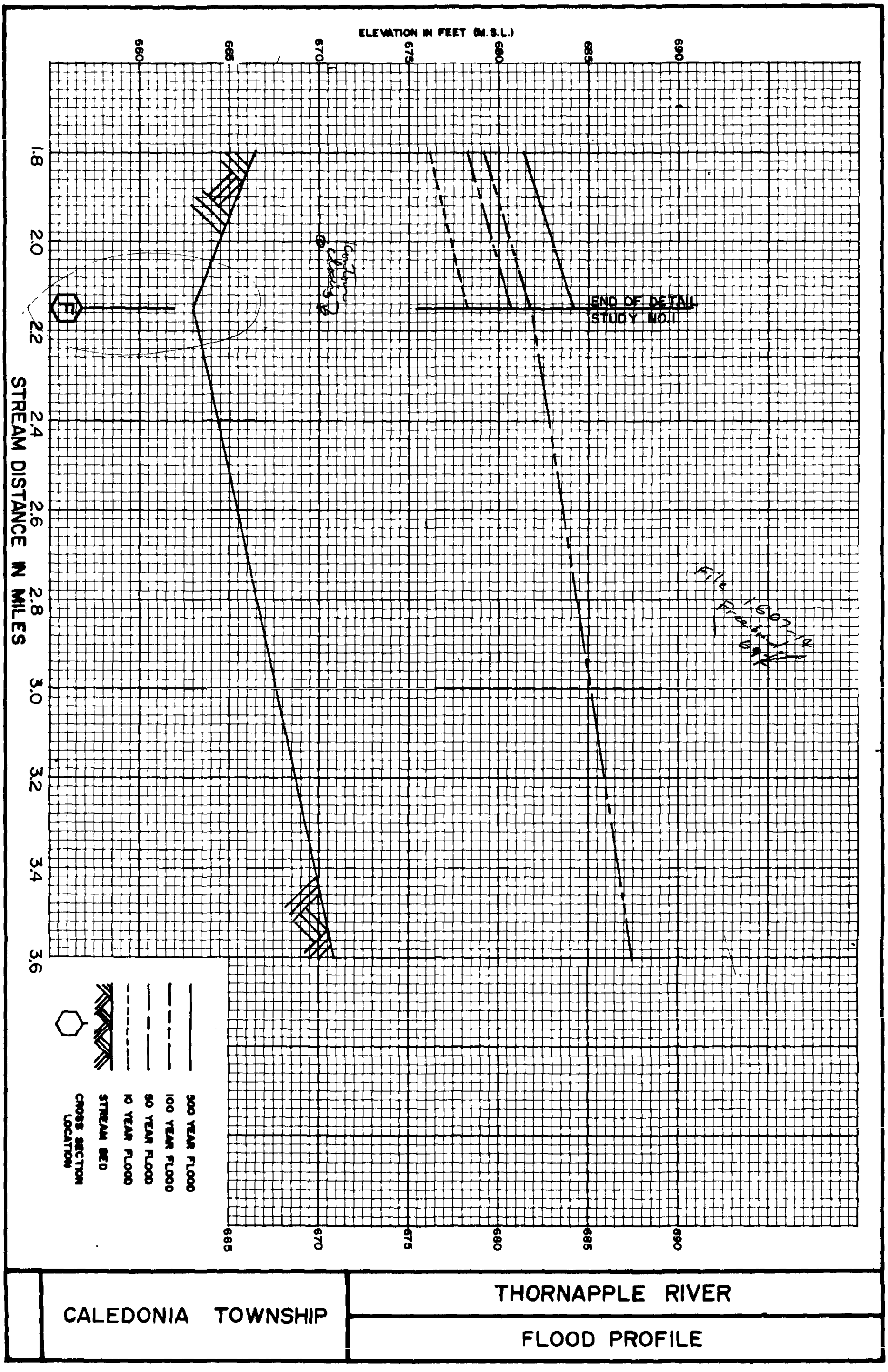
25 May 89



CALEDONIA TOWNSHIP

THORNAPPLE RIVER

FLOOD PROFILE



CALEDONIA TOWNSHIP

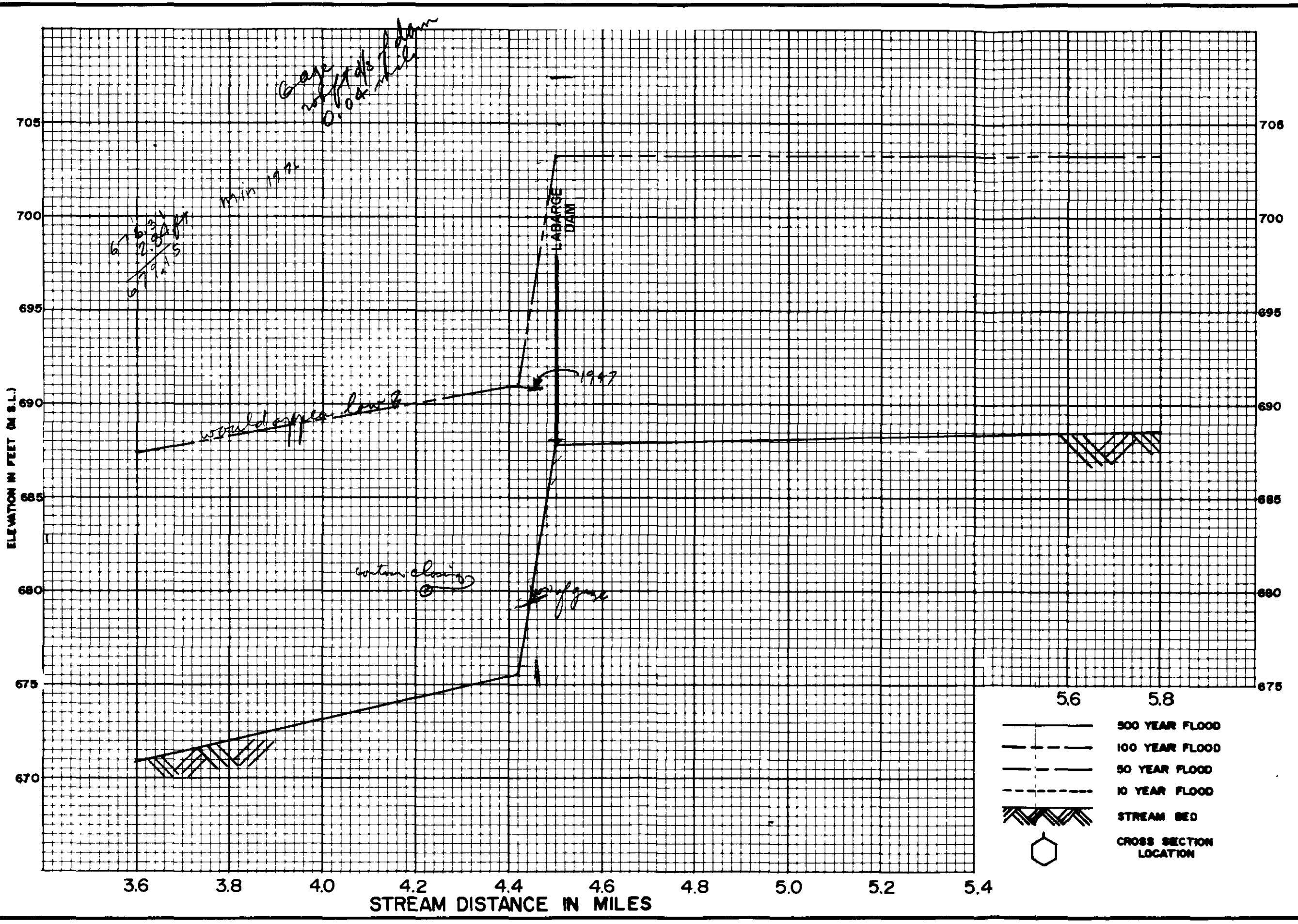
THORNAPPLE RIVER

FLOOD PROFILE

THORNAPPLE RIVER

CALEDONIA TOWNSHIP

FLOOD PROFILE



ELEVATION IN FEET (M S.L.)

685 690 695 700 705 710 715

STREAM DISTANCE IN MILES

5.8 6.0 6.2 6.4 6.6 6.8 7.0 7.2 7.4 7.6

G

BEGIN DETAIL STUDY NO. 2

H

ALASKA AVE.

I

100 TH. ST.

J

K

END OF STUDY

500 YEAR FLOOD

100 YEAR FLOOD

50 YEAR FLOOD

10 YEAR FLOOD

STREAM BED

CROSS SECTION LOCATION

690 695 700 705 710 715

THORNAPPLE RIVER

SYSTEM ID TP - TP CLASS A COMPLETION STATUS

THORNAPPLE RIVER
CALEDONIA TOWNSHIP
KENT COUNTY

100 yr. Floodway

Sensitivity of Horizontal
Slope Downstream of La Barge Dam

THIS RUN EXECUTED 10/17/79

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*****************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED  AUG1977
  ERROR CORR -  01,02
  MODIFICATION -  50,51,52,53
*****************************************************

C
T1      CALEDONIA KENT
T2      APPROXIMATE 100 YR LEVEL
T3      THORNAPPLE RIVER

J1  ICHECK    INO       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ
      0.        4.        0.        0.   0.0          0.0       0.0       0.     668.470    0.0
J2  NPROF     IPLOT     PREVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE
    -1.000     0.0      -1.000     0.0       0.0       0.0       0.0       0.0       0.0       0.0
J3  VARIABLE CODES FOR SUMMARY PRINTOUT
    110.000   150.000     0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
QT      5.000   5830.000   9950.000   11800.000   17300.000   11800.000      0.0       0.0       0.0       0.0
NC      0.055      0.075      0.030      0.100      0.300      0.0        0.0       0.0       0.0       0.0
ET      0.0        0.0        0.0        0.0        0.0        9.100      0.0       0.0    1980.000   2370.000

                VALLEY SECTION A (NORTH STUDY LIMIT)

X1      1.000     48.000   2000.000   2274.000      0.0       0.0        0.0       0.0       0.0       0.0
GR    684.000   1889.000    668.500   1920.000    667.600   1989.000    666.800   1998.000    663.900   2000.000
GR    662.700   2005.000    662.100   2010.000    661.700   2022.000    661.500   2032.000    661.200   2042.000
GR    661.000   2052.000    660.800   2062.000    663.200   2072.000    660.600   2082.000    660.600   2092.000
GR    660.700   2102.000    661.000   2112.000    661.200   2122.000    661.400   2132.000    661.500   2142.000
GR    661.400   2152.000    661.800   2162.000    661.800   2172.000    661.800   2182.000    661.800   2192.000
GR    661.900   2202.000    662.500   2212.000    662.200   2222.000    662.100   2232.000    662.100   2242.000
GR    662.600   2252.000    663.100   2257.000    664.600   2274.000    665.500   2283.000    666.300   2307.000
GR    672.800   2345.000    674.000   2355.000    675.200   2389.000    671.400   2463.000    676.300   2520.000
GR    677.300   2564.000    678.400   2651.000    679.000   2704.000    679.500   2789.000    679.700   2856.000
GR    680.000   2966.000    679.500   2987.000    685.100   3056.000      0.0       0.0       0.0       0.0
NC      0.050      0.060      0.0        0.0        0.0        0.0        0.0       0.0       0.0       0.0
ET      0.0        0.0        0.0        0.0        0.0        9.100      0.0       0.0    1990.000   2240.000

                VALLEY SECTION B

X1      2.000     44.000   2000.000   2233.000   3400.000   3000.000   3360.000      0.0       0.0       0.0
GR    686.100   1550.000    682.600   1564.000    680.000   1584.000    679.800   1618.000    681.000   1628.000
GR    680.600   1654.000    680.400   1674.000    680.900   1713.000    682.100   1754.000    681.300   1821.000
GR    675.900   1888.000    675.200   1898.000    673.000   1942.000    672.400   1964.000    671.700   1974.000
GR    671.400   1985.000    666.700   2000.000    664.900   2005.000    664.300   2010.000    664.100   2020.000
GR    664.000   2030.000    664.000   2040.000    664.100   2050.000    663.900   2060.000    664.000   2070.000
GR    663.800   2080.000    663.700   2090.000    663.900   2100.000    663.800   2110.000    663.700   2120.000
GR    663.500   2130.000    663.500   2140.000    663.400   2150.000    663.000   2160.000    662.700   2170.000
GR    662.500   2180.000    662.600   2190.000    663.100   2200.000    663.300   2210.000    663.200   2220.000
GR    666.700   2233.000    672.700   2245.000    680.700   2259.000    686.800   2269.000      0.0       0.0
NC      0.060      0.080      0.0        0.0        0.0        0.0        0.0       0.0       0.0       0.0
ET      0.0        0.0        0.0        0.0        0.0        9.100      0.0       0.0    2000.000   2245.000
```

VALLEY SECTION C

X1	3.000	35.000	2000.000	2235.000	2240.000	2[illegible].000	2200.000	0.0	0.0	0.0
GR	688.900	1657.000	687.100	1687.000	685.100	1[illegible].000	[illegible].200	1933.000	679.800	1950.000
GR	678.100	1962.000	676.500	1982.000	668.700	20[illegible].000	[illegible].200	2005.000	664.500	2010.000
GR	663.800	2020.000	664.300	2030.000	664.400	20[illegible].000	664.200	2050.000	664.400	2060.000
GR	664.200	2070.000	664.100	2080.000	664.200	20[illegible].000	664.600	2100.000	668.600	2110.000
GR	664.400	2120.000	664.600	2130.000	664.300	21[illegible].000	664.300	2150.000	665.900	2160.000
GR	663.600	2170.000	663.100	2180.000	663.500	21[illegible].000	668.500	2200.000	670.900	2210.000
GR	668.200	2220.000	668.500	2235.000	669.900	224[illegible].000	672.500	2304.000	690.000	2337.000
ET	0.0	0.0	0.0	0.0	0.0	[illegible].100	0.0	0.0	1950.000	2214.000
X1	3.200	32.000	2000.000	2213.500	362.500	4[illegible].500	440.000	0.0	0.0	0.0
GR	690.000	1680.000	683.000	1810.000	683.000	18[illegible].000	683.000	1810.000	683.000	1810.000
GR	668.720	2000.000	668.720	2000.000	664.820	201[illegible].240	664.560	2022.470	664.780	2033.710
GR	664.630	2044.950	664.710	2056.180	664.540	206[illegible].420	664.520	2078.660	664.790	2089.890
GR	664.820	2101.130	664.750	2112.370	664.770	212[illegible].610	664.750	2134.840	664.420	2146.080
GR	664.070	2157.320	663.900	2168.550	667.030	217[illegible].790	669.650	2191.030	667.970	2202.260
GR	668.820	2213.500	668.820	2213.500	668.820	221[illegible].000	668.820	2213.500	668.820	2213.500
GR	680.000	2300.000	700.000	2400.000	0.0	[illegible]	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	0.0	[illegible].100	0.0	0.0	2000.000	2210.000
X1	3.400	32.000	2000.000	2192.000	362.500	4[illegible].500	440.000	0.0	0.0	0.0
GR	688.800	1723.000	680.000	1850.000	676.000	19[illegible].000	676.000	1980.000	676.000	1980.000
GR	668.750	2000.000	668.750	2000.000	665.300	201[illegible].110	665.080	2020.210	665.200	2030.320
GR	665.050	2040.420	665.060	2050.530	664.910	20[illegible].630	664.880	2070.740	665.030	2080.840
GR	665.060	2090.950	665.030	2101.050	665.120	21[illegible].160	665.200	2121.260	664.960	2131.370
GR	664.710	2141.470	664.490	2151.580	666.620	21[illegible].680	668.470	2171.790	667.690	2181.890
GR	669.150	2192.000	669.150	2192.000	668.820	21[illegible].000	668.820	2192.000	668.820	2192.000
GR	680.000	2275.000	700.000	2350.000	0.0	[illegible]	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	0.0	[illegible].100	0.0	0.0	1980.000	2230.000

X1	3.600	32.000	2000.000	2170.500	362.500	4[illegible].500	440.000	0.0	0.0	0.0
GR	688.000	1750.000	682.000	1900.000	682.000	19[illegible].000	682.000	1900.000	682.000	1900.000
GR	668.770	2000.000	668.770	2000.000	665.780	20[illegible].970	665.600	2017.950	665.610	2026.920
GR	665.460	2035.890	665.410	2044.870	665.290	20[illegible].840	665.230	2062.820	665.270	2071.790
GR	665.300	2080.760	665.310	2089.740	665.470	20[illegible].710	665.640	2107.680	665.500	2116.660
GR	665.340	2125.630	665.070	2134.610	666.210	2143.580	667.290	2152.550	667.410	2161.530
GR	669.470	2170.500	669.470	2170.500	669.150	2170.500	669.150	2170.500	669.150	2170.500
GR	680.000	2350.000	700.000	2400.000	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.080	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	0.0	[illegible].100	0.0	0.0	1995.000	2160.000
X1	3.800	29.000	2000.000	2149.000	362.500	4[illegible].500	440.000	0.0	0.0	0.0
GR	688.600	1809.000	687.700	1831.000	682.300	190[illegible].000	680.500	1916.000	679.500	1943.000
GR	679.300	1955.000	673.700	1984.000	672.400	199[illegible].000	668.800	2000.000	669.000	2003.000
GR	666.300	2006.000	666.100	2017.000	666.000	202[illegible].000	665.800	2035.000	665.500	2063.000
GR	665.600	2081.000	666.100	2093.000	666.000	21[illegible].000	665.600	2119.000	665.900	2129.000
GR	666.400	2139.000	669.800	2149.000	671.600	21[illegible].000	672.900	2170.000	677.400	2224.000
GR	677.800	2339.000	685.200	2399.000	690.900	24[illegible].000	694.400	2449.000	0.0	0.0
NC	0.0	0.0	0.0	0.300	0.500	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	0.0	[illegible].100	0.0	0.0	2000.000	2228.000
X1	3.900	35.000	2000.000	2228.000	100.000	100.000	100.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	883.000	886.000	0.0
GR	685.500	1949.000	684.900	1975.000	685.100	199[illegible].000	685.600	2000.000	677.800	2000.000
GR	677.400	2003.000	669.800	2024.000	666.400	20[illegible].000	665.500	2054.000	665.700	2056.000
GR	665.400	2064.000	665.300	2076.000	665.300	20[illegible].100	665.300	2080.000	665.300	2080.100
GR	665.300	2097.000	665.700	2111.000	665.500	21[illegible].000	666.700	2134.000	665.700	2134.100
GR	665.800	2138.000	665.800	2138.100	665.900	2142.000	665.600	2148.000	665.000	2160.000
GR	665.900	2170.000	666.800	2178.000	666.600	2190.000	668.000	2193.000	669.800	2199.000
GR	670.000	2225.000	674.100	2228.000	688.500	222[illegible].000	688.500	2237.000	688.900	2285.000

ET	0.0	0.0	0.0	0.0	0.0	9.100	0.0	0.0	2000.000	2228.000

BRIDGE SECTION D (DOWNSTREAM FACE OF 68TH ST. BRIDGE)

X1	4.000	0.0	0.0	0.0	1.000	1.0	1.000	0.0	0.0	0.0
BT	17.000	1949.000	685.500	0.0	1975.000	684.9	0.0	1992.000	685.100	0.0
BT	2000.000	685.600	677.800	2000.000	685.600	679.9	2076.000	686.600	680.000	2076.100
BT	686.600	665.300	2080.000	686.700	665.300	2080.1	686.700	680.000	2134.000	687.300
BT	680.600	2134.100	687.300	665.700	2138.000	687.4	665.800	2138.100	687.400	680.000
BT	2228.000	688.500	680.100	2228.000	688.500	674.1	2237.000	688.500	0.0	2285.000
BT	688.900	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	0.0	9.1	0.0	0.0	2000.000	2228.000

X1	4.100	35.000	2000.000	2228.000	38.000	38.0	38.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	883.000	886.000	0.0
BT	14.000	1937.000	681.000	0.0	2000.000	685.6	678.300	2000.000	685.600	680.900
BT	2076.000	686.600	681.800	2076.100	686.600	665.5	2080.000	686.600	665.500	2080.100
BT	686.600	681.800	2134.000	687.300	682.400	2134.1	687.300	665.600	2138.000	687.300
BT	665.600	2138.100	687.300	682.400	2228.000	688.5	683.600	2228.000	688.500	681.100
BT	2233.000	689.600	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GR	688.800	1832.000	687.600	1851.000	685.600	1908.0	681.000	1937.000	685.600	2000.000
GR	678.300	2000.000	678.300	2003.000	669.800	2020.0	668.200	2024.000	666.300	2029.000
GR	665.700	2039.000	665.300	2051.000	665.900	2062.0	665.500	2076.000	665.500	2076.100
GR	665.500	2080.000	665.500	2080.100	665.500	2091.0	665.100	2100.000	665.500	2119.000
GR	665.600	2134.000	665.600	2134.100	665.600	2138.0	665.600	2138.100	665.200	2146.000
GR	668.800	2150.000	665.100	2162.000	665.600	2173.0	666.300	2181.000	666.500	2192.000
GR	669.800	2201.000	680.300	2224.000	681.100	2228.0	688.500	2228.000	689.600	2233.000
ET	0.0	0.0	0.0	0.0	0.0	9.1	0.0	0.0	2000.000	2228.000

X1	4.200	0.0	0.0	0.0	1.000	1.000	1.000	0.0	0.0	0.0
NC	0.080	0.080	0.030	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	0.0	9.100	0.0	0.0	2000.000	2228.000

X1	4.300	27.000	2000.000	2228.000	50.000	50.0	50.000	0.0	0.0	0.0
GR	688.800	1832.000	687.600	1851.000	685.600	1908.0	681.000	1937.000	687.300	2000.000
GR	678.300	2003.000	669.800	2020.000	668.200	2024.0	666.300	2029.000	665.700	2039.000
GR	665.300	2051.000	665.900	2062.000	665.500	2076.0	665.500	2080.000	665.500	2091.000
GR	665.600	2138.000	665.200	2146.000	668.800	2150.0	665.100	2162.000	665.600	2173.000
GR	666.300	2181.000	666.500	2192.000	669.800	2201.0	680.300	2224.000	681.100	2228.000
GR	689.600	2233.000	694.200	2350.000	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	0.0	9.1	0.0	0.0	2000.000	2213.000

X1	4.470	32.000	2000.000	2213.000	267.500	387.5	337.500	0.0	0.0	0.0
GR	689.000	1830.000	680.000	1940.000	680.000	1940.0	680.000	1940.000	680.000	1940.000
GR	684.570	2000.000	684.570	2000.000	673.730	2011.2	667.530	2022.420	666.990	2033.630
GR	666.420	2044.840	666.670	2056.050	666.750	2067.2	666.900	2078.470	667.200	2089.680
GR	667.130	2100.890	667.020	2112.110	666.820	2123.3	666.230	2134.530	667.210	2145.740
GR	666.120	2156.950	667.070	2168.160	667.540	2179.3	671.470	2190.580	675.950	2201.790
GR	680.200	2213.000	680.200	2213.000	680.200	2213.0	680.200	2213.000	680.200	2213.000
GR	680.000	2250.000	690.000	2350.000	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	0.0	9.1	0.0	0.0	2000.000	2198.000

X1	4.650	32.000	2000.000	2198.000	267.500	387.5	337.500	0.0	0.0	0.0
GR	690.000	1790.000	680.000	1900.000	680.000	1900.0	680.000	1900.000	680.000	1900.000
GR	681.850	2000.000	681.850	2000.000	673.650	2010.8	669.000	2020.840	668.100	2031.260
GR	667.440	2041.680	667.550	2052.110	667.880	2062.5	668.290	2072.950	668.890	2083.370
GR	668.730	2093.790	668.480	2104.210	668.040	2114.6	667.170	2125.050	667.480	2135.470
GR	666.860	2145.890	667.940	2156.320	668.590	2166.7	671.760	2177.160	675.250	2187.580
GR	679.300	2198.000	679.300	2198.000	680.200	2198.0	680.200	2198.000	680.200	2198.000
GR	680.000	2250.000	690.000	2300.000	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	0.0	9.1	0.0	0.0	2000.000	2183.000

X1	4.820	32.000	2000.000	2183.000	267.500	3[illegible].500	337.500	0.0	0.0	0.0
GR	690.000	1780.000	680.000	1880.000	680.000	1[illegible].000	680.000	1880.000	680.000	1880.000
GR	679.120	2000.000	679.120	2000.000	673.580	20[illegible].630	669.500	2019.260	669.210	2028.890
GR	668.460	2038.530	668.420	2048.160	669.010	20[illegible].790	669.690	2067.420	670.540	2077.050
GR	670.320	2086.680	669.940	2096.320	669.270	21[illegible].950	668.100	2115.580	667.740	2125.210
GR	667.600	2134.840	668.800	2144.470	669.630	21[illegible].110	672.060	2163.740	674.550	2173.370
GR	678.400	2183.000	678.400	2183.000	679.300	21[illegible].000	679.300	2183.000	679.300	2183.000
GR	680.000	2250.000	690.000	2300.000	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.050	0.070	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	0.0	0.100	0.0	0.0	1976.000	2168.000

VALLEY SECTION E

X1	5.000	32.000	2000.000	2168.000	267.500	3[illegible].500	337.500	0.0	0.0	0.0
GR	691.500	1763.000	688.800	1781.000	685.600	18[illegible].000	684.800	1851.000	681.900	1912.000
GR	677.800	1947.000	678.200	1976.000	675.900	19[illegible].000	674.200	1998.000	676.400	2000.000
GR	674.200	2005.000	673.300	2010.000	671.500	20[illegible].000	669.700	2030.000	669.300	2040.000
GR	668.900	2040.000	670.800	2060.000	672.300	20[illegible].000	671.900	2080.000	671.300	2090.000
GR	670.200	2100.000	668.300	2110.000	667.700	21[illegible].000	669.400	2130.000	670.400	2140.000
GR	678.300	2150.000	674.000	2160.000	677.500	21[illegible].000	690.300	2177.000	691.200	2198.000
GR	695.800	2234.000	696.800	2272.000	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	0.0	0.100	0.0	0.0	2000.000	2165.250

X1	5.130	31.000	2000.000	2165.250	350.000	27[illegible].000	312.500	0.0	-0.450	0.0
GR	690.000	1770.000	685.000	1820.000	681.900	19[illegible].000	681.900	1910.000	681.900	1910.000
GR	675.910	2000.000	675.910	2000.000	674.230	20[illegible].700	672.400	2017.390	669.640	2026.090
GR	668.780	2034.790	668.530	2043.490	669.320	20[illegible].180	670.260	2060.880	671.430	2069.580
GR	671.240	2078.280	670.810	2086.970	670.080	20[illegible].670	668.890	2104.370	668.150	2113.070
GR	668.500	2121.760	669.650	2130.460	670.530	21[illegible].160	672.030	2147.860	673.480	2156.550
GR	676.900	2165.250	676.900	2165.250	677.200	21[illegible].250	677.200	2165.250	677.200	2165.250
GR	690.000	2200.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	0.0	0.100	0.0	0.0	2000.000	2162.500

X1	5.250	31.000	2000.000	2162.500	350.000	27[illegible].000	312.500	0.0	-0.060	0.0
GR	690.000	1780.000	685.000	1820.000	681.900	19[illegible].000	681.900	1910.000	681.900	1910.000
GR	675.420	2000.000	675.420	2000.000	674.950	20[illegible].550	672.890	2017.110	668.960	2025.660
GR	668.070	2034.210	667.760	2042.760	668.510	20[illegible].320	669.440	2059.870	670.580	2068.420
GR	670.560	2076.970	670.230	2085.530	669.650	20[illegible].080	668.750	2102.630	668.300	2111.180
GR	668.650	2119.740	669.630	2128.290	670.380	21[illegible].840	671.700	2145.390	673.020	2153.950
GR	676.300	2162.500	676.300	2162.500	676.300	21[illegible].500	676.300	2162.500	676.300	2162.500
GR	690.000	2200.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	0.0	0.100	0.0	0.0	1980.000	2160.000

X1	5.500	32.000	2000.000	2157.000	700.000	55[illegible].000	625.000	0.0	1.480	0.0
GR	690.000	1850.000	685.000	1900.000	680.000	19[illegible].000	680.000	1950.000	680.000	1950.000
GR	674.450	2000.000	674.450	2000.000	676.400	20[illegible].260	673.860	2016.530	667.600	2024.790
GR	666.660	2033.050	666.220	2041.320	666.880	20[illegible].580	667.790	2057.840	668.880	2066.110
GR	669.200	2074.370	669.070	2082.630	668.810	20[illegible].890	668.460	2099.160	668.590	2107.420
GR	668.960	2115.680	669.600	2123.950	670.080	21[illegible].210	671.050	2140.470	672.190	2148.740
GR	675.100	2157.000	675.100	2157.000	676.300	21[illegible].000	676.300	2157.000	676.300	2157.000
GR	680.000	2200.000	690.000	2400.000	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	0.0	0.100	0.0	0.0	1990.000	2180.000

X1	5.750	32.000	2000.000	2151.500	700.000	55[illegible].000	625.000	0.0	3.020	0.0
GR	690.000	1900.000	685.000	1970.000	685.000	19[illegible].000	685.000	1970.000	685.000	1970.000
GR	673.470	2000.000	673.470	2000.000	677.850	20[illegible].970	674.840	2015.950	666.240	2023.920
GR	665.250	2031.890	664.680	2039.870	665.240	20[illegible].840	666.140	2055.820	667.190	2063.790
GR	667.850	2071.760	667.900	2079.740	667.960	20[illegible].710	668.170	2095.680	668.890	2103.660
GR	669.270	2111.630	669.570	2119.610	669.790	21[illegible].580	670.390	2135.550	671.360	2143.530
GR	673.900	2151.500	673.900	2151.500	675.100	2151.500	675.100	2151.500	675.100	2151.500
GR	680.000	2200.000	690.000	2400.000	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	0.0	0.100	0.0	0.0	1995.000	2385.000

VALLEY SECTION F (SOUTH STUDY LIMIT)

6.000	38.000	2000.000	2146.000	700.000	550.0	675.000	0.0	4.700	0.0
692.600	1886.000	690.500	1899.000	687.600	1963.0	685.900	1970.000	672.500	2000.000
669.200	2005.000	688.000	2010.000	665.300	2020.0	683.900	2030.000	663.000	2040.000
664.000	2050.000	665.300	2060.000	666.600	2070.0	666.800	2080.000	667.500	2090.000
669.200	2100.000	669.700	2110.000	669.400	2120.0	669.700	2130.000	670.000	2135.000
670.800	2140.000	672.700	2146.000	675.500	2153.0	674.800	2163.000	676.900	2184.000
677.300	2187.000	677.100	2199.000	680.900	2213.0	681.300	2244.000	680.400	2262.000
677.600	2289.000	677.400	2311.000	679.200	2329.0	676.500	2366.000	677.900	2384.000
678.200	2396.000	683.000	2413.000	696.100	2436.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

*PROF 1

CCHV= 0.100 CEHV= 0.300

*SECNO 1.000

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	TOC	ICONT	CORAR	TOPWID	ENDST
		VALLEY SECTION A (NORTH STUDY LIMIT)							
1.00	7.87	668.47	0.0	668.47	669.09	0.62	0.0	0.0	663.90
11800.	38.	11618.	144.	47.	1827.	106.	0.	0.	664.60
0.0	0.82	6.36	1.35	0.055	0.030	0.075	0.0	660.60	1922.30
0.001319	0.	0.	0.	0	0	0	0.0	397.38	2319.69

*SECNO 2.000

VALLEY SECTION B

2.00	9.58	672.08	0.0	0.0	672.63	0.55	3.53	0.01	666.70
11800.	84.	11679.	38.	52.	1955.	29.	154.	46.	666.70
0.16	1.61	5.98	1.30	0.050	0.030	0.060	0.030	662.50	1968.67
0.000860	3400.	3360.	3000.	2	0	0	0.0	275.08	2243.75

*SECNO 3.000

VALLEY SECTION C

3.00	10.78	673.88	0.0	0.0	674.36	0.47	1.72	0.01	668.70
11800.	36.	11539.	224.	31.	2065.	211.	264.	41.	668.50
0.27	1.18	5.59	1.06	0.060	0.030	0.080	0.030	663.10	1988.05
0.000713	2240.	2200.	2080.	2	0	0	0.0	318.55	2306.60

*SECNO 3.200

3.20	10.26	674.16	0.0	0.0	674.72	0.56	0.34	0.02	668.72
11800.	276.	11410.	114.	197.	1875.	110.	286.	44.	668.82
0.29	1.40	6.09	1.03	0.060	0.030	0.080	0.030	663.90	1927.57
0.000844	363.	440.	488.	2	0	0	0.0	327.27	2254.84

*SECNO 3.400

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	TOC	ICONT	CORAR	TOPWID	ENDST
3.40	9.98	674.47	0.0	0.0	675.18	0.71	0.41	0.05	668.75
11800.	70.	11588.	142.	45.	1698.	118.	307.	47.	668.82
0.31	1.55	6.82	1.20	0.060	0.030	0.080	0.030	664.49	1984.23
0.001050	363.	440.	488.	2	0	0	0.0	249.70	2233.93

*SECNO 3.600

3.60	9.83	674.90	0.0	0.0	675.68	0.78	0.48	0.02	668.77
11800.	251.	11200.	349.	142.	1542.	274.	326.	50.	669.15
0.32	1.77	7.26	1.28	0.060	0.030	0.080	0.030	665.07	1953.64
0.001155	363.	440.	488.	2	0	0	0.0	312.05	2265.69

*SECNO 3.800

3.80	9.77	675.27	0.0	0.0	676.36	1.09	0.00	0.09	668.80
11800.	61.	11566.	173.	49.	1367.	114.	3.	52.	688.50
0.34	1.24	8.46	1.52	0.080	0.030	0.080	0.00	665.50	1975.87
0.001542	363.	440.	488.	2	0	0	0.0	222.57	2198.44

CCHV= 0.300 CEHV= 0.500
*SECNO 3.900

3301 HV CHANGED MORE THAN HVINS

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA= 883.00 ELREA= 886.00

3.90	11.10	676.10	0.0	0.0	676.63	0.54	0.00	0.17	685.60
11800.	0.	11800.	0.	0.	2009.	0.	349.	53.	688.50
0.34	0.0	5.87	0.0	0.080	0.030	0.080	0.030	665.00	2006.58
0.000773	100.	100.	100.	2	0	0	0.0	221.42	2228.00

*SECNO 4.000

3370 NORMAL BRIDGE,NRD= 17 MIN ELTRD= 684.90 MAX ELLC= 680.60

BRIDGE SECTION D (DOWNSTREAM FACE OF 68TH ST. BRIDGE)

4.00	11.07	676.07	0.0	0.0	676.66	0.59	0.00	0.03	685.60
11800.	0.	11800.	0.	0.	1917.	0.	349.	53.	688.50
0.34	0.0	6.16	0.0	0.080	0.030	0.080	0.030	665.00	2006.67
0.000903	1.	1.	1.	2	0	0	-84.37	221.33	2228.00

*SECNO 4.100

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBI	XLCH	XLOBR	ITRIAL	IOF	ICONT	CORAR	TOPWTD	ENDST

3370 NORMAL BRIDGE,NRD= 14 MIN ELTRD= 681.00 MAX ELLC= 683.60

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA= 883.00 ELREA= 886.00

4.10	10.98	676.08	0.0	0.0	676.72	0.65	0.04	0.03	685.60
11800.	0.	11800.	0.	0.	1827.	0.	349.	53.	688.50
0.35	0.0	6.46	0.0	0.080	0.030	0.080	0.030	665.10	2007.45
0.000970	58.	58.	58.	2	0	0	-84.37	207.30	2214.75

*SECNO 4.200

4.20	11.06	676.16	0.0	0.0	676.75	0.58	0.00	0.02	685.60
11800.	0.	11800.	0.	0.	1930.	0.	349.	53.	688.50
0.35	0.0	6.11	0.0	0.080	0.030	0.080	0.030	665.10	2007.27
0.000811	1.	1.	1.	2	0	0	0.0	207.67	2214.94

CCHV= 0.100 CEHV= 0.300
*SECNO 4.300

4.30	11.11	676.21	0.0	0.0	676.79	0.58	0.04	0.04	687.30
11800.	0.	11800.	0.	0.	1932.	0.	351.	53.	691.10
0.35	0.0	6.11	0.0	0.080	0.030	0.080	0.030	665.10	2007.18
0.000809	50.	50.	50.	2	0	0	0.0	207.86	2215.04

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*SECNO 4.470
     4.47     10.28    676.40      0.0       0.0.    677.17      0.77      0.33      0.04    684.57
   11800.        0.    11800.       0.         0.     1673.        0.      366.       [illegible]    680.20
     0.36       0.0      7.05      0.0     0.080     0.030     0.080     0.030    [illegible]   2008.45
 0.001186      268.      338.     388.         2         0         0       0.0    [illegible]   2202.97

*SECNO 4.650
     4.65      9.84    676.70      0.0       0.0.    677.74      1.04      0.49      0.08    681.85
   11800.        0.    11800.       0.         0.     1439.        0.      378.       56.     680.20
     0.37       0.0      8.20      0.0     0.080     0.030     0.080     0.030    [illegible]   2006.55
 0.001823      268.      338.     388.         2         0         0       0.0    184.76   2191.31

*SECNO 4.820
   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        QLOSS    BANK ELEV
   Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA      LEFT/RIGHT
   TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN       SSTA
   SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID      ENDST

     4.82      9.62    677.22      0.0       0.0.    678.55      1.33      0.72      0.08    679.12
   11800.        0.    11800.       0.         0.     1277.        0.      388.       58.     679.30
     0.38       0.0      9.24      0.0     0.080     0.030     0.080     0.030    667.60   2003.30
 0.002556      268.      338.     388.         2         0         0       0.0    176.76   2180.06

*SECNO 5.000

3265 DIVIDED FLOW

                VALLEY SECTION E

     5.00     10.33    678.03      0.0       0.0.    679.56      1.53      0.95      0.04    676.40
   11800.      110.    11690.       0.        43.     1174.        0.      398.       59.     677.50
     0.39      2.54      9.96      0.01     0.050     0.030     0.070     0.030    667.70   1945.03
 0.003097      268.      338.     388.         2         0         0       0.0    210.02   2168.37

*SECNO 5.130

3301 HV CHANGED MORE THAN HVTNS

     5.13     11.60    679.30      0.0       0.0.    680.23      0.93      0.61      0.06    675.46
   11800.      187.    11605.       8.       111.     1487.        9.      408.       61.     676.75
     0.40      1.69      7.80      0.88     0.050     0.030     0.070     0.030    667.70   1942.25
 0.001356      350.      313.     275.         2         0         0       0.0    229.93   2172.18

*SECNO 5.250
     5.25     12.07    679.77      0.0       0.0.    680.64      0.87      0.40      0.01    675.36
   11800.      235.    11548.      18.       135.     1530.       17.      420.       63.     676.24
     0.42      1.74      7.55      1.03     0.050     0.030     0.070     0.030    667.70   1938.75
 0.001195      350.      313.     275.         2         0         0       0.0    233.42   2172.16

*SECNO 5.500
     5.50     12.80    680.50      0.0       0.0.    681.47      0.96      0.80      0.03    675.93
   11800.      180.    11579.      42.        94.     1457.       43.      444.       66.     677.78
     0.44      1.91      7.94      0.97     0.050     0.030     0.070     0.030    667.70   1958.79
 0.001377      700.      625.     550.         2         0         0       0.0    229.87   2188.66

*SECNO 5.750
   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        QLOSS    BANK ELEV
```

TIME	VLOB	VCH	VRCB	XNL	XNCH	XNR	WTR	ELMIN	SSTA
SLOPF	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORA	TOPWID	ENDST
5.75	13.65	681.35	0.0	0.0	682.41	1.07	0.[illegible]	0.03	676.49
11800.	62.	11679.	59.	31.	1403.	51.	4[illegible]	49.	676.12
0.46	2.02	8.33	1.15	0.050	0.030	0.070	0.[illegible]	667.70	1987.37
0.001554	700.	625.	550.	2	0	0	0.[illegible]	196.06	2183.43

*SECNO 6.000

3265 DIVIDED FLOW

VALLEY SECTION F (SOUTH STUDY LIMIT)

6.00	14.61	682.31	0.0	0.0	683.37	1.06	0.[illegible]	0.00	677.20
11800.	39.	11622.	138.	20.	1394.	112.	48[illegible]	12.	677.40
0.48	1.93	8.34	1.24	0.050	0.030	0.070	0.[illegible]	667.70	1992.00
0.001515	700.	625.	550.	2	0	0	0.[illegible]	255.00	2380.22

*

THIS RUN EXECUTED 10/17/79

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**********************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED  AUG1977
  ERROR CORR -  01,02
  MODIFICATION -  50,51,52,53
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NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

THORNAPPLE RIVER

SUMMARY PRINTOUT TABLE 110

SECNO	CWSEL	DIFKWS	EG	TOPWID	QLOB	QCH	QROB	PERFNC	STENCL	STCHL	STCHR	STENCR
1.000	668.47	0.0	669.09	397.38	38.41	11617.90	143.68	0.0	0.0	2000.00	2274.00	0.0
2.000	672.08	0.0	672.63	275.08	83.63	11678.75	37.62	0.0	0.0	2000.00	2233.00	0.0
3.000	673.88	0.0	674.36	318.55	36.44	11939.36	224.20	0.0	0.0	2000.00	2235.00	0.0
3.200	674.16	0.0	674.72	327.27	275.95	11609.92	114.13	0.0	0.0	2000.00	2213.50	0.0
3.400	674.87	0.0	675.18	249.70	69.97	11568.46	141.56	0.0	0.0	2000.00	2192.00	0.0
3.600	674.90	0.0	675.68	312.05	251.12	11199.69	349.19	0.0	0.0	2000.00	2170.50	0.0
3.800	675.27	0.0	676.36	222.57	60.84	11965.80	173.35	0.06	0.0	2000.00	2149.00	0.0
3.900	676.10	0.0	676.63	221.42	0.0	11800.00	0.0	0.0	0.0	2000.00	2228.00	0.0
4.000	676.07	0.0	676.66	221.33	0.0	11800.00	0.0	0.0	0.0	2000.00	2228.00	0.0
4.100	676.08	0.0	676.72	207.30	0.0	11800.00	0.0	0.0	0.0	2000.00	2228.00	0.0
4.200	676.16	0.0	676.75	207.67	0.0	11800.00	0.0	0.0	0.0	2000.00	2228.00	0.0
4.300	676.21	0.0	676.79	207.86	0.0	11800.00	0.0	0.0	0.0	2000.00	2228.00	0.0
4.470	676.40	0.0	677.17	194.52	0.0	11800.00	0.0	0.0	0.0	2000.00	2213.00	0.0
4.650	676.70	0.0	677.74	184.76	0.0	11800.00	0.0	0.0	0.0	2000.00	2198.00	0.0
4.820	677.22	0.0	678.55	176.76	0.0	11800.00	0.0	0.0	0.0	2000.00	2183.00	0.0
5.000	678.03	0.0	679.56	210.02	109.92	11690.08	0.00	0.0	0.0	2000.00	2168.00	0.0
5.130	679.30	0.0	680.23	229.93	187.46	11604.73	7.80	0.0	0.0	2000.00	2165.25	0.0
5.250	679.77	0.0	680.64	233.42	234.70	11547.76	17.53	0.0	0.0	2000.00	2162.50	0.0
5.500	680.50	0.0	681.47	229.87	179.70	11578.65	41.64	0.0	0.0	2000.00	2157.00	0.0
5.750	681.35	0.0	682.41	196.06	62.00	11678.95	59.05	0.0	0.0	2000.00	2151.50	0.0

SECNO	CWSEL	DIFKWS	EG	TOPWID	GLOB	OCH	GROB	PERENC	STENCL	STCHL	STCHR	STENCR
6.000	682.31	0.0	683.37	255.00	39.39	11622.7	138.23	0.0	0.0	2000.00	2146.00	0.0

THORNAPPLE RIVER

SUMMARY PRINTOUT TABLE 150

SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	WSEL	CRIWS	FG	10K*S	VCH	AREA	.01K
1.000	0.0	0.0	0.0	660.60	11800.00	668.47	0.0	669.09	13.19	6.36	1980.17	3249.68
2.000	3360.00	0.0	0.0	662.50	11800.00	672.08	0.0	672.63	8.60	5.98	2034.16	4024.27
3.000	2200.00	0.0	0.0	663.10	11800.00	673.88	0.0	674.36	7.13	5.59	2306.22	4817.87
3.200	440.00	0.0	0.0	663.90	11800.00	674.16	0.0	674.72	8.44	6.09	2182.53	4062.42
3.400	440.00	0.0	0.0	664.49	11800.00	674.47	0.0	675.18	10.50	6.82	1861.99	3641.26
3.600	440.00	0.0	0.0	665.07	11800.00	674.90	0.0	675.68	11.55	7.26	1958.23	3472.75
3.800	440.00	0.0	0.0	665.50	11800.00	675.27	0.0	676.36	15.42	8.46	1530.17	3004.71
3.900	100.00	0.0	0.0	665.00	11800.00	676.10	0.0	676.63	7.73	5.87	2008.63	4243.76
4.000	1.00	684.90	680.60	665.00	11800.00	676.07	0.0	676.66	9.03	6.16	1916.90	3927.21
4.100	38.00	681.00	683.60	665.10	11800.00	676.08	0.0	676.72	9.70	6.46	1827.26	3787.94
4.200	1.00	0.0	0.0	665.10	11800.00	676.16	0.0	676.75	8.11	6.11	1929.73	4143.29
4.300	50.00	0.0	0.0	665.10	11800.00	676.21	0.0	676.79	8.09	6.11	1932.08	4149.23
4.470	337.50	0.0	0.0	666.12	11800.00	676.40	0.0	677.17	11.86	7.05	1672.87	3425.90
4.650	337.50	0.0	0.0	666.86	11800.00	676.70	0.0	677.74	18.23	8.20	1438.69	2764.06
4.820	337.50	0.0	0.0	667.60	11800.00	677.22	0.0	678.55	25.56	9.24	1276.64	2334.16
5.000	337.50	0.0	0.0	667.70	11800.00	678.03	0.0	679.56	30.97	9.96	1217.43	2120.50
5.130	312.50	0.0	0.0	667.70	11800.00	679.30	0.0	680.23	13.56	7.80	1607.06	3204.18
5.250	312.50	0.0	0.0	667.70	11800.00	679.77	0.0	680.64	11.95	7.55	1682.06	3413.62
5.500	625.00	0.0	0.0	667.70	11800.00	680.50	0.0	681.47	13.77	7.94	1594.85	3179.88
5.750	625.00	0.0	0.0	667.70	11800.00	681.35	0.0	682.41	15.54	8.33	1484.92	2993.79
6.000	625.00	0.0	0.0	667.70	11800.00	682.31	0.0	683.37	15.15	8.34	1526.12	3031.74

SYSTEM ID IP - TP CLASS A COMPLETION STATUS C0000

THORNAPPLE RIVER
CALEDONIA TOWNSHIP
KENT COUNTY

Encroachment Run Upstream
La Barge Dam

THIS RUN EXECUTED 10/17/79

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**************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED  AUG1977
  ERROR CORR -  01,02
  MODIFICATION -  50,51,52,53
**************************************************

T1      CALEDONIA KENT
T2      APPROXIMATE 100 YR LEVEL
T3      THORNAPPLE RIVER      STUDY 2

J1  ICHECK     INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ
        0.       4.        0.        0.  0.0           0.0       0.0       0.    703.300     0.0
J2  NPROF      IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE
    1.000      0.0      -1.000     0.0       0.0       0.0       0.0       0.0       0.0       15.000
J3  VARIABLE CODES FOR SUMMARY PRINTOUT
  110.000   150.000   200.000     0.0       0.0       0.0       0.0       0.0       0.0       0.0

QT      5.000  5700.000  9730.000 11550.000 16920.000 11550.000     0.0       0.0       0.0       0.0
NC      0.070     0.060     0.030     0.100     0.300     0.0       0.0       0.0       0.0       0.0
ET      0.0       0.0       0.0       0.0       0.0       9.100     0.0       0.0    2000.000  2300.000

X1     11.000    30.000  2000.000  2182.000  7250.000  7800.000  7500.000     0.0       0.0       0.0
GR    714.600  1958.000   697.700  1988.000   693.100  2000.000   691.100  2005.000   690.100  2011.000
GR    689.700  2021.000   689.100  2031.000   689.000  2041.000   689.800  2057.000   688.900  2061.000
GR    689.100  2071.000   689.500  2081.000   689.600  2091.000   689.500  2101.000   689.600  2111.000
GR    689.500  2121.000   689.400  2131.000   689.700  2141.000   691.500  2151.000   691.900  2161.000
GR    691.700  2171.000   692.600  2176.000   693.200  2182.000   695.800  2212.000   697.900  2291.000
GR    700.400  2306.000   701.300  2436.000   702.700  2480.000   713.200  2526.000   718.900  2564.000
NC      0.080     0.080     0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
ET      0.0       0.0       0.0       0.0       0.0       9.100     0.0       0.0    2000.000  2180.000

X1     11.800    26.000  2000.000  2152.000  1224.000   949.000  1074.000     0.0       0.0       0.0
GR    713.700  1844.000   709.400  1947.000   702.200  1972.000   693.500  2000.000   691.300  2005.000
GR    690.300  2010.000   689.600  2020.000   689.500  2030.000   689.700  2040.000   689.900  2050.000
GR    690.100  2060.000   690.000  2070.000   690.300  2080.000   691.000  2090.000   690.800  2100.000
GR    690.600  2110.000   689.000  2120.000   688.800  2130.000   689.100  2140.000   693.500  2152.000
GR    696.000  2187.000   703.500  2214.000   709.100  2322.000   708.700  2338.000   711.000  2417.000
GR    712.200  2440.000     0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
NC      0.0       0.0       0.0       0.300     0.500     0.0       0.0       0.0       0.0       0.0

X1     11.900    27.000  2000.000  2152.000   375.000   375.000   375.000     0.0       0.0       0.0
GR    715.000  1810.000   711.000  1897.000   708.100  2000.000   694.400  2000.000   691.400  2007.000
GR    690.300  2012.000   689.200  2022.000   689.300  2032.000   689.700  2042.000   689.900  2052.000
GR    689.900  2062.000   689.800  2072.000   690.300  2082.000   689.700  2092.000   690.600  2102.000
GR    690.600  2112.000   690.800  2122.000   690.100  2152.000   690.000  2142.000   693.500  2152.000
GR    708.100  2152.000   707.900  2157.000   708.500  2295.000   708.400  2322.000   706.300  2336.000
GR    708.600  2348.000   713.300  2432.000     0.0       0.0       0.0       0.0       0.0       0.0

X1     12.000    0.0       0.0       0.0       1.000     1.000     1.000     0.0       0.0       0.0
BT      9.000  1897.000   711.000     0.0    2000.000   708.100   694.400  2000.000   708.100   707.200
       -2.000   708.100   707.200  2152.000   708.100   693.500  2157.000   707.900     0.0    2295.000
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BT	708.500	0.0	2322.000	708.400	0.0	4338.000	706.300	0.0	0.0	0.0
X1	12.100	27.000	2000.000	2152.000	20.000	20.000	20.000	0.0	0.0	0.0
BT	9.000	1897.000	711.000	0.0	2000.000	[illegible]	694.400	2000.000	708.100	707.200
BT	2152.000	708.100	707.200	2152.000	708.100	[illegible]	2157.000	707.900	0.0	2295.000
BT	708.500	0.0	2322.000	708.400	0.0	[illegible]	706.300	0.0	0.0	0.0
GR	715.000	1810.000	711.000	1897.000	708.100	[illegible]	694.400	2000.000	690.900	2010.000
GR	689.900	2020.000	688.800	2028.000	688.700	[illegible]	689.800	2050.000	689.700	2060.000
GR	690.000	2070.000	690.300	2080.000	690.100	[illegible]	690.700	2100.000	691.500	2110.000
GR	691.100	2120.000	690.600	2130.000	690.400	[illegible]	691.200	2150.000	691.500	2152.000
GR	708.100	2152.000	707.900	2157.000	708.500	[illegible]	708.400	2322.000	706.300	2336.000
GR	708.600	2348.000	713.300	2452.000	0.0	[illegible]	0.0	0.0	0.0	0.0
X1	12.200	0.0	0.0	0.0	1.000	[illegible]	1.000	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	0.0	[illegible]	0.0	0.0	2000.000	2152.000
X1	12.300	25.000	2000.000	2152.000	50.000	[illegible]	50.000	0.0	0.0	0.0
GR	715.000	1810.000	711.000	1897.000	708.100	[illegible]	690.900	2010.000	689.900	2020.000
GR	688.800	2028.000	688.700	2040.000	689.800	[illegible]	689.700	2060.000	690.000	2070.000
GR	690.300	2080.000	690.100	2090.000	690.700	[illegible]	691.000	2110.000	691.100	2120.000
GR	690.600	2130.000	690.400	2140.000	691.200	[illegible]	691.500	2152.000	707.900	2157.000
GR	708.500	2295.000	708.400	2322.000	706.300	[illegible]	708.600	2348.000	713.300	2452.000
NC	0.070	0.070	0.030	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	0.0	9.100	0.0	0.0	1980.000	2195.000
X1	12.800	29.000	2000.000	2189.000	2280.000	[illegible]	2530.000	0.0	0.0	0.0
GR	718.100	1838.000	718.000	1874.000	711.200	[illegible]	703.600	1951.000	700.100	1980.000
GR	698.500	1991.000	694.400	2000.000	692.300	[illegible]	690.700	2010.000	690.200	2020.000
GR	689.900	2030.000	690.800	2040.000	691.600	[illegible]	691.600	2060.000	691.600	2070.000
GR	691.400	2080.000	691.400	2090.000	691.500	[illegible]	691.600	2110.000	691.300	2120.000
GR	690.600	2130.000	690.300	2140.000	689.900	[illegible]	690.000	2160.000	690.100	2170.000
GR	694.500	2189.000	698.100	2202.000	706.500	[illegible]	723.300	2230.000	0.0	0.0
NC	0.0	0.0	0.0	0.300	0.500	[illegible]	0.0	0.0	0.0	0.0
X1	12.900	29.000	2000.000	2350.000	70.000	[illegible]	70.000	0.0	0.0	0.0
GR	707.800	1711.000	709.200	1863.000	711.500	[illegible]	705.400	2000.000	690.000	2044.000
GR	690.500	2068.000	690.500	2068.100	690.600	[illegible]	690.600	2072.100	691.100	2110.000
GR	691.000	2138.000	691.000	2138.100	691.000	[illegible]	691.000	2142.100	690.800	2170.000
GR	691.000	2218.000	691.000	2218.100	691.000	[illegible]	691.000	2222.100	691.000	2230.000
GR	690.300	2278.000	690.300	2278.100	690.200	[illegible]	690.200	2282.100	690.000	2293.000
GR	711.200	2350.000	717.300	2350.000	720.000	[illegible]	726.800	2670.000	0.0	0.0
X1	13.000	0.0	0.0	0.0	1.000	[illegible]	1.000	0.0	0.0	0.0
BT	22.000	1863.000	709.200	0.0	2000.000	[illegible]	711.500	0.0	2000.000	711.500	708.000
BT	2068.000	712.600	709.100	2068.100	712.600	[illegible]	690.500	2072.000	712.700	690.600	2072.100
BT	712.700	709.200	2138.000	713.800	710.300	[illegible]	2138.100	713.800	691.000	2142.000	713.900
BT	691.000	2142.100	713.900	710.400	2218.000	[illegible]	710.000	711.500	2218.100	715.000	691.000
BT	2222.000	715.100	691.000	2222.100	715.100	[illegible]	711.600	2278.000	716.200	712.700	2278.100
BT	716.200	690.300	2282.000	716.300	690.200	[illegible]	2282.100	716.300	712.800	2350.000	717.300
BT	713.800	2350.000	717.300	0.0	2475.000	[illegible]	720.000	0.0	0.0	0.0	0.0
X1	13.100	0.0	0.0	0.0	37.000	[illegible]	37.000	37.000	0.0	0.0	0.0
X2	0.0	0.0	0.0	0.0	0.0	[illegible]	0.0	1.000	0.0	0.0	0.0
X1	13.200	0.0	0.0	0.0	1.000	[illegible]	1.000	1.000	0.0	0.0	0.0
X1	13.300	0.0	0.0	0.0	50.000	[illegible]	50.000	50.000	0.0	0.0	0.0
NC	0.080	0.080	0.030	0.100	0.300	[illegible]	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	0.0	[illegible]	9.100	0.0	0.0	1950.000	2300.000

X1	14.000	39.000	2000.000	2168.000	3450.000	3850.000	3800.000	0.0	0.0	0.0
GR	718.900	1834.000	715.300	1840.000	709.100	1850.000	702.100	1869.000	697.700	1879.000
GR	696.100	1969.000	696.300	2000.000	693.300	2008.000	692.400	2013.000	692.000	2023.000
GR	691.600	2033.000	691.600	2043.000	691.700	2053.000	691.600	2063.000	691.300	2073.000
GR	691.300	2083.000	691.000	2093.000	690.900	2103.000	690.900	2113.000	691.000	2123.000
GR	691.100	2133.000	691.300	2143.000	691.700	2152.000	695.100	2160.000	696.200	2168.000
GR	697.400	2175.000	701.700	2191.000	700.900	2254.000	700.200	2306.000	701.000	2317.000
GR	703.900	2324.000	696.000	2334.000	695.600	2362.000	698.700	2365.000	704.300	2409.000
GR	709.000	2526.000	706.600	2613.000	706.100	2701.000	715.800	2790.000	0.0	0.0
EJ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

*PROF 1

CCHV= 0.100 CEHV= 0.300
*SECNO 11.000

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	AL	QLOSS	BANK ELEV	
Q	GLOB	OCH	GROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT	
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA	
SLOPF	XLOBI	XLCH	XLOBR	ITRIAL	IDC	ICCNT	CORAR	TOPWID	FNDST	
11.00	14.40	703.30	0.0	703.30	703.54	0.24	0.0	0.0	693.10	
11550.	130.	10048.	1371.	123.	2419.	1212.	0.	0.	693.20	
0.0	1.06	4.15	1.13	0.070	0.030	0.060	0.0	688.90	1978.06	
0.000225	7250.	7500.	7800.	0	0	0	0.0	504.57	2482.63	

FLOW DISTRIBUTION FOR SECNO= 11.00 CWSEL= 703.30

STA=	1978.	1988.	2000.	2182.	2212.	2291.	2360.	2436.	2480.	2483.
PER Q=	0.1	1.0	87.0	3.6	5.7	0.5	1.9	0.2	0.0	
AREA=	27.8	94.2	2819.1	264.0	509.6	62.3	318.5	57.2	0.8	
VEL=	0.6	1.2	4.2	1.6	1.3	0.9	0.7	0.4	0.2	

*SECNO 11.800

11.80	14.68	703.48	0.0	0.0	703.89	0.42	0.30	0.05	693.50	
11550.	174.	10828.	548.	160.	2027.	406.	76.	9.	693.50	
0.06	1.09	5.34	1.35	0.080	0.030	0.080	0.030	688.80	1967.57	
0.000373	1224.	1074.	949.	2	0	0	0.0	246.35	2213.91	

FLOW DISTRIBUTION FOR SECNO= 11.80 CWSEL= 703.48

STA=	1968.	2000.	2152.	2187.	2214.
PER Q=	1.5	93.7	4.0	0.7	
AREA=	160.4	2026.8	305.4	100.6	
VEL=	1.1	5.3	1.5	0.8	

CCHV= 0.300 CEHV= 0.500
*SECNO 11.900

11.90	14.39	703.59	0.0	0.0	704.10	0.51	0.16	0.04	708.10	
11550.	0.	11550.	0.	0.	2023.	0.	96.	11.	708.10	
0.08	0.0	5.71	0.0	0.080	0.030	0.080	0.030	689.20	2000.00	
0.000500	375.	375.	375.	0	0	0	0.0	152.00	2152.00	

FLOW DISTRIBUTION FOR SECNO= 11.90 CWSEL= 703.59

STA=	2000.	2152.	
PER Q=	100.0		
AREA=	2022.8		
VEL=	5.7		

*SECNO 12.000

3370 NORMAL BRIDGE,NRD= 9 MIN ELTRD= 706.30 MAX ELLC= 707.20

12.00	14.39	703.59	0.0	0.0	704.10	0.51	0.00	0.00	708.10	
11550.	0.	11550.	0.	0.	2024.	0.	96.	11.	708.10	
0.08	0.0	5.71	0.0	0.080	0.030	0.080	0.030	689.20	2000.00	
0.000499	1.	1.	1.	0	0	0	0.0	152.00	2152.00	

FLOW DISTRIBUTION FOR SECNO= 12.00 CWSEL= 703.59

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STA=     2000.     2152.
  PER Q=     100.0
   AREA=    2023.6
    VEL=       5.7

*SECNO 12.100
   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS    BANK ELEV
   Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA      LEFT/RIGHT
   TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN       SSTA
   SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID      FNDST

3370 NORMAL BRIDGE,NRD=  9 MIN ELTRD=  706.30 MAX FLLC=  707.[illegible]

    12.10     14.90    703.60      0.0       0.0    704.11      0.[illegible]      0.01      0.00    708.10
   11550.        0.   11550.        0.        0.     2013.        [illegible]       .97.       11.    708.10
     0.08       0.0      5.74      0.0     0.080     0.030     0.08[illegible]     0.030    688.70   2000.00
 0.000513       20.       20.       20.         0         0         [illegible]       0.0    152.00   2152.00

FLOW DISTRIBUTION FOR SECNO=      12.10          CWSEL=     703.[illegible]

STA=     2000.     2152.
  PER Q=     100.0
   AREA=    2013.2
    VEL=       5.7

*SECNO 12.200
    12.20     14.90    703.60      0.0       0.0    704.11      0.[illegible]      0.00      0.00    708.10
   11550.        0.   11550.        0.        0.     2013.        [illegible]       .97.       11.    708.10
     0.08       0.0      5.74      0.0     0.080     0.030     0.08[illegible]     0.030    688.70   2000.00
 0.000514        1.        1.        1.         0         0         [illegible]       0.0    152.00   2152.00

FLOW DISTRIBUTION FOR SECNO=      12.20          CWSEL=     703.60

STA=     2000.     2152.
  PER Q=     100.0
   AREA=    2012.9
    VEL=       5.7

*SECNO 12.300
    12.30     14.91    703.61      0.0       0.0    704.15      0.[illegible]      0.03      0.01    708.10
   11550.        0.   11537.       13.        0.     1958.        [illegible]       100.       11.    691.50
     0.08       0.0      5.89     0.60     0.080     0.030     0.0[illegible]     0.030    688.70   2002.60
 0.000489       50.       50.       50.         1         0         [illegible]       0.0    153.09   2155.70

FLOW DISTRIBUTION FOR SECNO=      12.30          CWSEL=     703.61

STA=     2003.     2152.     2156.
  PER Q=      99.9       0.1
   AREA=    1958.1      22.4
    VEL=       5.9       0.6

CCHV=    0.100 CEHV=    0.300
*SECNO 12.800
    12.80     14.83    704.73      0.0       0.0    705.01      0.2[illegible]      0.84      0.03    694.40
   11550.      209.   11176.      165.      220.     2575.       141.      242.       23.    694.50
     0.25      0.95      4.34     1.17     0.070     0.030     0.0[illegible]     0.030    689.90   1947.44
 0.000238     2280.     2530.    2680.         2         0         [illegible]       0.0    264.03   2211.47

FLOW DISTRIBUTION FOR SECNO=      12.80          CWSEL=     704.[illegible]

STA=     1947.     1980.     1991.     2000.     2189.     2202.     2211.
  PER Q=       0.5       0.5       0.8      96.8       1.3       0.2
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AREA=	85.5	59.7	74.5	2574.7	109.6	51.4
VEL=	0.6	1.0	1.3	4.3	1.3	0.6

CCHV= 0.300 CEHV= 0.500

*SECNO 12.900

12.90	14.95	704.95	0.0	0.0	705.07	0.12	0.01	0.05	711.50
11550.	0.	11550.	0.	0.	4155.	0.	248.	23.	717.30
0.25	0.0	2.78	0.0	0.070	0.030	0.070	0.030	690.00	2001.28
0.000111	70.	70.	70.	2	0	0	0.0	331.92	2333.20

FLOW DISTRIBUTION FOR SECNO= 12.90 CWSEL= 704.95

STA= 2001. 2350.
PER Q= 100.0
AREA= 4155.5
VEL= 2.8

*SECNO 13.000

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	GLOB	QCH	QROB	ALOB	ACH	AROB	WOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3370 NORMAL BRIDGE,NRD= 22 MIN ELTRD= 709.20 MAX ELLC= 713.80

13.00	14.94	704.94	0.0	0.0	705.08	0.13	0.00	0.01	711.50
11550.	0.	11550.	0.	0.	3927.	0.	248.	23.	717.30
0.25	0.0	2.94	0.0	0.070	0.030	0.070	0.030	690.00	2001.28
0.000133	1.	1.	1.	0	0	0	228.03	331.92	2333.20

FLOW DISTRIBUTION FOR SECNO= 13.00 CWSEL= 704.94

STA= 2001. 2350.
PER Q= 100.0
AREA= 3927.3
VEL= 2.9

*SECNO 13.100

3370 NORMAL BRIDGE,NRD= 22 MIN ELTRD= 709.20 MAX ELLC= 713.80

13.10	14.95	704.95	0.0	0.0	705.08	0.13	0.00	0.00	711.50
11550.	0.	11550.	0.	0.	3926.	0.	251.	24.	717.30
0.26	0.0	2.94	0.0	0.070	0.030	0.070	0.030	690.00	2001.29
0.000134	37.	37.	37.	0	0	0	227.98	331.90	2333.19

FLOW DISTRIBUTION FOR SECNO= 13.10 CWSEL= 704.95

STA= 2001. 2350.
PER Q= 100.0
AREA= 3926.4
VEL= 2.9

*SECNO 13.200

13.20	14.97	704.97	0.0	0.0	705.09	0.12	0.00	0.00	711.50
11550.	0.	11550.	0.	0.	4150.	0.	251.	24.	717.30
0.26	0.0	2.78	0.0	0.070	0.030	0.070	0.030	690.00	2001.26
0.000110	1.	1.	1.	1	0	0	0.0	331.96	2333.22

FLOW DISTRIBUTION FOR SECNO= 13.20 CWSEL= 704.97

STA= 2001. 2350.

```
  PER Q=     100.0
   AREA=    4157.6
    VEL=       2.8

*SECNO 13.300
    13.30     14.97    704.97      0.0       0.0.    705.09      0.[illegible]      0.05      0.08    711.50
   11550.        0.    11550.       0.        0.     4163.      [illegible]      [illegible]      24.    717.30
     0.26       0.0      2.77      0.0     0.070     0.030      0.0[illegible]     0.030    690.00   2001.22
 0.000110       50.       50.       50.         0         0                 0.0    332.05   2333.26

FLOW DISTRIBUTION FOR SECNO=      13.30          CWSEL=     704.[illegible]

STA=     2001.     2350.
  PER Q=     100.0
   AREA=    4162.8
    VEL=       2.8

CCHV=    0.100 CEHV=    0.300
*SECNO 14.000
    14.00     14.57    705.47      0.0       0.0    705.68      0.[illegible]      0.56      0.03    696.30
   11550.     1252.     9208.     1090.     1130.     2282.     129[illegible]      639.       63.    696.20
     0.57      1.11      4.03      0.84     0.080     0.030      0.0[illegible]     0.030    690.90   1859.85
 0.000207     3450.     3800.     3850.         2         0                 0.0    578.30   2438.15

FLOW DISTRIBUTION FOR SECNO=      14.00          CWSEL=     705.[illegible]

STA=     1860.     1969.     2000.     2168.     2306.     2362.     [illegible]438.
  PER Q=       7.9       2.9      79.7       4.6       3.6       1.[illegible]
   AREA=     842.5     287.4    2282.1     674.1     400.7     216.[illegible]
    VEL=       1.1       1.2       4.0       0.8       1.0       0.[illegible]
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                                                                                                THIS RUN EXECUTED   10/17/79
*****************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED  AUG1977
  ERROR CORR -  01,02
  MODIFICATION -  50,51,52,53
*****************************************************

T1
T2
T3

J1  ICHECK     INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ
     -10.       6.        0.        0.   0.0           0.0       0.0       0.    703.300    0.0
J2  NPROF      IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE
     15.000     0.0      -1.000     0.0       0.0       0.0       0.0       0.0       0.0       0.0
*PROF 2

CCHV=   0.100 CEHV=   0.300
*SECNO 11.000
   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS    BANK ELEV
   Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA    LEFT/RIGHT
   TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMTN      SSTA
   SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID     ENDST

3470 ENCROACHMENT STATIONS=     2000.0     2300.0  TYPE=      1  TARGET=      300.000
    11.00     14.40    703.30      0.0    703.30    703.56      0.26      0.0       0.0.    693.10
   11550.        0.    10367.     1183.       0.     2419.      815.       0.        .0.     693.20
     0.0       0.0      4.29      1.45     0.070     0.030     0.060     0.0     688.90   2000.00
 0.000257     7250.     7500.     7800.        0         0         0      0.0     300.00   2300.00

*SECNO 11.800

3470 ENCROACHMENT STATIONS=     2000.0     2180.0  TYPE=      1  TARGET=      180.000
    11.80     14.71    703.51      0.0    703.48    703.97      0.46      0.35      0.06    693.50
   11550.        0.    11195.      355.       0.     2032.      252.       .66.       .6.     693.50
     0.05       0.0      5.51      1.41     0.080     0.030     0.080     0.030    688.80   2000.00
 0.000430     1224.     1074.      949.        2         0         0      0.0     180.00   2180.00

CCHV=   0.300 CEHV=   0.500
*SECNO 11.900
    11.90     14.46    703.66      0.0    703.59    704.16      0.50      0.17      0.02    708.10
   11550.        0.    11550.       0.        0.     2034.        0.       .85.       .7.     708.10
     0.07       0.0      5.68      0.0     0.080     0.030     0.080     0.030    689.20   2000.00
 0.000491      375.      375.      375.        2         0         0      0.0     152.00   2152.00

*SECNO 12.000

3370 NORMAL BRIDGE,NRD=  9 MIN ELTRD=  706.30 MAX FLLC=  707.20

    12.00     14.46    703.66      0.0    703.59    704.16      0.50      0.00      0.0.    708.10
   11550.        0.    11550.       0.        0.     2034.        0.       .85.       .7.     708.10
     0.07       0.0      5.68      0.0     0.080     0.030     0.080     0.030    689.20   2000.00
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0.000491	1.	1.	1.	0	0	0	0.0	152.00	2152.00	

*SECNO 12.100

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	QLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST
12.10	14.97	703.67	0.0	703.60	704.17	0.00	0.01	0.00	708.10
11550.	0.	11550.	0.	0.	2023.	0	86.	7.	708.10
0.07	0.0	5.71	0.0	0.080	0.030	0.00	0.030	688.70	2000.00
0.000505	20.	20.	20.	0	0	0	0.0	152.00	2152.00

*SECNO 12.200

12.20	14.97	703.67	0.0	703.60	704.17	0.00	0.00	0.00	708.10
11550.	0.	11550.	0.	0.	2023.	0	86.	7.	708.10
0.07	0.0	5.71	0.0	0.080	0.030	0.00	0.030	688.70	2000.00
0.000506	1.	1.	1.	0	0	0	0.0	152.00	2152.00

*SECNO 12.300

3470 ENCROACHMENT STATIONS= 2000.0 2152.0 TYPE= 1. TARGET= 152.000

12.30	14.98	703.68	0.0	703.61	704.21	0.00	0.03	0.01	708.10
11550.	0.	11550.	0.	0.	1968.	0	88.	7.	100000.00
0.08	0.0	5.87	0.0	0.080	0.030	0.00	0.030	688.70	2002.57
0.000533	50.	50.	50.	1	0	0	0.0	149.43	2152.00

CCHV= 0.100 CEHV= 0.300

*SECNO 12.800

3470 ENCROACHMENT STATIONS= 1980.0 2195.0 TYPE= 1. TARGET= 215.000

12.80	14.92	704.82	0.0	704.73	705.11	0.00	0.87	0.02	694.40
11550.	145.	11359.	46.	136.	2591.	511	226.	18.	694.50
0.24	1.07	4.38	0.81	0.070	0.030	0.00	0.030	689.90	1980.00
0.000241	2280.	2530.	2680.	2	0	0	0.0	215.00	2195.00

CCHV= 0.300 CEHV= 0.500

*SECNO 12.900

12.90	15.06	705.06	0.0	704.95	705.17	0.00	0.01	0.05	711.50
11550.	0.	11550.	0.	0.	4190.	0	232.	18.	717.30
0.25	0.0	2.76	0.0	0.070	0.030	0.00	0.030	690.00	2000.98
0.000108	70.	70.	70.	2	0	0	0.0	332.50	2333.48

*SECNO 13.000

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	QLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3370 NORMAL BRIDGE,NRD= 22 MIN ELTRD= 709.20 MAX ELLC= 713.

13.00	15.05	705.05	0.0	704.94	705.18	0.00	0.00	0.01	711.50
11550.	0.	11550.	0.	0.	3960.	0	232.	18.	717.30
0.25	0.0	2.92	0.0	0.070	0.030	0.00	0.030	690.00	2000.98
0.000130	1.	1.	1.	0	0	0	-229.68	332.49	2333.48

*SECNO 13.100

3370 NORMAL BRIDGE,NRD= 22 MIN ELTRD= 709.20 MAX ELLC= 713.80

13.10	15.05	705.05	0.0	704.95	705.19	0.13	0.00	0.00	711.50
11550.	0.	11550.	0.	0.	3959.	0.	235.	19.	717.30
0.25	0.0	2.92	0.0	0.070	0.030	0.070	0.030	690.00	2000.99
0.000150	37.	37.	37.	0	0	0	229.84	332.48	2333.47

*SECNO 13.200

13.20	15.07	705.07	0.0	704.97	705.19	0.12	0.00	0.00	711.50
11550.	0.	11550.	0.	0.	4192.	0.	235.	19.	717.30
0.25	0.0	2.76	0.0	0.070	0.030	0.070	0.030	690.00	2000.97
0.000108	1.	1.	1.	1	0	0	0.0	332.53	2333.50

*SECNO 13.300

13.30	15.08	705.08	0.0	704.97	705.19	0.12	0.01	0.00	711.50
11550.	0.	11550.	0.	0.	4197.	0.	240.	19.	717.30
0.25	0.0	2.75	0.0	0.070	0.030	0.070	0.030	690.00	2000.92
0.000107	50.	50.	50.	0	0	0	0.0	332.62	2333.54

CCHV= 0.100 CEHV= 0.300

*SECNO 14.000

3470 ENCROACHMENT STATIONS= 1950.0 2300.0 TYPE= 1. TARGET= 350.000

14.00	14.66	705.56	0.0	705.47	705.85	0.29	0.60	0.05	696.30
11550.	565.	10419.	566.	467.	2247.	654.	571.	49.	696.20
0.51	1.21	4.54	0.87	0.080	0.030	0.080	0.030	690.90	1950.00
0.000259	3450.	3800.	3850.	2	0	0	0.0	350.00	2300.00

THIS RUN EXECUTED 10/17/79

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HEC2 RELEASE DATED NOV 76 UPDATED AUG1977
ERROR CORR - 01,02
MODIFICATION - 50,51,52,53
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NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

THORNAPPLE RIVER ST

SUMMARY PRINTOUT TABLE 110

SECNO	CWSEL	DIFKWS	EG	TOPWID	QLOB	QCH	QROB	PERENC	STENCL	STCHL	STCHR	STENCR
11.000	703.30	0.0	703.54	504.57	130.35	10048.30	1171.35	0.0	0.0	2000.00	2162.00	0.0
11.000	703.30	0.0	703.56	300.00	0.0	10366.73	1183.27	300.00	2000.00	2000.00	2162.00	2300.00
11.800	703.48	0.0	703.89	246.35	174.06	10827.63	548.32	0.0	0.0	2000.00	2152.00	0.0
11.800	703.51	0.03	703.97	180.00	0.0	11194.59	355.40	180.00	2000.00	2000.00	2152.00	2160.00
11.900	703.59	0.0	704.10	152.00	0.0	11550.00	0.0	0.0	0.0	2000.00	2152.00	0.0
11.900	703.66	0.07	704.16	152.00	0.0	11550.00	0.0	0.0	0.0	2000.00	2152.00	0.0
12.000	703.59	0.0	704.10	152.00	0.0	11550.00	0.0	0.0	0.0	2000.00	2152.00	0.0
12.000	703.66	0.07	704.16	152.00	0.0	11550.00	0.0	0.0	0.0	2000.00	2152.00	0.0
12.100	703.60	0.0	704.11	152.00	0.0	11550.00	0.0	0.0	0.0	2000.00	2152.00	0.0
12.100	703.67	0.07	704.17	152.00	0.0	11550.00	0.0	0.0	0.0	2000.00	2152.00	0.0
12.200	703.60	0.0	704.11	152.00	0.0	11550.00	0.0	0.0	0.0	2000.00	2152.00	0.0
12.200	703.67	0.07	704.17	152.00	0.0	11550.00	0.0	0.0	0.0	2000.00	2152.00	0.0
12.300	703.61	0.0	704.19	153.09	0.0	11536.56	13.45	0.0	0.0	2000.00	2152.00	0.0
12.300	703.68	0.07	704.21	149.43	0.0	11550.00	0.0	152.00	2000.00	2000.00	2152.00	2152.00
12.800	704.73	0.0	705.01	264.03	209.[illegible]	11175.[illegible]	165.07	0.0	0.0	2000.00	2189.00	0.0
12.800	704.82	0.09	705.11	215.00	144.[illegible]	11359.19	45.84	215.00	1980.00	2000.00	2189.00	2195.00
12.900	704.95	0.0	705.07	331.92	0.0	11550.00	0.0	0.0	0.0	2000.00	2350.00	0.0
12.900	705.06	0.10	705.17	332.50	0.0	11550.00	0.0	0.0	0.0	2000.00	2350.00	0.0
13.000	704.94	0.0	705.08	331.92	0.0	11550.00	0.0	0.0	0.0	2000.00	2350.00	0.0
13.000	705.05	0.10	705.18	332.49	0.0	11550.00	0.0	0.0	0.0	2000.00	2350.00	0.0
13.100	704.95	0.0	705.08	331.90	0.0	11550.00	0.0	0.0	0.0	2000.00	2350.00	0.0
13.100	705.05	0.10	705.19	332.48	0.0	11550.00	0.0	0.0	0.0	2000.00	2350.00	0.0
13.200	704.97	0.0	705.09	331.96	0.0	11550.00	0.0	0.0	0.0	2000.00	2350.00	0.0
13.200	705.07	0.10	705.19	332.53	0.0	11550.00	0.0	0.0	0.0	2000.00	2350.00	0.0
13.300	704.97	0.0	705.09	332.05	0.0	11550.00	0.0	0.0	0.0	2000.00	2350.00	0.0
13.300	705.08	0.10	705.19	332.62	0.0	11550.00	0.0	0.0	0.0	2000.00	2350.00	0.0

SECNO	CWSEL	DIFKWS	EG	TOPWID	QLOB	QCH	QROB	PERENC	STENCL	STCHL	STCHR	STENCR
14.000	705.47	0.0	705.68	576.30	1252.12	708.04	1089.84	0.0	0.0	2000.00	2168.00	0.0
14.000	705.56	0.09	705.85	350.00	565.17	518.62	566.21	350.00	1950.00	2000.00	2168.00	2300.00

THORNAPPLE RIVER ST

SUMMARY PRINTOUT TABLE 150

SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10K*S	VCH	AREA	.01K
11.000	7500.00	0.0	0.0	688.90	11550.00	703.30	0.0	703.54	2.25	4.15	3754.00	7706.55
11.000	7500.00	0.0	0.0	688.90	11550.00	703.30	0.0	703.56	2.57	4.29	3234.46	7201.76
11.800	1074.00	0.0	0.0	688.80	11550.00	703.48	0.0	703.89	3.73	5.34	2593.19	5982.03
11.800	1074.00	0.0	0.0	688.80	11550.00	703.51	0.0	703.97	4.30	5.51	2284.06	5568.00
11.900	375.00	0.0	0.0	689.20	11550.00	703.59	0.0	704.10	5.00	5.71	2022.81	5166.58
11.900	375.00	0.0	0.0	689.20	11550.00	703.66	0.0	704.16	4.91	5.68	2033.83	5210.67
12.000	1.00	706.30	707.20	689.20	11550.00	703.59	0.0	704.10	4.99	5.71	2023.55	5169.55
12.000	1.00	706.30	707.20	689.20	11550.00	703.66	0.0	704.16	4.91	5.68	2033.83	5210.67
12.100	20.00	706.30	707.20	688.70	11550.00	703.60	0.0	704.11	5.13	5.74	2013.16	5097.10
12.100	20.00	706.30	707.20	688.70	11550.00	703.67	0.0	704.17	5.05	5.71	2023.40	5137.75
12.200	1.00	0.0	0.0	688.70	11550.00	703.60	0.0	704.11	5.14	5.74	2012.90	5096.07
12.200	1.00	0.0	0.0	688.70	11550.00	703.67	0.0	704.17	5.06	5.71	2023.11	5136.57
12.300	50.00	0.0	0.0	688.70	11550.00	703.61	0.0	704.15	4.89	5.89	1980.45	5222.47
12.300	50.00	0.0	0.0	688.70	11550.00	703.68	0.0	704.21	5.33	5.87	1968.04	5003.52
12.800	2530.00	0.0	0.0	689.90	11550.00	704.73	0.0	705.01	2.38	4.34	2935.39	7484.40
12.800	2530.00	0.0	0.0	689.90	11550.00	704.82	0.0	705.11	2.41	4.38	2784.17	7442.55
12.900	70.00	0.0	0.0	690.00	11550.00	704.95	0.0	705.07	1.11	2.78	4155.46	10983.21
12.900	70.00	0.0	0.0	690.00	11550.00	705.06	0.0	705.17	1.08	2.76	4189.77	11121.37
13.000	1.00	709.20	713.80	690.00	11550.00	704.94	0.0	705.08	1.33	2.94	3927.30	9996.69
13.000	1.00	709.20	713.80	690.00	11550.00	705.05	0.0	705.18	1.30	2.92	3959.96	10123.43
13.100	37.00	709.20	713.80	690.00	11550.00	704.95	0.0	705.08	1.34	2.94	3926.38	9993.10
13.100	37.00	709.20	713.80	690.00	11550.00	705.05	0.0	705.19	1.30	2.92	3959.11	10120.12
13.200	1.00	0.0	0.0	690.00	11550.00	704.97	0.0	705.09	1.10	2.78	4157.64	10991.98
13.200	1.00	0.0	0.0	690.00	11550.00	705.07	0.0	705.19	1.08	2.76	4191.87	11129.87
13.300	50.00	0.0	0.0	690.00	11550.00	704.97	0.0	705.09	1.10	2.77	4162.79	11012.67
13.300	50.00	0.0	0.0	690.00	11550.00	705.08	0.0	705.19	1.07	2.75	4197.03	11150.68
14.000	3800.00	0.0	0.0	690.90	11550.00	705.47	0.0	705.68	2.07	4.03	4703.64	8027.43
14.000	3800.00	0.0	0.0	690.90	11550.00	705.56	0.0	705.85	2.59	4.54	3417.89	7171.49

THORNAPPLE RIVER ST

SUMMARY PRINTOUT TABLE 150

SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWTD	XLCH
11.000	11550.00	703.30	0.0	0.0	0.0	504.57	7500.00
11.000	11550.00	703.50	0.0	0.0	0.0	500.00	7500.00
11.800	11550.00	703.48	0.0	0.18	0.0	346.35	1074.00
11.800	11550.00	703.51	0.03	0.21	0.03	180.00	1074.00
11.900	11550.00	703.59	0.0	0.12	0.0	152.00	375.00
11.900	11550.00	703.66	0.07	0.15	0.07	152.00	375.00
12.000	11550.00	703.59	0.0	0.00	0.0	152.00	1.00
12.000	11550.00	703.66	0.07	0.00	0.07	152.00	1.00
12.100	11550.00	703.60	0.0	0.01	0.0	152.00	20.00
12.100	11550.00	703.67	0.07	0.01	0.07	152.00	20.00
12.200	11550.00	703.60	0.0	0.00	0.0	152.00	1.00
12.200	11550.00	703.67	0.07	0.00	0.07	152.00	1.00
12.300	11550.00	703.61	0.0	0.01	0.0	153.09	50.00
12.300	11550.00	703.68	0.07	0.01	0.07	149.43	50.00
12.800	11550.00	704.73	0.0	1.12	0.0	264.03	2530.00
12.800	11550.00	704.82	0.09	1.14	0.09	215.00	2530.00
12.900	11550.00	704.95	0.0	0.22	0.0	331.92	70.00
12.900	11550.00	705.06	0.10	0.24	0.10	332.50	70.00
13.000	11550.00	704.94	0.0	-0.01	0.0	331.92	1.00
13.000	11550.00	705.05	0.10	-0.01	0.10	332.49	1.00
13.100	11550.00	704.95	0.0	0.00	0.0	331.90	37.00
13.100	11550.00	705.05	0.10	0.00	0.10	332.48	37.00
13.200	11550.00	704.97	0.0	0.02	0.0	331.96	1.00
13.200	11550.00	705.07	0.10	0.02	0.10	332.53	1.00
13.300	11550.00	704.97	0.0	0.01	0.0	332.05	50.00
13.300	11550.00	705.08	0.10	0.01	0.10	332.62	50.00
14.000	11550.00	705.47	0.0	0.50	0.0	578.30	3800.00
14.000	11550.00	705.56	0.09	0.48	0.09	350.00	3800.00

SUMMARY OF ERRORS



1) COUNTY: KENT

2) STUDY NAME: CALEDONIA TOWNSHIP

3) WATERCOURSE: THORNAPPLE RIVER

4) DOCUMENT TYPE: MULTIPLE PROFILE SUMMARIES



Thornapple River
Caledonia Township
Multiple Profile Run
Study I (Downstream)

THIS RUN EXECUTED 06/28/79

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**********************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED  AUG1977
  ERROR CORR =  01,02
  MODIFICATION =  50,51,52,53
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NOTE= ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

THORNAPPLE RIVER

SUMMARY PRINTOUT TABLE 150

SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10K*S	VCH	AREA	.01K
1.000	0.0	0.0	0.0	660.60	5830.00	666.17	0.0	666.54	13.54	4.86	1215.64	1584.15
1.000	0.0	0.0	0.0	660.60	9950.00	667.83	0.0	668.38	13.26	5.96	1742.76	2732.45
1.000	0.0	0.0	0.0	660.60	11800.00	668.47	0.0	669.09	13.19	6.36	1930.97	3249.68
1.000	0.0	0.0	0.0	660.60	17300.00	670.12	0.0	670.92	12.99	7.31	2654.26	4799.71
2.000	3360.00	0.0	0.0	662.50	5830.00	669.50	0.0	669.79	7.22	4.29	1378.65	2169.12
2.000	3360.00	0.0	0.0	662.50	9950.00	671.38	0.0	671.85	8.24	5.52	1848.96	3465.48
2.000	3360.00	0.0	0.0	662.50	11800.00	672.08	0.0	672.63	8.60	5.98	2037.16	4024.27
2.000	3360.00	0.0	0.0	662.50	17300.00	673.85	0.0	674.63	9.51	7.15	2564.67	5608.55
3.000	2200.00	0.0	0.0	663.10	5830.00	671.04	0.0	671.31	6.64	4.16	1438.44	2261.83
3.000	2200.00	0.0	0.0	663.10	9950.00	673.10	0.0	673.52	6.99	5.20	2059.40	3763.19
3.000	2200.00	0.0	0.0	663.10	11800.00	673.88	0.0	674.36	7.13	5.59	2304.44	4417.87
3.000	2200.00	0.0	0.0	663.10	17300.00	675.85	0.0	676.51	7.58	6.60	2945.84	6281.74
3.200	440.00	0.0	0.0	663.90	5830.00	671.33	0.0	671.64	7.91	4.55	1348.74	2073.08
3.200	440.00	0.0	0.0	663.90	9950.00	673.39	0.0	673.87	8.29	5.67	1936.63	3454.91
3.200	440.00	0.0	0.0	663.90	11800.00	674.16	0.0	674.72	8.44	6.09	2182.63	4062.42
3.200	440.00	0.0	0.0	663.90	17300.00	676.15	0.0	676.89	8.83	7.13	2874.83	5822.90
3.400	440.00	0.0	0.0	664.49	5830.00	671.66	0.0	672.04	9.45	5.01	1198.34	1896.49
3.400	440.00	0.0	0.0	664.49	9950.00	673.70	0.0	674.31	10.15	6.32	1675.49	3123.60
3.400	440.00	0.0	0.0	664.49	11800.00	674.47	0.0	675.18	10.50	6.82	1861.95	3641.26
3.400	440.00	0.0	0.0	664.49	17300.00	676.41	0.0	677.41	11.40	8.11	2364.43	5124.69
3.600	440.00	0.0	0.0	665.07	5830.00	672.05	0.0	672.50	10.66	5.42	1167.62	1785.57
3.600	440.00	0.0	0.0	665.07	9950.00	674.12	0.0	674.81	11.33	6.77	1721.06	2956.11
3.600	440.00	0.0	0.0	665.07	11800.00	674.90	0.0	675.68	11.55	7.26	1955.63	3472.75
3.600	440.00	0.0	0.0	665.07	17300.00	676.90	0.0	677.93	12.07	8.48	2623.06	4979.92
3.800	440.00	0.0	0.0	665.50	5830.00	672.48	0.0	673.06	12.97	6.10	980.45	1618.96
3.800	440.00	0.0	0.0	665.50	9950.00	674.51	0.0	675.45	14.78	7.82	1364.37	2587.94
3.800	440.00	0.0	0.0	665.50	11800.00	675.27	0.0	676.36	15.42	8.46	1530.17	3004.71
3.800	440.00	0.0	0.0	665.50	17300.00	677.18	0.0	678.71	17.08	10.10	1984.79	4186.33
3.900	100.00	0.0	0.0	665.00	5830.00	672.93	0.0	673.23	7.07	4.41	1324.83	2192.06
3.900	100.00	0.0	0.0	665.00	9950.00	675.23	0.0	675.69	7.53	5.48	1816.82	3624.99
3.900	100.00	0.0	0.0	665.00	11800.00	676.10	0.0	676.63	7.73	5.87	2005.43	4243.76
3.900	100.00	0.0	0.0	665.00	17300.00	678.32	0.0	679.06	8.38	6.90	2507.26	5977.10

SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10K*S	VCH	ARE*	.01K
4.000	1.00	684.90	680.60	665.00	5830.00	672.92	0.0	673.25	8.28	4.63	1250.[illegible]	2026.35
4.000	1.00	684.90	680.60	665.00	9950.00	675.20	0.0	675.72	8.81	5.74	1732.[illegible]	3352.79
4.000	1.00	684.90	680.60	665.00	11800.00	676.07	0.0	676.66	9.03	6.16	1916.[illegible]	3927.21
4.000	1.00	684.90	680.60	665.00	17300.00	678.29	0.0	679.10	9.72	7.21	2398.[illegible]	5548.67
4.100	38.00	681.00	683.60	665.10	5830.00	672.94	0.0	673.29	8.21	4.76	1223.[illegible]	2034.99
4.100	38.00	681.00	683.60	665.10	9950.00	675.21	0.0	675.77	9.32	6.01	1656.[illegible]	3258.78
4.100	38.00	681.00	683.60	665.10	11800.00	676.08	0.0	676.72	9.70	6.46	1827.[illegible]	3787.94
4.100	38.00	681.00	683.60	665.10	17300.00	678.28	0.0	679.18	10.66	7.60	2277.[illegible]	5299.72
4.200	1.00	0.0	0.0	665.10	5830.00	672.98	0.0	673.30	6.89	4.52	1290.[illegible]	2221.84
4.200	1.00	0.0	0.0	665.10	9950.00	675.29	0.0	675.79	7.79	5.69	1749.[illegible]	3564.79
4.200	1.00	0.0	0.0	665.10	11800.00	676.16	0.0	676.75	8.11	6.11	1922.[illegible]	4143.29
4.200	1.00	0.0	0.0	665.10	17300.00	678.41	0.0	679.21	9.05	7.19	2406.[illegible]	5749.51
4.300	50.00	0.0	0.0	665.10	5830.00	673.02	0.0	673.34	6.88	4.52	1290.[illegible]	2222.20
4.300	50.00	0.0	0.0	665.10	9950.00	675.33	0.0	675.83	7.77	5.68	1751.[illegible]	3568.97
4.300	50.00	0.0	0.0	665.10	11800.00	676.21	0.0	676.79	8.09	6.11	1932.[illegible]	4149.23
4.300	50.00	0.0	0.0	665.10	17300.00	678.45	0.0	679.25	8.86	7.18	2409.[illegible]	5811.98
4.470	337.50	0.0	0.0	666.12	5830.00	673.22	0.0	673.67	11.63	5.40	1071.[illegible]	1709.82
4.470	337.50	0.0	0.0	666.12	9950.00	675.52	0.0	676.20	11.73	6.62	1504.[illegible]	2905.21
4.470	337.50	0.0	0.0	666.12	11800.00	676.40	0.0	677.17	11.86	7.05	1672.[illegible]	3425.90
4.470	337.50	0.0	0.0	666.12	17300.00	678.64	0.0	679.68	12.36	8.17	2119.[illegible]	4920.64
4.650	337.50	0.0	0.0	666.86	5830.00	673.57	0.0	674.25	20.57	6.62	880.[illegible]	1285.42
4.650	337.50	0.0	0.0	666.86	9950.00	675.84	0.0	676.77	18.54	7.76	1281.[illegible]	2310.68
4.650	337.50	0.0	0.0	666.86	11800.00	676.70	0.0	677.74	18.23	8.20	1439.[illegible]	2764.06
4.650	337.50	0.0	0.0	666.86	17300.00	678.92	0.0	680.27	17.84	9.31	1858.[illegible]	4095.99
4.820	337.50	0.0	0.0	667.60	5830.00	674.26	0.0	675.15	30.00	7.56	771.[illegible]	1064.38
4.820	337.50	0.0	0.0	667.60	9950.00	676.39	0.0	677.59	26.44	8.80	1130.[illegible]	1934.95
4.820	337.50	0.0	0.0	667.60	11800.00	677.22	0.0	678.55	25.56	9.24	1276.[illegible]	2334.16
4.820	337.50	0.0	0.0	667.60	17300.00	679.39	0.0	681.06	23.95	10.37	1672.[illegible]	3535.32
5.000	337.50	0.0	0.0	667.70	5830.00	675.29	0.0	676.30	36.77	8.09	722.[illegible]	961.41
5.000	337.50	0.0	0.0	667.70	9950.00	677.25	0.0	678.64	32.75	9.48	1068.[illegible]	1738.76
5.000	337.50	0.0	0.0	667.70	11800.00	678.03	0.0	679.56	30.97	9.96	1217.[illegible]	2120.50
5.000	337.50	0.0	0.0	667.70	17300.00	680.13	0.0	681.95	26.54	10.98	1705.[illegible]	3358.43
5.130	312.50	0.0	0.0	668.15	5830.00	676.46	0.0	677.05	15.38	6.18	945.[illegible]	1486.37
5.130	312.50	0.0	0.0	668.15	9950.00	678.46	0.0	679.39	16.46	7.75	1325.[illegible]	2452.32
5.130	312.50	0.0	0.0	668.15	11800.00	679.24	0.0	680.30	16.64	8.31	1491.[illegible]	2892.78
5.130	312.50	0.0	0.0	668.15	17300.00	681.24	0.0	682.65	17.02	9.68	1968.[illegible]	4193.48
5.250	312.50	0.0	0.0	667.76	5830.00	676.99	0.0	677.45	10.02	5.44	1084.[illegible]	1841.66
5.250	312.50	0.0	0.0	667.76	9950.00	679.09	0.0	679.83	11.30	6.95	1518.[illegible]	2960.20
5.250	312.50	0.0	0.0	667.76	11800.00	679.90	0.0	680.75	11.66	7.49	1697.[illegible]	3456.33
5.250	312.50	0.0	0.0	667.76	17300.00	681.97	0.0	683.13	12.40	8.81	2219.[illegible]	4913.05
5.500	625.00	0.0	0.0	666.22	5830.00	677.60	0.0	677.94	5.98	4.69	1288.[illegible]	2383.70
5.500	625.00	0.0	0.0	666.22	9950.00	679.84	0.0	680.41	7.27	6.11	1790.[illegible]	3691.26
5.500	625.00	0.0	0.0	666.22	11800.00	680.70	0.0	681.35	7.61	6.60	2011.[illegible]	4277.88
5.500	625.00	0.0	0.0	666.22	17300.00	682.90	0.0	683.78	8.30	7.78	2671.[illegible]	6006.09

SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	FG	10K*S	VCH	APP	.01K
5.750	625.00	0.0	0.0	664.68	5830.00	677.98	0.0	678.26	4.32	4.28	141	2803.93
5.750	625.00	0.0	0.0	664.68	9950.00	680.32	0.0	680.81	5.62	5.70	190	4196.86
5.750	625.00	0.0	0.0	664.68	11800.00	681.20	0.0	681.78	6.06	6.23	210	4794.37
5.750	625.00	0.0	0.0	664.68	17300.00	683.43	0.0	684.27	7.09	7.54	270	6496.30
6.000	625.00	0.0	0.0	663.00	5830.00	678.26	0.0	678.49	2.98	3.83	170	3378.92
6.000	625.00	0.0	0.0	663.00	9950.00	680.76	0.0	681.12	4.04	5.03	255	4951.17
6.000	625.00	0.0	0.0	663.00	11800.00	681.70	0.0	682.12	4.35	5.42	293	5659.11
6.000	625.00	0.0	0.0	663.00	17300.00	684.13	0.0	684.66	4.97	6.32	396	7758.21

SYSTEM ID TP - TP CLASS A COMPLETION STATUS C0000

THORNAPPLE RIVER
CALEDONIA TOWNSHIP
KENT COUNTY

Multiple Profile Run
Upstream La Barge Dam

THIS RUN EXECUTED 10/17/79

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**********************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED  AUG1977
  ERROR CORR =  01,02
  MODIFICATION =  50,51,52,53
**********************************************************
```

NOTE= ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

THORNAPPLE RIVER ST

SUMMARY PRINTOUT TABLE 150

SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	WSEL	CRIWS	EG	10K*S	VCH	AREA	.01K
0.0	0.0	0.0	0.0	688.00	5700.00	699.90	0.0	699.91	0.12	0.84	6795.47	16806.52
0.0	0.0	0.0	0.0	688.00	9730.00	702.40	0.0	702.42	0.17	1.18	8368.47	23483.72
0.0	0.0	0.0	0.0	688.00	11550.00	703.30	0.0	703.33	0.20	1.31	8947.08	26113.81
0.0	0.0	0.0	0.0	688.00	16920.00	705.60	0.0	705.64	0.26	1.66	10455.00	33356.19
11.000	7500.00	0.0	0.0	688.90	5700.00	700.04	0.0	700.16	1.61	2.92	2316.90	4490.92
11.000	7500.00	0.0	0.0	688.90	9730.00	702.58	0.0	702.78	1.94	3.77	3395.07	6902.11
11.000	7500.00	0.0	0.0	688.90	11550.00	703.51	0.0	703.73	2.11	4.07	3858.35	7948.91
11.000	7500.00	0.0	0.0	688.90	16920.00	705.86	0.0	706.16	2.37	4.79	5065.52	11001.67
11.800	1074.00	0.0	0.0	688.80	5700.00	700.20	0.0	700.39	2.44	3.58	1823.09	3651.93
11.800	1074.00	0.0	0.0	688.80	9730.00	702.75	0.0	703.09	3.22	4.78	2416.96	5423.16
11.800	1074.00	0.0	0.0	688.80	11550.00	703.67	0.0	704.07	3.54	5.26	2640.76	6134.95
11.800	1074.00	0.0	0.0	688.80	16920.00	705.98	0.0	706.58	4.34	6.46	3280.51	8125.09
11.900	375.00	0.0	0.0	689.20	5700.00	700.29	0.0	700.50	3.00	3.75	1519.96	3293.32
11.900	375.00	0.0	0.0	689.20	9730.00	702.86	0.0	703.26	4.24	5.09	1910.78	4725.45
11.900	375.00	0.0	0.0	689.20	11550.00	703.78	0.0	704.27	4.79	5.63	2051.09	5279.93
11.900	375.00	0.0	0.0	689.20	16920.00	706.09	0.0	706.86	6.26	7.04	2404.31	6760.41
12.000	1.00	706.30	707.20	689.20	5700.00	700.29	0.0	700.50	2.99	3.75	1520.87	3296.44
12.000	1.00	706.30	707.20	689.20	9730.00	702.86	0.0	703.26	4.23	5.09	1911.85	4729.61
12.000	1.00	706.30	707.20	689.20	11550.00	703.78	0.0	704.27	4.78	5.63	2051.61	5282.03
12.000	1.00	706.30	707.20	689.20	16920.00	706.09	0.0	706.86	6.27	7.04	2403.11	6755.16
12.100	20.00	706.30	707.20	688.70	5700.00	700.29	0.0	700.51	3.10	3.78	1509.85	3238.15
12.100	20.00	706.30	707.20	688.70	9730.00	702.86	0.0	703.27	4.36	5.12	1901.28	4660.04
12.100	20.00	706.30	707.20	688.70	11550.00	703.78	0.0	704.28	4.92	5.66	2041.18	5208.53
12.100	20.00	706.30	707.20	688.70	16920.00	706.10	0.0	706.88	6.43	7.07	2393.01	6671.85
12.200	1.00	0.0	0.0	688.70	5700.00	700.29	0.0	700.51	3.10	3.78	1509.66	3237.52
12.200	1.00	0.0	0.0	688.70	9730.00	702.87	0.0	703.27	4.36	5.12	1901.02	4659.05
12.200	1.00	0.0	0.0	688.70	11550.00	703.79	0.0	704.28	4.92	5.66	2040.84	5207.20
12.200	1.00	0.0	0.0	688.70	16920.00	706.10	0.0	706.88	6.43	7.07	2392.60	6670.09
12.300	50.00	0.0	0.0	688.70	5700.00	700.30	0.0	700.53	3.03	3.88	1477.98	3276.88
12.300	50.00	0.0	0.0	688.70	9730.00	702.88	0.0	703.30	4.18	5.26	1867.61	4758.77
12.300	50.00	0.0	0.0	688.70	11550.00	703.80	0.0	704.32	4.68	5.81	2008.47	5339.92
12.300	50.00	0.0	0.0	688.70	16920.00	706.11	0.0	706.93	5.99	7.24	2366.28	6914.26

SECNO	XLCH	ELTRD	ELLC	FLMIN	Q	CWSEL	CRIWS	EG	10K*Q	VCH	AREA	.01K
12.800	2530.00	0.0	0.0	689.90	5700.00	700.98	0.0	701.12	1.76	3.01	1994.89	4298.46
12.800	2530.00	0.0	0.0	689.90	9730.00	703.83	0.0	704.06	2.14	3.93	2699.16	6665.18
12.800	2530.00	0.0	0.0	689.90	11550.00	704.87	0.0	705.15	2.30	4.29	2972.97	7620.75
12.800	2530.00	0.0	0.0	689.90	16920.00	707.53	0.0	707.93	2.66	5.20	3693.70	10376.04
12.900	70.00	0.0	0.0	690.00	5700.00	701.09	0.0	701.15	0.80	1.96	2914.19	6370.12
12.900	70.00	0.0	0.0	690.00	9730.00	704.01	0.0	704.11	0.99	2.53	3845.58	9759.71
12.900	70.00	0.0	0.0	690.00	11550.00	705.09	0.0	705.21	1.07	2.75	4200.80	11165.91
12.900	70.00	0.0	0.0	690.00	16920.00	707.85	0.0	708.02	1.23	3.30	5131.12	15246.06
13.000	1.00	709.20	713.80	690.00	5700.00	701.08	0.0	701.15	0.97	2.07	2747.98	5776.15
13.000	1.00	709.20	713.80	690.00	9730.00	704.01	0.0	704.12	1.20	2.68	3632.50	8875.18
13.000	1.00	709.20	713.80	690.00	11550.00	705.08	0.0	705.21	1.29	2.91	3970.55	10164.62
13.000	1.00	709.20	713.80	690.00	16920.00	707.84	0.0	708.03	1.48	3.48	4856.77	13911.73
13.100	37.00	709.20	713.80	690.00	5700.00	701.09	0.0	701.15	0.97	2.07	2747.88	5775.68
13.100	37.00	709.20	713.80	690.00	9730.00	704.01	0.0	704.12	1.20	2.68	3631.89	8872.92
13.100	37.00	709.20	713.80	690.00	11550.00	705.09	0.0	705.22	1.29	2.91	3969.62	10161.02
13.100	37.00	709.20	713.80	690.00	16920.00	707.84	0.0	708.03	1.48	3.49	4855.16	13904.66
13.200	1.00	0.0	0.0	690.00	5700.00	701.10	0.0	701.16	0.80	1.96	2914.11	6369.83
13.200	1.00	0.0	0.0	690.00	9730.00	704.03	0.0	704.12	0.99	2.53	3847.55	9767.35
13.200	1.00	0.0	0.0	690.00	11550.00	705.10	0.0	705.22	1.07	2.75	4203.00	11174.80
13.200	1.00	0.0	0.0	690.00	16920.00	707.87	0.0	708.04	1.23	3.29	5138.77	15280.75
13.300	50.00	0.0	0.0	690.00	5700.00	701.10	0.0	701.16	0.80	1.95	2918.43	6388.47
13.300	50.00	0.0	0.0	690.00	9730.00	704.03	0.0	704.13	0.99	2.53	3851.94	9784.37
13.300	50.00	0.0	0.0	690.00	11550.00	705.11	0.0	705.23	1.06	2.74	4207.99	11194.98
13.300	50.00	0.0	0.0	690.00	16920.00	707.88	0.0	708.04	1.22	3.29	5140.97	15290.71
14.000	3800.00	0.0	0.0	690.90	5700.00	701.50	0.0	701.64	1.97	3.13	2569.71	4056.08
14.000	3800.00	0.0	0.0	690.90	9730.00	704.49	0.0	704.67	1.98	3.76	4148.11	6907.50
14.000	3800.00	0.0	0.0	690.90	11550.00	705.59	0.0	705.79	2.00	3.99	4773.12	8169.70
14.000	3800.00	0.0	0.0	690.90	16920.00	708.41	0.0	708.65	2.00	4.52	6785.53	11956.73



1) COUNTY: KENT

2) STUDY NAME: CALEDONIA TOWNSHIP

3) WATERCOURSE: THORNAPPLE RIVER

4) DOCUMENT TYPE: REPORT



HYDRAULIC ANALYSIS REPORT

THORNAPPLE RIVER, CALEDONIA TOWNSHIP

KENT COUNTY, MICHIGAN

Prepared by

COMMONWEALTH ASSOCIATES INC.
209 East Washington
Jackson, Michigan 49201

July, 1979

Introduction

Hydraulic calculations were performed for the Thornapple River within Caledonia Township limits. The reaches of the Thornapple River studied in detail were the north township line to 2.15 miles upstream, and 6.05 miles to 7.57 miles upstream from the north township boundary. The remaining portion of the river was studied by approximate methods. Field cross section data were surveyed by Commonwealth Associates in January, 1979. The flows for the 10, 50, 100, and 500-year recurrence intervals were approved by the Michigan Department of Natural Resources. A 7.5 minute series topographic map with a 10-foot contour interval was used.

This study was performed by Commonwealth Associates Inc. of Jackson, Michigan. The Project Manager was R. F. Tribukait, P.E.

Method of Analysis

The HEC-2 computer program was utilized for those areas studied in detail.

Variables and Coefficients

Manning's Roughness Coefficient

For Channel	0.03
For Overbanks	0.06 - 0.08

Coefficients for Floodway

Contraction	0.10
Expansion	0.30

Coefficients for Bridges

Contraction	0.30
Expansion	0.50

Ratios

Contraction	1:1
Expansion	1:4

High Water Marks

The proposed profiles compare well with the high water mark of 676.0 feet, recorded in 1947, as indicated on Kent County Road Commission Drawing B2 of 41-6-22. The high water mark, recorded on the previous 68th Street bridge crossing, for the 1947 flood level corresponds to a flow less than the 100-year level and greater than the 50-year level as interpolated from the gaging station data listed in Reference 1. The increase in area provided by the new 68th Street bridge makes the computed profile elevations consistent with the recorded high water mark. The computed water surface elevations for the 50 and 100-year profiles at the 68th Street bridge are 675.2 and 676.1, respectively.

Starting Conditions

The starting water surface elevation for detailed Study I, the downstream portion of the study, was specified by the slope area method. A starting slope of .00089 foot per feet was used. The starting water surface elevations were varied by 2 feet from the slope-area depth to ensure that the water surfaces converged at the downstream limit of the study. The starting water surface elevation for detailed Study II, the upstream portion of the study, was based on Figure 1 which plots flow versus water surface elevation at the Labarge Dam. The calculation sheets associated with Figure 1 are attached as Appendix A.

Special Problems

No special problems were encountered in this report.

CROSS SECTION REFERENCE

Cross Section ID in Profile/Table	Sec. No. in HEC-2 Program	Description
A	1	North Study Limit
B	2	Valley Section
C	3	Valley Section
D	4.1	Upstream Face of 68th St. Bridge
E	5	Valley Section
F	6	Valley Section (End Detail Study I)
G	11	Valley Section (Start Detail Study II)
H	12.1	Upstream Face of Alaska St. Bridge
I	12.8	Valley Section (70 Feet Downstream of 100th St. Bridge)
J	13.1	Upstream Face of 100th St. Bridge
K	14	Valley Section (South Limit of Detail Study II)

Bridge Notes and Sketches

Bridge sketches are found in cross-section plots contained in Appendix B.

Map

A copy of the 100-year flood plain, and floodway showing cross sections is contained in Appendix C.

Profiles

Copies of the water surface profiles are contained in Appendix D.

Computer Backwater Runs/Printouts

The final HEC-II printouts for the multiprofile run and floodway run are contained in Appendix E.

Cross Section Plots

Cross section plots showing floodway delineation and approximate 100-year elevation are contained in Appendix B.

References

1. Geological Survey, Water-Supply Paper 1677, p. 142, "Magnitude and Frequency of Floods in the U.S., Part 4., St. Lawrence River Basin."

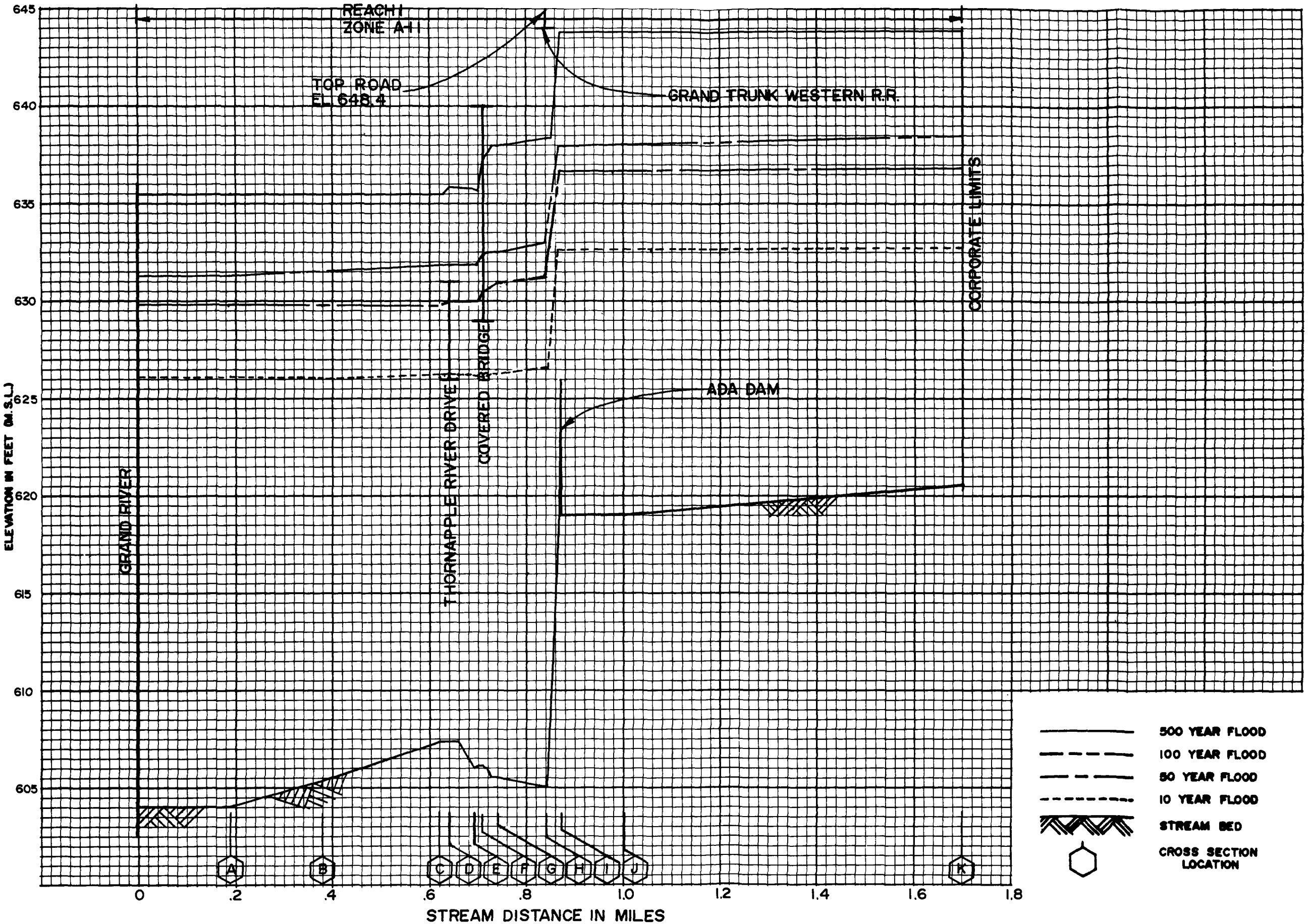
2. "Design of Small Dams," U.S. Department of Interior, Bureau of Reclamation. pp. 378-386.

APPENDIX A

THORNAPPLE CREEK

FLOOD PROFILE

TOWNSHIP OF ADA



1) COUNTY: Kent

2) STUDY NAME: Plainfield Township

3) WATERCOURSE: Grand River

4) DOCUMENT TYPE: 100-year Encroached

H A S P S Y S T E M L O G

```
$ 10.21.20 JOB  61 -- HECB      -- BEGINNING EXEC - INIT D - CLASS C
$*10.22.22 JOB  61 ESTIMATED TIME EXCEEDED
$ 10.24.25 JOB  61 END EXECUTION.

JOB STATS -      323 CARDS READ        1,025 LINES PRINTED        0 CARDS PUNCHED        0 PLOT BLOCKS      3.08 MINS EXEC TIME
//HECB JOB (1575,5458,1,5,,,,3),'DAN62-0104-010(6221)',CLASS=C,TIME=1     JOB 061
//STEP1 EXEC HEC2
XXHEC2 PROC SPACE='TRK,(100,50)'                                          00000010
*************************************************                          00000011
***          WATER SURFACE PROFILES                                       00000020
***        HYDROLOGIC ENGINEERING CENTER                                  00000030
***        U.S.ARMY CORPS OF ENGINEERS                                    00000040
***                          JUNE 1978                                    00000050
***                          G.A. HOGOBOOM                                00000060
*************************************************                          00000061
XXGO EXEC PGM=HEC2,REGION=300K                                            00000070
XXFT05F001 DD DDNAME=SYSIN                                                00000080
XXFT06F001 DD SYSOUT=A                                                    00000090
XXFT91F001 DD UNIT=SYSDA,SPACE=(&SPACE),                                  00000100
IEF653I SUBSTITUTION JCL - UNIT=SYSDA,SPACE=(TRK,(100,50)),
XX      DCB=(RECFM=FB,LRECL=133,BLKSIZE=1330)                             00000110
XXFT92F001 DD UNIT=SYSDA,SPACE=(&SPACE),                                  00000120
IEF653I SUBSTITUTION JCL - UNIT=SYSDA,SPACE=(TRK,(100,50)),
XX      DCB=(RECFM=FB,LRECL=133,BLKSIZE=1330)                             00000130
XXFT93F001 DD UNIT=SYSDA,SPACE=(&SPACE),                                  00000140
IEF653I SUBSTITUTION JCL - UNIT=SYSDA,SPACE=(TRK,(100,50)),
XX      DCB=(RECFM=FB,LRECL=133,BLKSIZE=1330)                             00000150
XXFT94F001 DD UNIT=SYSDA,SPACE=(&SPACE),                                  00000160
IEF653I SUBSTITUTION JCL - UNIT=SYSDA,SPACE=(TRK,(100,50)),
XX      DCB=(RECFM=FB,LRECL=80,BLKSIZE=4240)                              00000170
XXFT95F001 DD UNIT=SYSDA,SPACE=(&SPACE),DCB=(RECFM=VBS,BLKSIZE=1000)      00000180
IEF653I SUBSTITUTION JCL - UNIT=SYSDA,SPACE=(TRK,(100,50)),DCB=(RECFM=VBS,BLKSIZE=1000)
XXFT96F001 DD UNIT=SYSDA,SPACE=(&SPACE),                                  00000190
IEF653I SUBSTITUTION JCL - UNIT=SYSDA,SPACE=(TRK,(100,50)),
XX      DCB=(RECFM=FB,LRECL=133,BLKSIZE=1330)                             00000200
//GO.STEPLIB DD DSN=GAH3781.HEC2.LOAD,DISP=SHR
//SYSIN DD *
//
IEF236I ALLOC. FOR HECB      GO        STEP1
IEF237I 402    ALLOCATED TO FT05F001
IEF237I 502    ALLOCATED TO FT06F001
IEF237I 152    ALLOCATED TO FT91F001
IEF237I 153    ALLOCATED TO FT92F001
IEF237I 156    ALLOCATED TO FT93F001
IEF237I 152    ALLOCATED TO FT94F001
IEF237I 153    ALLOCATED TO FT95F001
IEF237I 154    ALLOCATED TO FT96F001
IEF237I 156    ALLOCATED TO STEPLIB
IEF142I - STEP WAS EXECUTED - COND CODE 0000
IEF285I   SYS79010.T102121.RV000.HECB.R0000002          DELETED
IEF285I   VOL SER NOS= CAI108.
IEF285I   SYS79010.T102121.RV000.HECB.R0000003          DELETED
IEF285I   VOL SER NOS= CAI107.
IEF285I   SYS79010.T102121.RV000.HECB.R0000004          DELETED
IEF285I   VOL SER NOS= CAI104.
IEF285I   SYS79010.T102121.RV000.HECB.R0000005          DELETED
IEF285I   VOL SER NOS= CAI108.
```

COMMONWEALTH ASSOC. INC.
FIS - PLAINFIELD TWP, KENT Co., MI
GRAND RIVER - ENCROACHED 100-YR FLOODWAY
Dan 1-25-79

THIS RUN EXECUTED 01/10/79

```
**************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED  AUG1977
  ERROR CORR -  01,02
  MODIFICATION -  50,51,52,53
**************************************************

C
T1      ENCROACHED 100-YEAR FLOODWAY
T2
T3      GRAND RIVER, PLAINFIELD
```

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
	1.	3.	0.	0.	0.0	0.0	0.0	0.	619.000	0.0

J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	-1.000	0.0	-1.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0

J3	VARIABLE CODES FOR SUMMARY PRINTOUT									
	110.000	150.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

QT	2.000	55000.000	55000.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.100	0.080	0.030	0.100	0.300	0.0	0.0	0.0	0.0	0.0

GRAND RAPIDS CITY-PLAINFIELD TWP LINE

STARTING ELEVATIONS TAKEN FROM FIS OF GRAND RAPIDS CITY

REC INT YEARS	FLOW(CFS)	ELEVATION
10	33000	614.7
50	48000	617.7
100	55000	619.0
500	74000	623.6

X1	42.900	84.000	1500.000	2040.000	0.0	0.0	0.0	0.0	0.0	0.0
X3	0.0	0.0	0.0	1050.000	0.0	2250.000	0.0	0.0	0.0	0.0
GR	623.000	100.000	620.000	150.000	618.000	200.000	616.000	400.000	611.500	800.000
GR	611.000	1100.000	610.800	1190.000	611.000	1220.000	611.200	1250.000	611.000	1350.000
GR	610.800	1400.000	611.400	1450.000	611.400	1500.000	611.000	1510.000	605.000	1525.000
GR	601.000	1540.000	601.000	1558.000	601.000	1580.000	601.000	1600.000	600.300	1670.000
GR	600.000	1680.000	600.000	1700.000	599.900	1710.000	599.400	1730.000	599.400	1750.000
GR	599.000	1770.000	599.000	1800.000	599.300	1820.000	599.000	1830.000	599.000	1860.000
GR	598.000	1870.000	598.000	1900.000	597.000	1930.000	597.900	1940.000	597.900	1990.000
GR	598.700	2000.000	599.400	2010.000	599.200	2020.000	601.000	2023.000	602.000	2024.000
GR	603.000	2026.000	604.000	2029.000	604.700	2030.000	606.700	2040.000	604.700	2050.000
GR	604.700	2105.000	606.000	2110.000	607.000	2114.000	609.000	2120.000	610.000	2130.000
GR	611.300	2150.000	612.000	2175.000	612.000	2190.000	612.400	2200.000	613.000	2210.000
GR	613.000	2280.000	612.600	2300.000	612.000	2335.000	612.000	2400.000	611.700	2435.000
GR	611.400	2450.000	610.900	2480.000	610.900	2530.000	611.000	2540.000	611.000	2570.000
GR	610.500	2610.000	610.000	2640.000	610.500	2660.000	611.000	2670.000	612.000	2700.000
				2800.000	616.400	2900.000	617.000	2950.000	615.000	3080.000
									632.000	3450.000

GR	622.200	3500.000	623.300	3550.000	622.700	3600.000	624.000	3650.000	0.0	0.0
NC	0.100	0.080	0.030	0.0	0.0	0.0	0.0	0.0	0.0	0.0

VALLEY SECTION 43 OF CORPS OF ENGINEERS

X1	43.000	0.0	0.0	0.0	660.000	710.000	660.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	300.000	0.0	2550.000	0.0	0.0	0.0	0.0
NC	0.100	0.080	0.030	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X1	43.900	14.000	2125.000	2710.000	1300.000	2500.000	2000.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	700.000	0.0	3000.000	0.0	0.0	0.0	0.0
GR	630.000	-100.000	620.000	500.000	610.000	1150.000	610.000	2000.000	610.000	2000.000
GR	612.700	2125.000	598.900	2200.000	599.900	2460.000	598.900	2660.000	610.900	2710.000
GR	610.000	2900.000	620.000	3730.000	630.000	3900.000	650.000	3910.000	0.0	0.0
NC	0.100	0.100	0.030	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X1	44.000	43.000	2125.000	2710.000	1200.000	1300.000	1300.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	650.000	0.0	3550.000	0.0	0.0	0.0	0.0
GR	647.000	20.000	639.000	50.000	633.000	100.000	629.000	200.000	628.500	250.000
GR	623.000	350.000	621.400	450.000	618.800	500.000	619.000	550.000	615.500	600.000
GR	615.000	700.000	612.000	850.000	613.000	900.000	613.000	1480.000	612.300	1500.000
GR	613.000	1600.000	615.500	1650.000	608.500	1800.500	609.000	1850.000	609.800	1950.000
GR	612.000	2000.000	613.000	2100.000	613.800	2125.000	600.000	2200.000	601.000	2460.000
GR	600.000	2660.000	612.000	2710.000	612.000	2865.000	609.000	2880.000	609.000	3150.000
GR	610.000	3200.000	610.000	3240.000	609.000	3270.000	609.000	3350.000	611.000	3365.000
GR	614.000	3500.000	616.000	3550.000	621.500	3700.000	621.500	3820.000	623.000	3850.000
GR	625.000	3900.000	627.500	3950.000	628.700	4000.000	0.0	0.0	0.0	0.0
NC	0.100	0.100	0.030	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X1	44.100	15.000	2125.000	2710.000	2000.000	2400.000	2200.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	426.000	0.0	3850.000	0.0	0.0	0.0	0.0
GR	640.000	0.0	630.000	120.000	620.000	420.000	610.000	1600.000	610.000	2100.000
GR	613.800	2125.000	600.000	2200.000	601.000	2460.000	600.000	2660.000	612.000	2710.000
GR	610.000	2800.000	610.000	2950.000	610.000	3780.000	620.000	3850.000	630.000	4000.000
NC	0.100	0.100	0.030	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X1	44.900	27.000	2965.000	3570.000	3300.000	3250.000	3600.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	1300.000	0.0	4100.000	0.0	0.0	0.0	0.0
GR	630.000	1080.000	620.000	1100.000	610.000	2150.000	610.000	2250.000	610.000	2900.000
GR	616.000	2965.000	614.000	2980.000	605.000	2995.000	603.000	3000.000	600.600	3020.000
GR	600.600	3030.000	601.500	3040.000	601.400	3070.000	601.000	3080.000	601.600	3090.000
GR	601.000	3110.000	601.200	3130.000	600.500	3160.000	601.000	3170.000	600.000	3285.000
GR	601.700	3300.000	601.500	3350.000	611.000	3570.000	610.000	4100.000	610.000	4500.000
GR	620.000	4900.000	630.000	5000.000	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.110	0.110	0.033	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X1	45.000	80.000	2965.000	3570.000	1800.000	1600.000	1600.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	680.000	0.0	3670.000	0.0	0.0	0.0	0.0
GR	623.000	0.0	622.800	20.000	618.000	40.000	615.500	100.000	614.800	250.000
GR	614.200	300.000	615.400	350.000	615.000	400.000	615.000	600.000	614.800	640.000
GR	614.200	700.000	612.500	850.000	611.000	863.000	610.000	867.000	611.000	870.000
GR	612.500	900.000	613.000	940.000	613.000	990.000	612.600	1050.000	614.000	1100.000
GR	614.000	1250.000	615.200	1290.000	616.000	1315.000	617.500	1400.000	617.600	1490.000
GR	617.000	1550.000	614.800	1590.000	614.800	1600.000	618.000	1645.000	616.000	1685.000
GR	616.000	1700.000	618.900	1800.000	615.500	1865.000	618.000	1900.000	620.800	1950.000
GR	618.900	2000.000	615.000	2050.000	612.700	2100.000	610.600	2140.000	610.300	2230.000
GR	610.800	2250.000	612.000	2350.000	613.000	2450.000	613.000	2490.000	612.800	2520.000
GR	613.500	2600.000	614.500	2700.000	613.500	2750.000	611.000	2760.000	610.000	2800.000
GR	611.000	2850.000	613.900	2900.000	616.000	2965.000	614.000	2980.000	605.000	2995.000
GR	603.000	3000.000	600.600	3020.000	600.600	3030.000	601.500	3040.000	601.400	3070.000
GR	601.000	3080.000	601.600	3090.000	601.000	3110.000	601.200	3130.000	600.500	3160.000

GR	600.500	3430.000	602.000	3480.000	602.000	3530.000	605.000	3550.000	611.000	3570.000
GR	611.000	3600.000	613.000	3650.000	615.000	3753.000	622.200	3770.000	623.000	3780.000
NC	0.110	0.110	0.033	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X1	45.100	31.000	2965.000	3570.000	1600.000	2600.000	2300.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	400.000	0.0	3600.000	0.0	0.0	0.0	0.0
GR	630.000	-100.000	620.000	0.0	610.000	2850.000	610.000	2850.000	610.000	2850.000
GR	615.800	2965.000	613.800	2980.000	604.800	2995.000	602.800	3000.000	600.400	3020.000
GR	600.400	3030.000	601.300	3040.000	601.200	3070.000	600.800	3080.000	601.400	3090.000
GR	600.800	3110.000	601.000	3130.000	600.300	3160.000	600.800	3170.000	599.800	3285.000
GR	601.500	3300.000	601.300	3350.000	601.300	3380.000	600.300	3430.000	601.800	3480.000
GR	601.800	3530.000	604.800	3550.000	610.800	3570.000	620.000	3750.000	630.000	3830.000
GR	640.000	4000.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.110	0.110	0.033	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X1	45.200	30.000	2965.000	3570.000	1200.000	3300.000	2950.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	1450.000	0.0	4650.000	0.0	0.0	0.0	0.0
GR	630.000	620.000	620.000	700.000	610.000	2900.000	615.600	2965.000	613.600	2980.000
GR	604.600	2995.000	602.600	3000.000	600.200	3020.000	600.200	3030.000	601.100	3040.000
GR	601.000	3070.000	600.600	3080.000	601.200	3090.000	600.600	3110.000	600.800	3130.000
GR	600.100	3160.000	600.600	3170.000	599.600	3285.000	601.300	3300.000	601.100	3350.000
GR	601.100	3380.000	600.100	3430.000	601.600	3480.000	601.600	3530.000	604.600	3550.000
GR	610.600	3570.000	610.000	3600.000	610.000	4400.000	620.000	4800.000	630.000	5200.000
NC	0.110	0.110	0.033	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X1	45.900	33.000	1920.000	2548.000	2150.000	1900.000	2150.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	850.000	0.0	3050.000	0.0	0.0	0.0	0.0
GR	630.000	-100.000	620.000	0.0	610.000	800.000	610.000	1780.000	610.000	1820.000
GR	613.400	1920.000	605.600	1930.000	604.700	1940.000	603.700	1950.000	603.700	2010.000
GR	603.900	2020.000	602.500	2070.000	602.600	2080.000	602.600	2240.000	602.900	2250.000
GR	602.900	2340.000	602.600	2350.000	602.600	2370.000	601.900	2380.000	601.900	2410.000
GR	600.900	2430.000	601.400	2440.000	599.900	2460.000	600.400	2470.000	600.400	2480.000
GR	599.300	2500.000	599.300	2520.000	604.900	2540.000	613.900	2548.000	610.000	2550.000
GR	610.000	3050.000	620.000	3250.000	630.000	3450.000	0.0	0.0	0.0	0.0
NC	0.110	0.110	0.033	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X1	46.000	64.000	1920.000	2548.000	700.000	1900.000	1500.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	950.000	0.0	3050.000	0.0	0.0	0.0	0.0
GR	646.000	0.0	645.000	10.000	647.000	20.000	617.800	450.000	617.000	500.000
GR	616.000	550.000	615.000	610.000	613.000	700.000	613.000	730.000	612.800	740.000
GR	612.000	800.000	612.000	1020.000	613.500	1100.000	613.000	1160.000	613.000	1210.000
GR	612.800	1220.000	612.800	1310.000	612.000	1320.000	612.000	1370.000	613.000	1400.000
GR	613.000	1470.000	612.000	1500.000	612.000	1610.000	612.800	1650.000	612.200	1660.000
GR	612.200	1790.000	615.500	1850.000	615.000	1890.000	613.500	1920.000	605.700	1930.000
GR	604.800	1940.000	603.800	1950.000	603.800	2010.000	604.000	2020.000	603.000	2070.000
GR	602.700	2080.000	602.700	2240.000	603.000	2250.000	603.000	2340.000	602.700	2350.000
GR	602.700	2370.000	602.000	2380.000	602.000	2410.000	601.000	2430.000	601.500	2440.000
GR	600.000	2460.000	600.500	2470.000	600.500	2480.000	599.400	2500.000	599.400	2520.000
GR	605.000	2540.000	614.000	2548.000	615.000	2570.000	615.000	2730.000	615.900	2740.000
GR	615.900	2850.000	616.000	2860.000	616.000	2900.000	616.500	2910.000	617.000	3000.000
GR	617.000	3020.000	618.000	3050.000	621.000	3080.000	630.000	3400.000	0.0	0.0
NC	0.110	0.110	0.036	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X1	46.100	32.000	1920.000	2548.000	1500.000	1700.000	1500.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	1311.000	0.0	3650.000	0.0	0.0	0.0	0.0
GR	630.000	650.000	620.000	750.000	610.000	1100.000	610.000	1550.000	610.000	1880.000
GR	613.700	1920.000	605.900	1930.000	605.000	1940.000	604.000	1950.000	604.000	2010.000
GR	604.200	2020.000	603.200	2070.000	602.900	2080.000	602.900	2240.000	603.200	2250.000
GR	603.200	2340.000	602.900	2350.000	602.900	2370.000	602.200	2380.000	602.200	2410.000
GR	601.200	2430.000	601.700	2440.000	600.200	2460.000	600.700	2470.000	600.700	2480.000
GR	599.600	2500.000	599.600	2520.000	605.200	2540.000	614.200	2548.000	610.000	3050.000
GR	620.000	3620.000	630.000	4000.000	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.090	0.090	0.036	0.0	0.0	0.0	0.0	0.0	0.0	0.0

X1	46.200	34.000	1920.000	2548.000	1900.000	1000.000	1850.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	1900.000	0.0	4190.000	0.0	0.0	0.0	0.0
GR	630.000	1550.000	620.000	1850.000	610.000	1900.000	610.000	1900.000	610.000	1900.000
GR	613.800	1920.000	606.000	1930.000	605.100	1940.000	604.100	1950.000	604.100	2010.000
GR	604.300	2020.000	603.300	2070.000	603.000	2080.000	603.000	2240.000	603.300	2250.000
GR	603.300	2340.000	603.000	2350.000	603.000	2370.000	602.300	2380.000	602.300	2410.000
GR	601.300	2430.000	601.800	2440.000	600.300	2460.000	600.800	2470.000	600.800	2480.000
GR	599.700	2500.000	599.700	2520.000	605.300	2540.000	614.300	2548.000	610.000	2600.000
GR	610.000	3100.000	610.000	3500.000	620.000	4750.000	630.000	5200.000	0.0	0.0
NC	0.080	0.080	0.030	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X1	47.000	81.000	1180.000	1600.000	2700.000	1000.000	2350.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	900.000	0.0	2710.000	0.0	0.0	0.0	0.0
GR	626.000	200.000	623.000	250.000	622.900	300.000	621.100	330.000	621.000	340.000
GR	621.000	440.000	621.500	450.000	621.500	550.000	621.000	560.000	621.000	750.000
GR	619.000	800.000	618.000	850.000	618.000	950.000	617.000	1000.000	616.000	1050.000
GR	615.000	1140.000	615.900	1180.000	613.500	1200.000	610.000	1205.000	605.500	1210.000
GR	604.000	1220.000	603.000	1230.000	602.000	1250.000	601.000	1290.000	600.000	1320.000
GR	600.000	1370.000	601.000	1380.000	601.000	1420.000	602.500	1450.000	602.000	1460.000
GR	604.000	1480.000	604.000	1520.000	605.000	1530.000	605.000	1570.000	610.000	1600.000
GR	609.000	1620.000	612.000	1635.000	612.000	1650.000	608.000	1690.000	608.000	1730.000
GR	612.000	1735.000	613.000	1750.000	615.000	1850.000	614.000	1875.000	612.900	1880.000
GR	611.000	1990.000	611.000	2000.000	611.000	2100.000	609.000	2150.000	610.000	2210.000
GR	610.000	2215.000	612.500	2220.000	611.000	2250.000	611.000	2350.000	612.500	2400.000
GR	613.000	2420.000	613.000	2500.000	612.000	2550.000	613.000	2600.000	613.000	2650.000
GR	614.500	2700.000	613.000	2800.000	613.000	3000.000	614.000	3050.000	613.000	3150.000
GR	616.000	3200.000	616.000	3350.000	614.000	3400.000	613.000	3450.000	613.000	3500.000
GR	615.000	3550.000	617.000	3600.000	618.400	3650.000	618.400	3750.000	617.000	3810.000
GR	619.000	3850.000	620.000	3860.000	620.000	3990.000	620.300	4000.000	621.000	4500.000
GR	630.000	4800.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
QT	2.000	54000.000	54000.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.080	0.080	0.033	0.0	0.0	0.0	0.0	0.0	0.0	0.0

SECTION D/S OF ROGUE RIVER

X1	47.100	28.000	1780.000	2200.000	2000.000	2800.000	2200.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	800.000	0.0	2780.000	0.0	0.0	0.0	0.0
GR	630.000	0.0	620.000	800.000	610.000	1760.000	610.000	1760.000	610.000	1760.000
GR	615.900	1780.000	613.500	1800.000	610.000	1805.000	605.500	1810.000	604.000	1820.000
GR	603.000	1830.000	602.000	1850.000	601.000	1890.000	600.000	1920.000	600.000	1970.000
GR	601.000	1980.000	601.000	2020.000	602.500	2050.000	602.000	2060.000	604.000	2080.000
GR	604.000	2120.000	605.000	2130.000	605.000	2170.000	610.000	2200.000	610.000	2600.000
GR	610.000	2750.000	620.000	4250.000	630.000	4320.000	0.0	0.0	0.0	0.0
QT	2.000	51400.000	51400.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.100	0.080	0.033	0.0	0.0	0.0	0.0	0.0	0.0	0.0

SECTION U/S ROGUE RIVER

X1	47.900	16.000	2073.000	2507.000	500.000	600.000	550.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	830.000	0.0	2920.000	0.0	0.0	0.0	0.0
GR	630.000	-200.000	620.000	450.000	610.000	2050.000	610.000	2050.000	610.000	2050.000
GR	608.700	2073.000	605.400	2080.000	598.600	2240.000	602.700	2370.000	602.700	2420.000
GR	603.700	2450.000	603.700	2480.000	611.200	2507.000	610.000	2700.000	620.000	3600.000
GR	630.000	3700.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.060	0.100	0.030	0.0	0.0	0.0	0.0	0.0	0.0	0.0

D/S OF US-131 BRIDGE

X1	49.000	24.000	2550.000	2965.000	1250.000	1750.000	1650.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	1700.000	0.0	2965.000	0.0	622.500	623.500	0.0
GR	630.000	0.0	624.000	350.000	620.000	720.000	620.000	2050.000	623.500	2050.000
GR	624.000	2550.000	620.000	2550.000	613.000	2560.000	605.000	2600.000	623.500	2605.000

GR	601.000	2680.000	598.000	2750.000	597.300	2760.000	597.300	2810.000	600.000	2825.000
GR	599.000	2850.000	601.000	2850.000	599.000	2890.000	600.000	2900.000	601.000	2910.000
GR	602.000	2930.000	609.000	2960.000	620.000	2965.000	630.000	3200.000	0.0	0.0
NC	0.080	0.100	0.030	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SB	0.900	1.250	2.600	0.0	334.250	25.000	7422.000	0.0	597.300	597.300

U/S OF US-131 BRIDGE

DOCUMENTED HIGH WATER MARKS

622.3(1904),620.25(1947),619.3(1960),616.25(1938),612.2(1933)

X1	49.100	0.0	0.0	0.0	56.000	56.000	56.000	0.0	0.0	0.0
X2	0.0	0.0	1.000	621.300	622.500	0.0	0.0	0.0	0.0	0.0
X3	10.000	0.0	0.0	1700.000	0.0	2965.000	0.0	622.500	626.800	0.0
BT	14.000	0.0	630.000	0.0	1250.000	624.000	0.0	1700.000	624.000	0.0
BT	1700.000	622.500	0.0	1850.000	623.000	0.0	1950.000	623.200	0.0	2050.000
BT	623.500	0.0	2200.000	624.000	0.0	2400.000	625.000	0.0	2550.000	626.800
BT	0.0	2550.000	626.800	621.300	2965.000	626.800	621.300	2965.000	626.800	0.0
BT	3090.000	626.800	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

X1	50.100	29.000	830.000	1420.000	415.000	415.000	415.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	178.000	0.0	1435.000	0.0	0.0	0.0	0.0
GR	627.900	170.000	613.000	200.000	612.000	250.000	609.500	300.000	610.000	350.000
GR	613.700	400.000	615.000	450.000	615.000	500.000	613.600	550.000	614.200	600.000
GR	611.800	650.000	613.000	700.000	610.000	730.000	610.000	750.000	615.400	800.000
GR	616.600	830.000	616.600	900.000	606.000	930.000	603.600	1010.000	599.500	1110.000
GR	597.800	1150.000	600.000	1220.000	600.000	1250.000	600.800	1270.000	601.900	1290.000
GR	611.000	1350.000	622.800	1400.000	623.000	1420.000	630.000	1550.000	0.0	0.0
NC	0.080	0.100	0.030	0.0	0.0	0.0	0.0	0.0	0.0	0.0

X1	50.900	27.000	2535.000	3060.000	2000.000	3200.000	2750.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	1400.000	0.0	4350.000	0.0	0.0	0.0	0.0
GR	650.000	0.0	640.000	550.000	630.000	920.000	620.000	1380.000	620.000	1380.000
GR	617.300	2535.000	601.400	2570.000	601.400	2610.000	600.400	2640.000	601.400	2650.000
GR	600.400	2680.000	600.400	2700.000	601.200	2710.000	600.400	2720.000	600.600	2750.000
GR	601.200	2760.000	600.100	2780.000	600.400	2790.000	600.400	2840.000	600.200	2850.000
GR	600.200	2970.000	601.200	2990.000	601.200	3010.000	614.200	3060.000	620.000	4400.000
GR	630.000	4500.000	640.000	4510.000	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.080	0.100	0.030	0.0	0.0	0.0	0.0	0.0	0.0	0.0

X1	51.000	63.000	1035.000	1560.000	2200.000	1700.000	1979.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	300.000	0.0	2900.000	0.0	0.0	0.0	0.0
GR	630.000	0.0	630.000	0.0	630.000	0.0	630.000	0.0	630.000	0.0
GR	625.400	100.000	620.500	130.000	615.000	310.000	613.000	350.000	612.000	400.000
GR	613.000	470.000	613.000	600.000	613.500	610.000	613.500	660.000	614.000	670.000
GR	614.000	720.000	615.000	770.000	615.000	820.000	615.700	850.000	618.800	950.000
GR	618.000	1000.000	618.900	1035.000	603.000	1070.000	603.000	1110.000	602.000	1140.000
GR	603.000	1150.000	602.000	1180.000	602.000	1200.000	602.800	1210.000	602.000	1220.000
GR	602.000	1250.000	602.800	1260.000	601.700	1280.000	602.000	1290.000	602.000	1340.000
GR	601.800	1350.000	601.800	1470.000	602.800	1490.000	602.800	1510.000	615.800	1560.000
GR	616.800	1600.000	617.400	1650.000	615.000	1700.000	615.000	1800.000	612.000	1850.000
GR	612.000	1900.000	611.000	1940.000	611.000	2230.000	611.500	2240.000	611.500	2410.000
GR	612.000	2420.000	612.000	2770.000	613.000	2810.000	613.000	2870.000	614.000	2900.000
GR	614.700	2940.000	614.700	3178.000	622.000	3180.000	627.000	3390.000	627.000	3410.000
GR	626.700	3450.000	630.700	3470.000	631.500	3480.000	0.0	0.0	0.0	0.0
NC	0.080	0.100	0.030	0.0	0.0	0.0	0.0	0.0	0.0	0.0

X1	51.100	28.000	1035.000	1560.000	1850.000	2250.000	2000.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	220.000	0.0	2850.000	0.0	0.0	0.0	0.0
GR	640.000	0.0	630.000	0.0	620.000	200.000	610.000	700.000	610.000	700.000
GR	617.600	1035.000	601.700	1070.000	601.700	1110.000	600.700	1140.000	601.700	1150.000

GR	601.500	1260.000	600.400	1280.000	600.700	1290.000	600.700	1340.000	600.500	1350.000
GR	600.500	1470.000	601.500	1490.000	601.500	1510.000	614.500	1560.000	620.000	2900.000
GR	630.000	3100.000	640.000	3200.000	650.000	3350.000	0.0	0.0	0.0	0.0
NC	0.100	0.080	0.030	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X1	51.900	25.000	2510.000	2940.000	2500.000	2900.000	2600.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	1650.000	0.0	3500.000	0.0	0.0	0.0	0.0
GR	650.000	1200.000	640.000	1300.000	630.000	1350.000	620.000	1600.000	610.000	2400.000
GR	611.300	2510.000	610.300	2600.000	599.200	2600.000	600.500	2635.000	600.700	2658.000
GR	601.000	2680.000	600.100	2710.000	601.100	2725.000	602.300	2748.000	603.400	2778.000
GR	603.600	2795.000	605.300	2885.000	605.400	2885.000	609.300	2940.000	616.200	2940.000
GR	620.000	3040.000	620.000	3900.000	630.000	4110.000	640.000	4290.000	650.000	4700.000
NC	0.100	0.080	0.030	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		U/S OF TOWNSHIP LINE								
X1	52.000	26.000	2809.000	3191.000	1550.000	2000.000	2000.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	1450.000	0.0	3300.000	0.0	0.0	0.0	0.0
GR	640.000	1250.000	630.000	1300.000	620.000	1350.000	620.000	1680.000	620.000	2280.000
GR	620.000	2770.000	619.100	2809.000	614.900	2815.000	608.000	2830.000	604.000	2877.500
GR	602.300	2902.500	601.000	2926.000	599.800	2945.000	599.400	2971.000	597.900	3000.000
GR	599.400	3029.000	599.800	3055.000	601.000	3074.000	602.300	3097.500	604.000	3122.500
GR	608.000	3170.000	614.900	3185.000	619.100	3191.000	620.000	3380.000	630.000	3600.000
GR	640.000	3680.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.080	0.080	0.030	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X1	52.100	24.000	2510.000	2940.000	1650.000	1900.000	1900.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	1280.000	0.0	3090.000	0.0	0.0	0.0	0.0
GR	650.000	750.000	640.000	820.000	630.000	900.000	620.000	1300.000	620.000	1300.000
GR	610.100	2510.000	609.100	2600.000	598.000	2600.000	599.300	2635.000	599.500	2658.000
GR	599.800	2680.000	599.900	2710.000	600.900	2725.000	601.100	2748.000	601.200	2778.000
GR	602.400	2795.000	604.000	2855.000	604.200	2885.000	608.100	2940.000	615.000	2940.000
GR	620.000	3100.000	630.000	3200.000	640.000	3250.000	650.000	3260.000	0.0	0.0
NC	0.080	0.080	0.033	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X1	52.900	35.000	980.000	1370.000	1650.000	2900.000	3100.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	50.000	0.0	2180.000	0.0	0.0	0.0	0.0
GR	650.000	-850.000	640.000	-800.000	630.000	-580.000	620.000	-300.000	610.000	950.000
GR	615.000	980.000	611.600	980.000	608.800	990.000	599.800	1010.000	598.100	1020.000
GR	598.100	1040.000	598.800	1070.000	600.600	1090.000	600.900	1100.000	600.900	1110.000
GR	601.600	1130.000	601.500	1140.000	601.800	1170.000	603.600	1240.000	603.600	1250.000
GR	603.800	1260.000	604.100	1270.000	604.600	1280.000	605.100	1300.000	605.600	1310.000
GR	605.600	1320.000	606.100	1330.000	608.800	1350.000	612.700	1360.000	614.200	1370.000
GR	610.000	2000.000	620.000	2200.000	630.000	2300.000	640.000	2350.000	650.000	2400.000
NC	0.080	0.100	0.030	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		CANNON-ADA TOWNSHIP LINE								
X1	53.000	56.000	980.000	1370.000	1650.000	800.000	1400.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	600.000	0.0	2600.000	0.0	0.0	0.0	0.0
GR	644.800	0.0	644.200	10.000	640.100	30.000	638.000	100.000	633.100	200.000
GR	629.000	300.000	620.800	400.000	617.000	500.000	614.600	600.000	613.700	700.000
GR	614.700	800.000	614.600	900.000	615.100	980.000	611.700	980.000	608.900	990.000
GR	599.900	1010.000	598.200	1020.000	598.200	1040.000	598.900	1070.000	600.700	1090.000
GR	601.000	1100.000	601.000	1110.000	601.700	1130.000	601.600	1140.000	601.900	1170.000
GR	602.500	1190.000	602.500	1200.000	602.800	1210.000	603.000	1220.000	603.500	1230.000
GR	603.700	1240.000	603.700	1250.000	603.900	1260.000	604.200	1270.000	604.700	1280.000
GR	605.200	1300.000	605.700	1310.000	605.700	1320.000	606.200	1330.000	608.900	1350.000
GR	612.700	1360.000	614.300	1370.000	614.300	1400.000	612.600	1425.000	611.700	1500.000
GR	611.500	1600.000	612.600	1620.000	612.800	1700.000	613.200	1800.000	613.000	1900.000
GR	612.500	1960.000	611.300	2000.000	609.900	2100.000	612.500	2500.000	627.000	2700.000
GR	640.000	2780.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EJ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

#PROF 1

CCHV= 0.100 CEHV= 0.300

#SECNO 42.900

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	FNOST

3470 ENCROACHMENT STATIONS= 1050.0 2250.0 TYPE= 1 TARGET= 1200.000

GRAND RAPIDS CITY-PLAINFIELD TWP LINE

STARTING ELEVATIONS TAKEN FROM FIS OF GRAND RAPIDS CITY

REC INT YEARS	FLOW(CFS)	ELEVATION
10	33000	614.7
50	48000	617.7
100	55000	619.0
500	74000	623.6

42.90	22.00	619.00	0.0	619.00	619.33	0.33	0.0	0.0	611.40
55000.	2898.	49609.	2493.	3577.	10232.	2025.	0.	0.	606.70
0.0	0.81	4.85	1.23	0.100	0.030	0.080	0.0	597.00	1050.00
0.000191	0.	0.	0.	0	0	0	0.0	1200.00	2250.00

#SECNO 43.000

3470 ENCROACHMENT STATIONS= 300.0 2550.0 TYPE= 1 TARGET= 2250.000

VALLEY SECTION 43 OF CORPS OF ENGINEERS

43.00	22.21	619.21	0.0	0.0	619.45	0.25	0.11	0.01	611.40
55000.	5523.	45233.	4244.	8101.	10344.	4287.	296.	27.	606.70
0.05	0.68	4.37	0.99	0.100	0.030	0.080	0.030	597.00	300.00
0.000153	660.	660.	710.	2	0	0	0.0	2250.00	2550.00

#SECNO 43.900

3470 ENCROACHMENT STATIONS= 700.0 3000.0 TYPE= 1 TARGET= 2300.000

43.90	20.63	619.53	0.0	0.0	619.73	0.20	0.27	0.00	612.70
55000.	8458.	44166.	2376.	11867.	11027.	2621.	1283.	115.	610.90
0.21	0.71	4.01	0.91	0.100	0.030	0.080	0.031	598.90	700.00
0.000131	1300.	2000.	2500.	0	0	0	0.0	2300.00	3000.00

#SECNO 44.000

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   44.00     19.71    619.71      0.0       0.0    619.91      0.19      0.17      0.00    613.80
  55000.     7052.    41965.     5983.    10586.    10483.     7641.     2066.      189.     612.00
    0.32      0.67      4.00      0.78     0.100     0.030     0.100     0.031    600.00    650.00
0.000140     1200.     1300.     1300.         0         0         0       0.0   2899.99   3550.00

*SECNO 44.100
   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS    BANK ELEV
   Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA      LEFT/RIGHT
   TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN       SSTA
   SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID      ENDST

                                          3250
3470 ENCROACHMENT STATIONS=      426.0     3850.0   TYPE=      1  TARGET=     3424.000
   44.10     20.03    620.03      0.0       0.0    620.19      0.16      0.29      0.00    613.80
  55000.     6784.    40025.     8191.    11160.    10672.    10998.     3613.      346.     612.00
    0.53      0.61      3.75      0.74     0.100     0.030     0.100     0.030    600.00    426.00
0.000120     2000.     2200.     2400.         2         0         0       0.0   3423.99   3850.00

*SECNO 44.900

3470 ENCROACHMENT STATIONS=     1300.0     4100.0   TYPE=      1  TARGET=     2800.000
   44.90     20.48    620.48      0.0       0.0    620.66      0.18      0.46      0.00    616.00
  55000.    10422.    40257.     4321.    13812.    10275.     5289.     6032.      585.     611.00
    0.85      0.75      3.92      0.82     0.100     0.030     0.100     0.030    600.00   1300.00
0.000144     3300.     3600.     3250.         1         0         0       0.0   2800.00   4100.00

*SECNO 45.000

3265 DIVIDED FLOW

3470 ENCROACHMENT STATIONS=      680.0     3670.0   TYPE=      1  TARGET=     2990.000
   45.00     20.71    620.71      0.0       0.0    620.92      0.20      0.25      0.01    616.00
  55000.     9292.    45087.      621.    14612.    11299.      877.     7129.      700.     611.00
    0.98      0.64      3.99      0.71     0.110     0.033     0.110     0.031    600.00    680.00
0.000160     1800.     1600.     1600.         0         0         0       0.0   2985.77   3670.00

*SECNO 45.100

3470 ENCROACHMENT STATIONS=      400.0     3600.0   TYPE=      1  TARGET=     3200.000
   45.10     21.26    621.06      0.0       0.0    621.25      0.19      0.33      0.00    615.80
  55000.    10147.    44679.      173.    17484.    11630.      285.     8358.      825.     610.80
    1.17      0.58      3.84      0.61     0.110     0.033     0.110     0.031    599.80    400.00
0.000143     1600.     2300.     2600.         1         0         0       0.0   3200.00   3600.00

*SECNO 45.200

3470 ENCROACHMENT STATIONS=     1450.0     4650.0   TYPE=      1  TARGET=     3200.000
   45.20     21.85    621.45      0.0       0.0    621.58      0.13      0.33      0.01    615.60
  55000.     6926.    40252.     7822.    12378.    11989.    11570.    10018.      964.     610.60
    1.46      0.56      3.36      0.68     0.110     0.033     0.110     0.032    599.60   1450.00
0.000105     1200.     2950.     3300.         1         0         0       0.0   3200.00   4650.00

*SECNO 45.900
   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS    BANK ELEV
   Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA      LEFT/RIGHT
   TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN       SSTA
   SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID      ENDST
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3470 ENCROACHMENT STATIONS=      850.0     3050.0  TYPE=      1  TARGET=    2200.000
   45.90     22.38    621.68       0.0       0.0    621.82      0.14      0.24      0.00    613.40
   55000.     9186.    41454.     4360.    12327.    11959.     5859.    11599.     1093.    613.90
    1.67      0.75      3.47      0.74     0.110     0.033     0.110     0.032    599.30    850.00
0.000118     2150.     2150.     1900.         2         0         0       0.0   2200.00   3050.00

*SECNO 46.000

3470 ENCROACHMENT STATIONS=      950.0     3050.0  TYPE=      1  TARGET=    2100.000
   46.00     22.42    621.82       0.0       0.0    622.03      0.21      0.19      0.02    613.50
   55000.     6356.    46988.     1657.     8811.    11980.     3002.    12374.     1153.    614.00
    1.78      0.72      3.92      0.55     0.110     0.033     0.110     0.033    599.40    950.00
0.000151      700.     1500.     1900.         0         0         0       0.0   2100.00   3050.00

*SECNO 46.100

3470 ENCROACHMENT STATIONS=     1311.0     3650.0  TYPE=      1  TARGET=    2339.000
   46.10     22.51    622.11       0.0       0.0    622.26      0.15      0.22      0.01    613.70
   55000.     6161.    42578.     6261.     7298.    12026.     9124.    13302.     1233.    614.20
    1.92      0.84      3.54      0.69     0.110     0.036     0.110     0.033    599.60   1311.00
0.000146     1500.     1500.     1700.         2         0         0       0.0   2338.99   3650.00

*SECNO 46.200

3470 ENCROACHMENT STATIONS=     1900.0     4190.0  TYPE=      1  TARGET=    2290.000
   46.20     22.67    622.37       0.0       0.0    622.48      0.11      0.22      0.00    613.80
   55000.      176.    38500.    16324.      209.    12127.    18290.    14293.     1305.    614.30
    2.11      0.84      3.17      0.89     0.090     0.036     0.090     0.033    599.70   1900.00
0.000116     1900.     1850.     1000.         2         0         0       0.0   2290.00   4190.00

*SECNO 47.000

3470 ENCROACHMENT STATIONS=      900.0     2710.0  TYPE=      1  TARGET=    1810.000
   47.00     22.55    622.55       0.0       0.0    622.81      0.26      0.29      0.04    615.90
   55000.     1445.    38717.    14838.     1701.     8062.    11949.    15244.     1374.    610.00
    2.26      0.85      4.80      1.24     0.080     0.030     0.080     0.033    600.00    900.00
0.000185     2700.     2350.     1000.         2         0         0       0.0   1810.00   2710.00

*SECNO 47.100
   SECNO     DEPTH     CWSEL     CRIWS     WSELK        EG        HV        HL      QLOSS   BANK ELEV
       Q      QLOB       QCH      QROB      ALOB       ACH      AROB       VOL        TWA  LEFT/RIGHT
    TIME      VLOB       VCH      VROB       XNL      XNCH       XNR       WTN     ELMIN       SSTA
   SLOPE     XLOBL      XLCH     XLOBR     ITRIAL       IDC    ICONT     CORAR     TOPWID      ENDST

3470 ENCROACHMENT STATIONS=      800.0     2780.0  TYPE=      1  TARGET=    1980.000
                SECTION D/S OF ROGUE RIVER
   47.10     23.03    623.03       0.0       0.0    623.24      0.20      0.42      0.01    615.90
   54000.     7860.    35904.    10236.     7913.     8265.     7556.    16504.     1478.    610.00
    2.45      0.99      4.34      1.35     0.080     0.033     0.080     0.033    600.00    800.00
0.000177     2000.     2200.     2800.         2         0         0       0.0   1980.00   2780.00

*SECNO 47.900

3470 ENCROACHMENT STATIONS=      830.0     2920.0  TYPE=      1  TARGET=    2090.000
                SECTION U/S ROGUE RIVER
```

51400.	9166.	36445.	5790.	11687.	9042.	5039.	16812.	1503.	611.20
2.50	0.78	4.03	1.15	0.100	0.033	0.080	0.033	598.60	830.00
0.000141	500.	550.	600.	0	0	0	0.0	2090.00	2920.00

*SECNO 49.000

3265 DIVIDED FLOW

3470 ENCROACHMENT STATIONS= 1700.0 2965.0 TYPE= 1 TARGET= 1265.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE.ELLEA= 622.50 ELREA= 623.50

D/S OF US-131 BRIDGE

49.00	25.91	623.21	0.0	0.0	623.71	0.49	0.29	0.09	626.80
51400.	921.	50479.	0.	1125.	8877.	0.	17437.	1550.	100000.00
2.58	0.82	5.69	0.0	0.060	0.030	0.100	0.033	597.30	1700.00
0.000236	1250.	1650.	1750.	2	0	0	0.0	765.00	2965.00

SPECIAL BRIDGE

SB	XK	XKOR	COFQ	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
	0.90	1.25	2.60	0.0	334.25	25.00	7422.00	0.0	597.30	597.30

*SECNO 49.100

3265 DIVIDED FLOW

PRESSURE AND WEIR FLOW

EGPRS	EGLWC	H3	QWEIR	QPR	BAREA	TRAPEZOID AREA	ELLC	ELTRD
624.14	623.74	0.03	1146.	50117.	7422.	7422.	621.30	622.50

3470 ENCROACHMENT STATIONS= 1700.0 2965.0 TYPE= 1 TARGET= 1265.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE.ELLEA= 622.50 ELREA= 626.80

U/S OF US-131 BRIDGE

DOCUMENTED HIGH WATER MARKS

622.3(1904),620.25(1947),619.3(1960),616.25(1938),612.2(1933)

49.10	26.32	623.62	0.0	0.0	624.10	0.48	0.39	0.0	626.80
51400.	818.	50582.	0.	1268.	9046.	0.	17450.	1551.	100000.00
2.59	0.65	5.59	0.0	0.080	0.030	0.100	0.033	597.30	1700.00
0.000223	56.	56.	56.	2	0	3	0.0	783.20	2965.00

*SECNO 50.100

3470 ENCROACHMENT STATIONS= 178.0 1435.0 TYPE= 1 TARGET= 1257.000

50.10	26.17	623.97	0.0	0.0	624.20	0.22	0.08	0.03	616.60
51400.	8189.	43210.	1.	7175.	10511.	9.	17583.	1561.	623.00
2.62	1.14	4.11	0.12	0.080	0.030	0.100	0.033	597.80	178.00

*SECNO 50.900

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	QLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST
3470 ENCROACHMENT STATIONS=			1400.0	4350.0	TYPE=	1	TARGET=	2950.000	
50.90	24.23	624.33	0.0	0.0	624.50	0.17	0.30	0.01	617.30
51400.	3557.	42919.	4924.	6473.	11794.	9466.	18948.	1685.	614.20
2.86	0.55	3.64	0.52	0.080	0.030	0.100	0.033	600.10	1400.00
0.000086	2000.	2750.	3200.	2	0	0	0.0	2950.00	4350.00

*SECNO 51.000

3470 ENCROACHMENT STATIONS=			300.0	2900.0	TYPE=	1	TARGET=	2600.000	
51.00	22.85	624.55	0.0	0.0	624.66	0.11	0.15	0.01	618.90
51400.	5385.	35288.	10727.	7279.	11079.	16099.	20314.	1808.	615.80
3.08	0.74	3.19	0.67	0.080	0.030	0.100	0.033	601.70	300.00
0.000072	2200.	1979.	1700.	0	0	0	0.0	2599.99	2900.00

*SECNO 51.100

3470 ENCROACHMENT STATIONS=			220.0	2850.0	TYPE=	1	TARGET=	2630.000	
51.10	24.28	624.68	0.0	0.0	624.82	0.14	0.15	0.01	617.60
51400.	6325.	40272.	4802.	8385.	11822.	9714.	21839.	1933.	614.50
3.28	0.75	3.41	0.49	0.080	0.030	0.100	0.033	600.40	220.00
0.000075	1850.	2000.	2250.	2	0	0	0.0	2630.00	2850.00

*SECNO 51.900

3470 ENCROACHMENT STATIONS=			1650.0	3500.0	TYPE=	1	TARGET=	1850.000	
51.90	25.67	624.87	0.0	0.0	625.14	0.27	0.28	0.04	611.30
51400.	8723.	40535.	2142.	9204.	8682.	2919.	23376.	2071.	616.20
3.47	0.95	4.67	0.73	0.100	0.030	0.080	0.032	599.20	1650.00
0.000171	2500.	2600.	2900.	0	0	0	0.0	1850.00	3500.00

*SECNO 52.000

3470 ENCROACHMENT STATIONS=			1450.0	3300.0	TYPE=	1	TARGET=	1850.000	
U/S OF TOWNSHIP LINE									
52.00	27.22	625.12	0.0	0.0	625.56	0.44	0.37	0.05	619.10
51400.	4488.	46383.	529.	6982.	8329.	628.	24136.	2144.	619.10
3.57	0.64	5.57	0.84	0.100	0.030	0.080	0.032	597.90	1450.00
0.000212	1550.	2000.	2000.	2	0	0	0.0	1850.00	3300.00

*SECNO 52.100

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	QLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST
3470 ENCROACHMENT STATIONS=			1280.0	3090.0	TYPE=	1	TARGET=	1810.000	
52.10	27.67	625.67	0.0	0.0	625.86	0.19	0.28	0.02	610.10
51400.	12266.	38151.	983.	12964.	9502.	1250.	24944.	2217.	615.00

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 0.000112    1650.    1900.    1900.        2        0        0      0.0   1810.00  3090.00

*SECNO 52.900

3470 ENCROACHMENT STATIONS=      50.0     2180.0  TYPE=      1  TARGET=     2130.000
    52.90    27.93   626.03      0.0       0.0    626.14     0.11     0.27      0.01    615.00
   51400.   10740.   30060.   10601.    11597.     8959.   10855.   26469.     2319.    614.20
     4.06     0.93     3.36     0.98     0.080     0.033    0.080    0.033    598.10     50.00
 0.000087    1650.    3100.    2900.         2         0        0      0.0   2130.00  2180.00

*SECNO 53.000

3470 ENCROACHMENT STATIONS=     600.0     2600.0  TYPE=      1  TARGET=     2000.000
                 CANNON-ADA TOWNSHIP LINE

    53.00    27.92   626.12      0.0       0.0    626.27     0.15     0.11      0.01    615.10
   51400.    3945.   33568.   13887.     4438.     8958.   17033.   27317.     2375.    614.30
     4.19     0.89     3.75     0.82     0.080     0.030    0.100    0.033    598.20    600.00
 0.000090    1650.    1400.     800.         2         0        0      0.0   2000.00  2600.00
```

00BREAK00

1) COUNTY: KENT

2) STUDY NAME: PLAINFIELD TOWNSHIP

3) WATERCOURSE: GRAND RIVER

4) DOCUMENT TYPE: 100 YEAR NATURAL

00BREAK00

COMMONWEALTH ASSOC. INC.

FIS - PLAINFIELD TWP, KENT Co., MI

GRAND RIVER - 100 YR NATURAL FLOODWAY WITH I-PLOT

Dan 1-25-79

THIS RUN EXECUTED 01/25/79

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**********************************************************
  HEC2 RELEASE DATED NOV 76 UPDATE   7061977
  ERROR CORR -  01.02
  MODIFICATION -  50.51.52.[illegible]
**********************************************************

C
T1      GRAND RIVER, KENT COUNTY, ICHIGAN.
T2      PLAINFIELD TOWNSHIP H 01 62-0104-010
T3      100-YEAR FLOOD

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ
      0.        2.        [illegible]       0.  0.0       0.0       0.0       0.   619.000    0.0

J2  NPROF     IPLOT     PRFCS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE
    -1.000    1.000    -1.000     0.0       0.0       0.0       0.0       0.0       0.0       15.000

J3  VARIABLE CODES FOR SUMMARY PRINTOUT
    150.000   110.000   200.000   0.0       0.0       0.0       0.0       0.0       0.0       0.0

CT      2.000   55000.000   55000.000       0.0       0.0       0.0       0.0       0.0       0.0       0.0
RT      0.0       0.0       1.400       0.0       0.0       0.0       0.0       0.0       0.0       0.0
NC      0.100     0.080     0.030       0.100     0.300     0.0       0.0       0.0       0.0       0.0
RT      0.0       9.100     7.100       0.0       0.0       0.0    1050.000  2250.000   800.000  2720.000

                GRAND RAPIDS CITY-PLAINFIELD TWP LINE
                STARTING ELEVATIONS TAKEN FROM FIS OF GRAND RAPIDS CITY
                REC INT YEARS   FLO (CFS)   ELEVATION
                        10       33000       614.7
                        50       48000       617.7
                        100      55000       619.0
                        500      74000       623.6

X1      42.900    84.000   1500.000   2040.000      0.0       0.0       0.0       0.0       0.0       0.0
GR     623.000   100.000   620.000    150.000   612.000   200.000   616.000   400.000   611.500   800.000
GR     611.000  1100.000   610.800   1190.000   611.000  1220.000   611.200  1250.000   611.000  1350.000
GR     610.800  1400.000   611.400   1450.000   611.400  1500.000   611.000  1510.000   605.000  1525.000
GR     601.000  1540.000   601.000   1558.000   601.000  1580.000   601.000  1600.000   600.300  1670.000
GR     600.000  1680.000   600.000   1700.000   599.900  1710.000   599.400  1730.000   599.400  1750.000
GR     599.000  1770.000   599.000   1800.000   599.300  1820.000   599.000  1830.000   599.000  1860.000
GR     598.000  1870.000   598.000   1900.000   597.000  1930.000   597.900  1940.000   597.900  1990.000
GR     598.700  2000.000   599.400   2010.000   599.200  2020.000   601.000  2023.000   602.000  2024.000
GR     603.000  2026.000   604.000   2029.000   604.700  2030.000   606.700  2040.000   604.700  2050.000
GR     604.700  2105.000   606.000   2110.000   607.000  2114.000   609.000  2120.000   610.000  2130.000
GR     611.300  2150.000   612.000   2175.000   612.000  2190.000   612.400  2200.000   613.000  2210.000
GR     613.000  2280.000   612.600   2300.000   612.000  2335.000   612.000  2400.000   611.700  2435.000
GR     611.400  2450.000   610.900   2480.000   610.900  2530.000   611.000  2540.000   611.000  2570.000
GR     610.500  2610.000   610.000   2640.000   610.500  2660.000   611.000  2670.000   612.000  2700.000
GR     612.700  2720.000   614.400   [illegible]   [illegible]   [illegible]   617.000  2950.000   615.000  3080.000
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GR	616.600	3200.000	617.200	3350.000	615.000	3350.000	617.200	3400.000	622.000	3450.000
GR	622.200	3500.000	623.300	3550.000	622.700	3600.000	624.000	3650.000	0.0	0.0
NC	0.100	0.100	0.030	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FT	0.0	5.100	1.400	0.0	0.0	0.0	0.0	0.0	100.000	2640.000

VALLEY SECTION 43 OF CORPS OF ENGINEERS

XT	43.000	0.0	0.0	0.0	660.000	710.000	660.000	0.0	0.0	0.0
NC	0.100	0.100	0.030	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FT	0.0	5.100	0.0	0.0	0.0	0.0	0.0	0.0	200.000	3160.000

X1	43.900	14.000	2125.000	2710.000	1300.000	2500.000	2000.000	0.0	0.0	0.0
GR	630.000	-100.000	620.000	500.000	610.000	1150.000	610.000	2000.000	610.000	2000.000
GR	612.700	2125.000	599.900	2200.000	599.900	2460.000	598.900	2660.000	610.900	2710.000
GR	610.000	2500.000	620.000	2730.000	630.000	3400.000	650.000	3910.000	0.0	0.0
NC	0.100	0.100	0.030	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FT	0.0	5.100	0.0	0.0	0.0	0.0	0.0	0.0	325.000	0.0

X1	44.000	43.000	2125.000	2710.000	1200.000	1300.000	1300.000	0.0	0.0	0.0
GR	647.000	20.000	639.000	50.000	633.000	100.000	629.000	200.000	628.500	250.000
GR	623.000	350.000	621.400	450.000	618.800	500.000	619.000	550.000	615.500	600.000
GR	615.000	700.000	612.000	850.000	613.000	900.000	613.000	1480.000	612.300	1500.000
GR	613.000	1600.000	615.500	1850.000	608.500	1800.500	609.000	1850.000	609.800	1950.000
GR	612.000	2000.000	613.000	2100.000	613.800	2125.000	600.000	2200.000	601.000	2460.000
GR	600.000	2660.000	612.600	2710.000	612.000	2865.000	609.000	2880.000	609.000	3150.000
GR	610.000	3200.000	610.000	3240.000	609.000	3270.000	609.000	3350.000	611.000	3365.000
GR	614.000	3500.000	616.000	3550.000	621.500	3700.000	621.500	3820.000	623.000	3850.000
GR	625.000	3900.000	627.500	4950.000	628.700	4000.000	0.0	0.0	0.0	0.0
NC	0.100	0.100	0.030	0.0	0.0	0.0	0.0	0.0	0.0	0.0

X1	44.100	15.000	2125.000	2710.000	2000.000	2400.000	2200.000	0.0	0.0	0.0
GR	640.000	0.0	630.000	120.000	620.000	420.000	610.000	1600.000	610.000	2100.000
GR	613.800	2125.000	610.000	2200.000	601.000	2460.000	600.000	2660.000	612.000	2710.000
GR	610.000	2800.000	610.000	2950.000	610.000	3780.000	620.000	3850.000	630.000	4000.000
NC	0.100	0.100	0.030	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FT	0.0	5.100	0.0	0.0	0.0	0.0	0.0	0.0	1080.000	4166.000

X1	44.900	27.000	2965.000	3570.000	3300.000	3250.000	3600.000	0.0	0.0	0.0
GR	630.000	1080.000	620.000	1100.000	610.000	2150.000	610.000	2250.000	610.000	2900.000
GR	616.000	2965.000	614.000	2980.000	605.000	2995.000	603.000	3000.000	600.600	3020.000
GR	600.600	3030.000	601.500	3040.000	601.400	3070.000	601.000	3080.000	601.600	3090.000
GR	601.000	3110.000	601.200	3130.000	600.500	3160.000	601.000	3170.000	600.000	3285.000
GR	601.700	3300.000	601.500	3350.000	611.000	3570.000	610.000	4100.000	610.000	4500.000
GR	620.000	4500.000	630.000	5000.000	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.110	0.110	0.033	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FT	0.0	5.100	0.0	0.0	0.0	0.0	0.0	0.0	606.000	0.0

X1	45.000	80.000	2965.000	3570.000	1800.000	1600.000	1600.000	0.0	0.0	0.0
GR	623.000	0.0	622.800	20.000	618.000	40.000	615.500	100.000	614.800	250.000
GR	614.200	300.000	615.400	350.000	615.000	400.000	615.000	600.000	614.800	640.000
GR	614.200	700.000	612.500	850.000	611.000	863.000	610.000	867.000	611.000	870.000
GR	612.500	900.000	613.000	940.000	613.000	990.000	612.600	1050.000	614.000	1100.000
GR	614.000	1250.000	615.200	1290.000	616.000	1315.000	617.500	1400.000	617.600	1490.000
GR	617.000	1550.000	614.600	1590.000	614.800	1600.000	618.000	1645.000	616.000	1685.000
GR	615.000	1700.000	618.900	1800.000	615.500	1865.000	618.000	1900.000	620.800	1950.000
GR	618.900	2000.000	615.000	2050.000	612.700	2100.000	610.600	2140.000	610.300	2230.000
GR	610.800	2250.000	612.000	2350.000	613.000	2450.000	613.000	2490.000	612.800	2520.000
GR	613.500	2600.000	614.500	2700.000	613.500	2750.000	611.000	2760.000	610.000	2800.000
GR	611.000	2850.000	613.900	2900.000	616.000	2965.000	614.000	2980.000	605.000	2995.000
GR	603.000	3000.000	600.600	3020.000	600.600	3030.000	601.500	3040.000	601.400	3070.000
GR	601.000	3080.000	601.200	3130.000	611.000	3110.000	601.200	3130.000	600.500	3160.000
							601.500	3350.000	601.500	3380.000

GR	600.500	3430.000	[illegible]	[illegible]	3[illegible].000	3530.000	605.000	3550.000	611.000	3570.000
GR	611.000	3600.000	13.[illegible]	3550.000	615.000	3753.000	622.200	3770.000	623.000	3780.000
NC	0.110	0.110	0.033	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	9.100	0.0	0.0	0.0	0.0	0.0	0.0	400.000	0.0
X1	45.100	31.000	2565.000	3570.000	1600.000	2600.000	2300.000	0.0	0.0	0.0
GR	630.000	-100.000	620.000	0.0	610.000	2850.000	610.000	2850.000	610.000	2850.000
GR	615.800	2965.000	613.200	2980.000	604.800	2995.000	602.800	3000.000	600.400	3020.000
GR	600.400	3030.000	601.200	3040.000	601.200	3070.000	600.800	3080.000	601.400	3090.000
GR	600.800	3110.000	601.000	3130.000	600.300	3160.000	600.800	3170.000	599.800	3285.000
GR	601.500	3301.000	601.300	3350.000	601.300	3380.000	600.300	3430.000	601.800	3480.000
GR	601.800	3530.000	604.200	3550.000	610.800	3570.000	620.000	3750.000	630.000	3830.000
GR	640.000	4000.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.110	0.110	0.033	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	9.100	0.0	0.0	0.0	0.0	0.0	0.0	1306.000	0.0
X1	45.200	30.000	2565.000	3570.000	1200.000	3300.000	2950.000	0.0	0.0	0.0
GR	630.000	620.000	620.000	700.000	610.000	2900.000	615.600	2965.000	613.600	2980.000
GR	604.600	2995.000	602.600	3000.000	600.200	3020.000	600.200	3030.000	601.100	3040.000
GR	601.000	3070.000	600.600	3080.000	601.200	3090.000	600.600	3110.000	600.800	3130.000
GR	600.100	3160.000	600.600	3170.000	599.600	3285.000	601.300	3300.000	601.100	3350.000
GR	601.100	3380.000	600.100	3430.000	601.600	3480.000	601.600	3530.000	604.600	3550.000
GR	610.600	3570.000	610.000	3500.000	610.000	4400.000	620.000	4800.000	630.000	5200.000
NC	0.110	0.110	0.033	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	9.100	0.0	0.0	0.0	0.0	0.0	0.0	761.000	0.0
X1	45.900	33.000	1920.000	2548.000	2150.000	1900.000	2150.000	0.0	0.0	0.0
GR	630.000	-100.000	620.000	0.0	610.000	800.000	610.000	1780.000	610.000	1820.000
GR	613.400	1920.000	605.600	1930.000	604.700	1940.000	603.700	1950.000	603.700	2010.000
GR	603.900	2020.000	602.500	2070.000	602.600	2080.000	602.600	2240.000	602.900	2250.000
GR	602.900	2340.000	602.500	2350.000	602.600	2370.000	601.900	2380.000	601.900	2410.000
GR	600.900	2430.000	601.400	2440.000	599.900	2460.000	600.400	2470.000	600.400	2480.000
GR	599.300	2500.000	599.300	2520.000	604.900	2540.000	613.900	2548.000	610.000	2550.000
GR	610.000	3050.000	620.000	3250.000	630.000	3450.000	0.0	0.0	0.0	0.0
NC	0.110	0.110	0.033	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	9.100	0.0	0.0	0.0	0.0	0.0	0.0	936.000	0.0
			Stat	STOHR						
X1	46.000	64.000	1920.000	2548.000	700.000	1900.000	1500.000	0.0	0.0	0.0
GR	646.000	0.0	645.000	10.000	647.000	20.000	617.800	450.000	617.000	500.000
GR	616.000	550.000	615.000	610.000	613.000	700.000	613.000	730.000	612.800	740.000
GR	612.000	800.000	612.000	1020.000	613.500	1100.000	613.000	1160.000	613.000	1210.000
GR	612.800	1220.000	612.800	1310.000	612.000	1320.000	612.000	1370.000	613.000	1400.000
GR	613.000	1470.000	612.000	1500.000	612.000	1610.000	612.800	1650.000	612.200	1660.000
GR	612.200	1790.000	615.500	1850.000	615.000	1890.000	613.500	1920.000	605.700	1930.000
GR	604.800	1940.000	603.800	1950.000	603.800	2010.000	604.000	2020.000	603.000	2070.000
GR	602.700	2080.000	602.700	2240.000	603.000	2250.000	603.000	2340.000	602.700	2350.000
GR	602.700	2370.000	602.000	2380.000	602.000	2410.000	601.000	2430.000	601.500	2440.000
GR	600.000	2460.000	600.500	2470.000	600.500	2480.000	599.400	2500.000	599.400	2520.000
GR	605.000	2540.000	614.000	2548.000	615.000	2570.000	615.000	2730.000	615.900	2740.000
GR	615.900	2850.000	616.000	2860.000	616.000	2900.000	616.500	2910.000	617.000	3000.000
GR	617.000	3020.000	618.000	3050.000	621.000	3080.000	630.000	3400.000	0.0	0.0
NC	0.110	0.110	0.036	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	5.100	0.0	0.0	0.0	0.0	0.0	0.0	1311.000	0.0
X1	46.100	32.000	1920.000	2548.000	1500.000	1700.000	1500.000	0.0	0.0	0.0
GR	630.000	650.000	620.000	750.000	610.000	1100.000	610.000	1550.000	610.000	1880.000
GR	613.700	1920.000	605.900	1930.000	605.000	1940.000	604.000	1950.000	604.000	2010.000
GR	604.200	2020.000	603.200	2070.000	602.900	2080.000	602.900	2240.000	603.200	2250.000
GR	603.200	2340.000	602.900	2350.000	602.900	2370.000	602.200	2380.000	602.200	2410.000
GR	601.200	2430.000	601.700	2440.000	600.200	2460.000	600.700	2470.000	600.700	2480.000
GR	599.600	2500.000	599.600	2520.000	605.200	2540.000	614.200	2548.000	610.000	3050.000
GR	620.000	3620.000	630.000	[illegible]	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.040	0.040	0.036	[illegible]	0.0	0.0	0.0	0.0	0.0	0.0

FT	0.0	5.100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1550.000	4211.000
X1	46.200	34.000	1520.000	2540.000	1900.000	1000.000	1850.000	0.0	0.0	0.0	
GR	630.000	1550.000	620.000	1550.000	610.000	1900.000	610.000	1900.000	610.000	1900.000	
GR	613.800	1920.000	606.000	1930.000	605.100	1940.000	604.100	1950.000	604.100	2010.000	
GR	604.300	2020.000	603.300	2070.000	603.000	2080.000	603.000	2240.000	603.300	2250.000	
GR	603.300	2340.000	603.000	2350.000	603.000	2370.000	602.300	2380.000	602.300	2410.000	
GR	601.300	2430.000	601.300	2440.000	600.300	2460.000	600.800	2470.000	600.800	2480.000	
GR	599.700	2500.000	599.700	2520.000	605.300	2540.000	614.300	2548.000	610.000	2600.000	
GR	610.000	3100.000	610.000	4500.000	620.000	4750.000	630.000	5200.000	0.0	0.0	
NC	0.080	0.050	0.030	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
FT	0.0	5.100	0.0	0.0	0.0	0.0	0.0	0.0	900.000	2713.000	
X1	47.000	81.000	1180.000	1600.000	2700.000	1000.000	2350.000	0.0	0.0	0.0	
GR	626.000	200.000	623.000	250.000	622.900	300.000	621.100	330.000	621.000	340.000	
GR	621.000	440.000	621.500	450.000	621.500	550.000	621.000	560.000	621.000	750.000	
GR	619.000	800.000	618.000	850.000	618.000	950.000	617.000	1000.000	616.000	1050.000	
GR	615.000	1140.000	615.000	1180.000	613.500	1200.000	610.000	1205.000	605.500	1210.000	
GR	604.000	1220.000	603.000	1230.000	602.000	1250.000	601.000	1290.000	600.000	1320.000	
GR	600.000	1370.000	601.000	1380.000	601.000	1420.000	602.500	1450.000	602.000	1460.000	
GR	604.000	1480.000	604.000	1520.000	605.000	1530.000	605.000	1570.000	610.000	1600.000	
GR	609.000	1620.000	612.000	1645.000	612.000	1650.000	608.000	1690.000	608.000	1730.000	
GR	612.000	1735.000	613.000	1750.000	615.600	1850.000	614.000	1875.000	612.900	1880.000	
GR	611.000	1990.000	611.000	2000.000	611.000	2100.000	609.000	2150.000	610.000	2210.000	
GR	610.000	2215.000	612.500	2220.000	611.000	2250.000	611.000	2350.000	612.500	2400.000	
GR	613.000	2421.000	613.000	2500.000	612.000	2550.000	613.000	2600.000	613.000	2650.000	
GR	614.500	2700.000	613.000	2800.000	613.000	3000.000	614.000	3050.000	613.000	3150.000	
GR	616.000	3200.000	616.000	3350.000	614.000	3400.000	613.000	3450.000	613.000	3500.000	
GR	615.000	3550.000	617.000	3600.000	618.400	3650.000	618.400	3750.000	617.000	3810.000	
GR	619.000	3850.000	620.000	3880.000	620.000	3990.000	620.300	4000.000	621.000	4500.000	
GR	630.000	4900.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
OT	2.000	54000.000	54000.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
NC	0.080	0.050	0.030	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
FT	0.0	5.100	0.0	0.0	0.0	0.0	0.0	0.0	387.000	2788.000	

SECTION D/S OF BOGUE RIVER

X1	47.100	28.000	1750.000	2200.000	2000.000	2800.000	2200.000	0.0	0.0	0.0	
GR	630.000	0.0	620.000	1600.000	610.000	1760.000	610.000	1760.000	610.000	1760.000	
GR	615.900	1780.000	614.500	1810.000	610.000	1805.000	605.500	1810.000	604.000	1820.000	
GR	603.000	1830.000	602.000	1850.000	601.000	1890.000	600.000	1920.000	600.000	1970.000	
GR	601.000	1980.000	601.000	2020.000	602.500	2050.000	602.000	2060.000	604.000	2080.000	
GR	604.000	2120.000	605.000	2130.000	605.000	2170.000	610.000	2200.000	610.000	2600.000	
GR	610.000	2750.000	620.000	4250.000	630.000	4320.000	0.0	0.0	0.0	0.0	
OT	2.000	51400.000	51400.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
NC	0.100	0.050	0.033	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
FT	0.0	5.100	0.0	0.0	0.0	0.0	0.0	0.0	805.000	2945.000	

SECTION U/S BOGUE RIVER

X1	47.900	16.000	2073.000	2507.000	500.000	600.000	550.000	0.0	0.0	0.0	
GR	630.000	-200.000	620.000	450.000	610.000	2050.000	610.000	2050.000	610.000	2050.000	
GR	608.700	2073.000	605.400	2080.000	598.600	2240.000	602.700	2370.000	602.700	2420.000	
GR	603.700	2450.000	603.700	2460.000	611.200	2507.000	610.000	2700.000	620.000	3600.000	
GR	630.000	3760.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
NC	0.060	0.100	0.030	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
FT	0.0	5.100	0.0	0.0	0.0	0.0	0.0	0.0	1700.000	0.0	

D/S OF US-131 BRIDGE

X1	49.000	24.000	2540.000	2765.000	1750.000	1750.000	1650.000	0.0	0.0	0.0	
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	622.500	623.500	0.0	
GR	630.000	0.0	624.000	350.000	620.000	720.000	620.000	2050.000	623.500	2050.000	

LR	622.5	622.5	622.5	622.5	597.300	2760.000	597.300	2810.000	600.000	2825.000
GR	661.000	2825.000	611.000	2850.000	599.000	2890.000	600.000	2900.000	601.000	2910.000
GR	599.000	2850.000	611.000	2870.000	620.000	2965.000	630.000	3200.000	0.0	0.0
GR	602.000	2930.000	614.000	2960.000	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.080	0.100	0.030	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SB	0.900	1.250	2.500	0.0	334.250	25.000	7422.000	0.0	597.300	597.300
ET	0.0	9.100	7.100	0.0	0.0	0.0	1864.400	2965.000	1700.000	2965.000

U/S OF US-131 BRIDGE?

DOCUMENTED HIGH WATER MARKS

622.3(1904),620.25(1947),619.3(1960),616.25(1938),612.2(1933)

X1	49.100	0.0	0.0	0.0	56.000	56.000	56.000	0.0	0.0	0.0
X2	0.0	0.0	1.000	621.300	622.500	0.0	0.0	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	622.500	626.800	0.0
PT	14.000	0.0	630.000	0.0	1250.000	624.000	0.0	1700.000	624.000	0.0
PT	1700.000	622.500	0.0	1550.000	623.000	0.0	1950.000	623.200	0.0	2050.000
PT	623.500	0.0	2200.000	624.000	0.0	2400.000	625.000	0.0	2550.000	626.800
PT	0.0	2550.000	626.800	621.300	2965.000	626.800	621.300	2965.000	626.800	0.0
PT	3090.000	625.800	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FT	0.0	0.0	1.400	0.0	0.0	0.0	0.0	0.0	0.0	0.0

X1	50.100	24.000	1430.000	1420.000	415.000	415.000	415.000	0.0	0.0	0.0
GR	627.900	170.000	613.000	2610.000	612.000	250.000	609.500	300.000	610.000	350.000
GR	613.700	400.000	615.000	450.000	615.000	500.000	613.600	550.000	614.200	600.000
GR	611.800	650.000	613.000	700.000	610.000	730.000	610.000	750.000	615.400	800.000
GR	616.600	830.000	616.600	900.000	606.000	930.000	603.600	1010.000	599.500	1110.000
GR	597.800	1150.000	600.000	1220.000	600.000	1250.000	600.800	1270.000	601.900	1290.000
GR	611.000	1350.000	622.800	1400.000	623.000	1420.000	630.000	1550.000	0.0	0.0
NC	0.080	0.100	0.030	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FT	0.0	9.100	0.0	0.0	0.0	0.0	0.0	0.0	1217.000	4500.000

X1	50.900	27.000	2535.000	3060.000	2000.000	3200.000	2750.000	0.0	0.0	0.0
GR	650.000	0.0	640.000	550.000	630.000	920.000	620.000	1380.000	620.000	1380.000
GR	617.300	2535.000	611.400	2570.000	601.400	2610.000	600.400	2640.000	601.400	2650.000
GR	600.400	2680.000	600.400	2700.000	601.200	2710.000	600.400	2720.000	600.600	2750.000
GR	601.200	2750.000	600.100	2780.000	600.400	2790.000	600.400	2840.000	600.200	2850.000
GR	600.200	2870.000	601.200	2960.000	601.200	3010.000	614.200	3060.000	620.000	4400.000
GR	630.000	4500.000	640.000	4510.000	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.080	0.100	0.030	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FT	0.0	9.100	0.0	0.0	0.0	0.0	0.0	0.0	300.000	2900.000

X1	51.000	63.000	1035.000	1560.000	2200.000	1700.000	1979.000	0.0	0.0	0.0
GR	630.000	0.0	630.000	0.0	630.000	0.0	630.000	0.0	630.000	0.0
GR	625.400	100.000	620.500	1130.000	615.000	310.000	613.000	350.000	612.000	400.000
GR	613.000	470.000	613.000	610.000	613.500	610.000	613.500	660.000	614.000	670.000
GR	614.000	720.000	615.000	770.000	615.000	820.000	615.700	850.000	618.800	950.000
GR	618.000	1000.000	618.900	1035.000	603.000	1070.000	603.000	1110.000	602.000	1140.000
GR	603.000	1150.000	602.000	1180.000	602.000	1200.000	602.800	1210.000	602.000	1220.000
GR	602.000	1250.000	602.800	1260.000	601.700	1280.000	602.000	1290.000	602.000	1340.000
GR	601.800	1350.000	601.800	1470.000	602.800	1490.000	602.800	1510.000	615.800	1560.000
GR	616.800	1600.000	617.400	1650.000	615.000	1700.000	615.000	1800.000	612.000	1850.000
GR	612.000	1900.000	611.000	1940.000	611.000	2230.000	611.500	2240.000	611.500	2410.000
GR	612.000	2420.000	612.000	2770.000	613.000	2810.000	613.000	2870.000	614.000	2900.000
GR	614.700	2940.000	614.700	3178.000	622.000	3180.000	627.000	3390.000	627.000	3410.000
GR	626.700	3450.000	630.700	3470.000	631.500	3480.000	0.0	0.0	0.0	0.0
NC	0.080	0.100	0.030	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FT	0.0	9.100	0.0	0.0	0.0	0.0	0.0	0.0	150.000	2920.000

X1	51.100	24.000	1435.000	1560.000	1850.000	2250.000	2000.000	0.0	0.0	0.0
GR	640.000	0.0	630.000	0.0	620.000	200.000	610.000	700.000	610.000	700.000

GR	600.700	1120.000	600.700	1200.000	601.500	1210.000	600.700	1220.000	600.700	1250.000
GR	601.500	1260.000	601.400	1260.000	600.700	1290.000	600.700	1340.000	600.500	1350.000
GR	600.500	1470.000	611.500	1490.000	601.500	1510.000	614.500	1560.000	620.000	2900.000
GR	630.000	3100.000	640.000	3200.000	650.000	3350.000	0.0	0.0	0.0	0.0
NC	0.100	0.080	0.030	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FT	0.0	4.160	0.0	0.0	0.0	0.0	0.0	0.0	1480.000	3749.000

X1	51.900	25.000	510.000	2940.000	2500.000	2900.000	2600.000	0.0	0.0	0.0
GR	650.000	1200.000	640.000	1300.000	630.000	1350.000	620.000	1600.000	610.000	2400.000
GR	611.300	2510.000	610.300	2600.000	599.200	2600.000	600.500	2635.000	600.700	2658.000
GR	601.000	2680.000	600.100	2710.000	601.100	2725.000	602.300	2748.000	603.400	2778.000
GR	603.600	2795.000	605.300	2885.000	605.400	2885.000	609.300	2940.000	616.200	2940.000
GR	620.000	3040.000	620.000	3900.000	630.000	4110.000	640.000	4290.000	650.000	4700.000
NC	0.100	0.080	0.030	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FT	0.0	4.100	0.0	0.0	0.0	0.0	0.0	0.0	1016.000	0.0

U/S OF 30 [illegible] LINE

X1	52.000	26.000	2504.000	3191.000	1550.000	2000.000	2000.000	0.0	0.0	0.0
GR	640.000	1250.000	630.000	1300.000	620.000	1350.000	620.000	1680.000	620.000	2280.000
GR	620.000	2770.000	614.100	2804.000	614.900	2815.000	608.000	2830.000	604.000	2877.500
GR	602.300	2902.500	601.000	2926.100	599.800	2945.000	599.400	2971.000	597.900	3000.000
GR	599.400	3025.000	599.400	3055.000	601.000	3074.000	602.300	3097.500	604.000	3122.500
GR	608.000	3170.000	614.500	3125.000	619.100	3191.000	620.000	3380.000	630.000	3600.000
GR	640.000	3680.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.080	0.080	0.030	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FT	0.0	4.100	0.0	0.0	0.0	0.0	0.0	0.0	1135.000	0.0

X1	52.100	24.000	2510.000	2940.000	1650.000	1900.000	1900.000	0.0	0.0	0.0
GR	650.000	750.000	640.000	820.000	630.000	900.000	620.000	1300.000	620.000	1300.000
GR	610.100	2510.000	609.100	2600.000	598.000	2600.000	599.300	2635.000	599.500	2658.000
GR	599.800	2680.000	599.900	2710.000	600.900	2725.000	601.100	2748.000	601.200	2778.000
GR	602.400	2795.000	604.000	2855.000	604.200	2885.000	608.100	2940.000	615.000	2940.000
GR	620.000	3100.000	630.000	3200.000	640.000	3250.000	650.000	3260.000	0.0	0.0
NC	0.080	0.080	0.033	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FT	0.0	4.100	0.0	0.0	0.0	0.0	0.0	0.0	23.000	0.0

X1	52.900	35.000	540.000	1370.000	1650.000	2900.000	3100.000	0.0	0.0	0.0
GR	650.000	-450.000	640.000	-800.000	630.000	-580.000	620.000	-300.000	610.000	950.000
GR	515.000	980.000	511.800	950.000	608.800	990.000	599.800	1010.000	598.100	1020.000
GR	598.100	1040.000	598.800	1070.000	600.600	1090.000	600.900	1100.000	600.900	1110.000
GR	601.600	1130.000	601.500	1140.000	601.800	1170.000	603.600	1240.000	603.600	1250.000
GR	603.800	1260.000	604.100	1270.000	604.600	1280.000	605.100	1300.000	605.600	1310.000
GR	605.600	1320.000	606.100	1330.000	608.800	1350.000	612.700	1360.000	614.200	1370.000
GR	610.000	2600.000	620.000	2210.000	630.000	2300.000	640.000	2350.000	650.000	2400.000
NC	0.080	0.100	0.030	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FT	0.0	4.100	0.0	0.0	0.0	0.0	0.0	0.0	600.000	2650.000

CANYON-AXIS [illegible] LINE

X1	53.000	56.000	580.000	1370.000	1650.000	800.000	1400.000	0.0	0.0	0.0
GR	644.800	0.0	644.200	10.000	640.100	30.000	638.000	100.000	633.100	200.000
GR	629.000	301.000	620.300	400.000	617.000	500.000	614.600	600.000	613.700	700.000
GR	614.700	801.000	614.600	900.000	615.100	980.000	611.700	980.000	608.900	990.000
GR	599.900	1010.000	598.200	1029.000	598.200	1040.000	598.900	1070.000	600.700	1090.000
GR	601.000	1100.000	601.000	1110.000	601.700	1130.000	601.600	1140.000	601.900	1170.000
GR	602.500	1190.000	602.500	1200.000	602.800	1210.000	603.000	1220.000	603.500	1230.000
GR	603.700	1240.000	603.700	1250.000	603.900	1260.000	604.200	1270.000	604.700	1280.000
GR	605.200	1300.000	605.700	1310.000	605.700	1320.000	606.200	1330.000	608.900	1350.000
GR	612.700	1360.000	614.300	1370.000	614.300	1400.000	612.600	1425.000	611.700	1500.000
GR	611.500	1610.000	612.800	1660.000	612.800	1700.000	613.200	1800.000	613.000	1900.000
GR	612.500	1951.000	611.400	2010.000	609.900	2100.000	612.500	2500.000	627.000	2700.000

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GR     640.000   [illegible]   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
FJ       0.0       [illegible]   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0

*PROF 1

CCHV=    0.100 CEHV=    0.300
*SECNO 42.900
   SECNO     DEPTH     [illegible]     [illegible]     [illegible]     EG       [illegible]     HL       QLOSS    BANK ELEV
   Q         [illegible]     [illegible]     [illegible]     [illegible]     [illegible]     ARGH     VOL      TWA    LEFT/RIGHT
   TIME      [illegible]     [illegible]     [illegible]     [illegible]     XNL      XLCH     XNR      WTN      ELMIN      SSTA
   SLOPE     XLOFL     XLCH      XLOHR     ITRIAL    IDC      ICONT    CORAR    TOPWID     ENDST

3470 ENCROACHMENT STATIONS=      800.0     2720.0  TYPE=     1  TARGET=     1920.000
                GRAND RAPIDS CITY-[illegible] FIELD, [illegible]

                STARTING ELEVATIONS TAKEN FROM FIS OF GRAND RAPIDS CITY

                REC INT YEARS    FLO (CFS)   ELEVATION

                        10        33000       614.7

                        50        48000       617.7

                        100       55000       619.1

                        500       74000       623.6

    42.90     22.00    619.00     0.0       0.0     619.26     0.26      0.0       0.0     611.40
   55000.     4071.    45449.    5480.     5504.    10232.    5550.       0.        0.     606.70
     0.0       0.74      4.44     0.99     0.100     0.030    0.080      0.0     597.00     800.00
 0.000161       0.        0.       0.        1         0        0       0.0    1920.00    2720.00

FLOW DISTRIBUTION FOR SECNO=      42.90          CWSEL=     619.00

STA=      800.     1100.     1400.     1500.     2040.     2150.     2450.     2660.     2720.
  PER Q=      3.1       3.3       1.0      82.6       3.2       3.1       3.0       0.7
   AREA=   2325.0    2404.0     775.0   10232.3    1365.8    2015.2    1728.5     440.5
    VEL=      0.7       0.8       0.7       4.4       1.3       0.8       1.0       0.8

*SECNO 43.000

3470 ENCROACHMENT STATIONS=      100.0     2640.0  TYPE=     1  TARGET=     2540.000
                VALLEY SECTION 43 OF CORPS OF ENGINEERS

    43.00     22.12    619.12     0.0       0.0     619.36     0.24      0.10      0.00     611.40
   55000.     5425.    44709.    4866.     8166.    10294.    5003.      345.       34.     606.70
     0.05      0.66      4.34     0.97     0.100     0.030    0.080     0.030     597.00     172.14
 0.000152      660.      660.      710.        1         0        0       0.0    2467.86    2640.00

FLOW DISTRIBUTION FOR SECNO=      43.00          CWSEL=     619.12

STA=      172.     1100.     1400.     1500.     2040.     2150.     2450.     2640.
  PER Q=      5.5       3.3       1.       81.3       3.1       3.1       2.6
                                                                    [illegible]    1675.2
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    VEL=        1.6        1.7        1.7        4.3        1.3        0.8        0.9

*SECNO 43.900

3470 ENCROACHMENT STATIONS=      200.0     3160.0  TYPE=      1  TARGET=     2960.000
    43.90      20.54     619.44       0.0       0.0     619.64       0.20       0.27       0.00     612.70
   55000.      8148.     43598.      3254.     11936.     10970.      3756.      1385.       133.     610.90
     0.21       0.68       3.97       0.27      0.100      0.030      0.080      0.030     598.90     536.23
 0.000130      1300.      2000.      2500.          2          0          0        0.0    2623.77    3160.00

8930.RDST NOT ON GR CARD        1.0
FLOW DISTRIBUTION FOR SECNO=      43.90          CWSEL=     619.44

STA=       536.      1150.      2000.      2125.      2710.      2900.      3160.
  PER Q=       2.5       11.0        1.3       79.3        2.8        3.1
   AREA=    2897.8     8028.2     1011.6    10970.0     1708.6     2047.9
    VEL=       0.5        0.8        0.7        4.0        0.9        1.8

*SECNO 44.000

3470 ENCROACHMENT STATIONS=      325.0     4000.0  TYPE=      1  TARGET=     -325.000
    44.00      19.62     619.62       0.0       0.0     619.81       0.19       0.17       0.00     613.80
   55000.      7107.     41911.      5982.     10829.     10431.      7746.      2189.       216.     612.00
     0.32       0.66       4.02       0.77      0.100      0.030      0.100      0.030     600.00     484.21
 0.000142      1200.      1300.      1300.          0          0          0        0.0    3164.54    3648.76

FLOW DISTRIBUTION FOR SECNO=      44.00          CWSEL=     619.62

STA=       484.      1480.      1850.      2125.      2710.      3150.      3350.      3649.
  PER Q=       6.2        3.5        3.2       76.2        6.1        3.1        1.6
   AREA=    5712.7     2790.2     2325.8    10431.8     4185.8     2044.2     1515.5
    VEL=       0.6        0.7        0.7        4.0        0.8        0.8        0.6

*SECNO 44.100
   SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         QLOSS    BANK ELEV
   Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA      LEFT/RIGHT
   TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN       SSTA
   SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID      ENDST

    44.10      19.94     619.94       0.0        0.0     620.11       0.16       0.29       0.00     613.80
   55000.      6714.     41132.      3154.     11005.     10619.     10895.      3735.       380.     612.00
     0.53       0.61       3.78       0.75      0.100      0.030      0.100      0.030     600.00     426.77
 0.000123      2000.      2200.      2400.          2          0          0        0.0    3422.83    3849.60

FLOW DISTRIBUTION FOR SECNO=      44.10          CWSEL=     619.94

STA=       427.      1600.      2100.      2125.      2710.      2800.      2950.      3780.      3850.
  PER Q=       5.1        6.9        0.2       73.0        1.0        2.1       11.4        0.3
   AREA=    5832.5     4971.3      201.1    10618.9      804.8     1491.4     8252.4      346.0
    VEL=       0.5        0.8        0.7        3.8        0.7        0.8        0.8        0.5

*SECNO 44.900

3470 ENCROACHMENT STATIONS=     1080.0     4166.0  TYPE=      1  TARGET=     3086.000
    44.90      20.40     620.40       0.0       0.0     620.58       0.18       0.47       0.00     616.00
   55000.     10099.     40041.      4860.     13944.     10225.      5931.      6169.       628.     611.00
     0.85       0.72       3.92       0.82      0.100      0.030      0.100      0.030     600.00    1099.21
 0.000145      3300.      3600.      3250.          1          0          0        0.0    3066.79    4166.00

FLOW DISTRIBUTION FOR SECNO=      44.90          CWSEL=     620.40

STA=      1099       2150.      2250.      2900.      2965.      3570.      4100.      4166.
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AREA=	[illegible]	1035.6	[illegible]	[illegible]	11225.0	5245.1	626.1	
VEL=	0.5	1.5	1.4	1.7	3.4	0.8	0.8	

*SECNO 45.000

3265 DIVIDED FLOW

3470 ENCROACHMENT STATIONS=			606.0	3780.0	TYPE=	1	TARGET=	-606.000		
45.00	20.63	621.03	0.0	0.0	620.83	0.20	0.25	0.01	616.00	
55000.	6349.	44646.	455.	14264.	11251.	1441.	7295.	752.	611.00	
0.94	0.63	3.47	0.62	0.110	0.033	0.110	0.031	600.00	606.00	
0.000159	1800.	1500.	1600.	0	0	0	0.0	3152.57	3766.28	

FLOW DISTRIBUTION FOR SECNO= 45.01 CWSEL= 620.63

STA=	606.	660.	1251.	2241.	2520.	2656.	2965.	3570.	3766.	
PER Q=	3.3	3.1	3.4	4.6	3.2	6.9	81.3	1.7		
AREA=	2812.9	3062.0	3225.8	2472.4	2586.6	777.7	11251.2	1439.8		
VEL=	0.5	0.5	0.6	0.7	0.7	0.6	4.0	0.7		

*SECNO 45.100

3470 ENCROACHMENT STATIONS=			400.0	4000.0	TYPE=	1	TARGET=	-400.000		
45.10	21.18	621.98	0.0	0.0	621.17	0.19	0.33	0.00	615.80	
55000.	6990.	44510.	510.	17276.	11581.	1007.	8561.	886.	610.80	
1.18	0.54	3.44	0.51	0.110	0.033	0.110	0.031	599.80	400.00	
0.000144	1600.	2300.	2600.	1	0	0	0.0	3357.77	3757.77	

FLOW DISTRIBUTION FOR SECNO= 45.10 CWSEL= 620.98

STA=	400.	2250.	2645.	3570.	3751.	3758.				
PER Q=	17.0	1.1	80.9	0.9	0.0					
AREA=	16347.9	925.1	11581.1	1002.7	3.8					
VEL=	0.6	0.7	3.8	0.5	0.1					

*SECNO 45.200

3470 ENCROACHMENT STATIONS=			1306.0	5200.0	TYPE=	1	TARGET=	-1306.000		
45.20	21.77	621.37	0.0	0.0	621.50	0.13	0.33	0.01	615.60	
55000.	7615.	40154.	7826.	12253.	11440.	12005.	10266.	1041.	610.60	
1.46	0.54	3.35	0.65	0.110	0.033	0.110	0.032	599.60	1306.00	
0.000106	1200.	2950.	3300.	1	0	0	0.0	3548.54	4854.54	

FLOW DISTRIBUTION FOR SECNO= 45.21 CWSEL= 621.37

STA=	1306.	2500.	2645.	3570.	3801.	4400.	4800.	4855.		
PER Q=	12.2	1.5	73.0	1.4	11.6	2.2	0.0			
AREA=	12334.7	924.5	11434.5	331.4	4090.7	2545.4	37.2			
VEL=	0.5	0.6	3.4	0.7	0.7	0.5	0.1			

*SECNO 45.900

SECNO	DEPTH	CWSEL	CWIWS	WSELR	FG	HV	HL	ULOSS	BANK ELEV
0	ELCH	QCH	QRCH	XLOB	ACH	ARCH	VHL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XRCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IHC	ICONT	CORAR	TOPWID	ENDST

3470 ENCROACHMENT STATIONS=			761.0	3450.0	TYPE=	1	TARGET=	-761.000	
45.90	22.30	621.60	0.0	0.0	621.74	0.13	0.23	0.00	613.40
55000.	9572.	42363.	4965.	13262.	11911.	7167.	11918.	1185.	613.90
1.68	0.73	3.39	0.69	0.110	0.033	0.110	0.032	599.30	761.00
0.000114	2100.	2150.	1900.	2	0	0	0.0	2521.05	3282.05

FLOW DISTRIBUTION FOR SECNO= [illegible] CWSEL= 621.60

STA=	761.	800.	[illegible]	1820.	1920.	2548.	2550.	3050.	3250.	3282.
PER Q=	0.5	15.3	0.6	1.2	73.4	0.0	7.8	1.2	0.0	
AREA=	443.0	11370.2	464.1	990.2	11910.5	19.3	5801.1	1320.5	25.7	
VEL=	0.6	0.7	0.7	0.7	3.4	0.4	0.7	0.5	0.1	

*SECNO 46.000

3470 ENCROACHMENT STATIONS= [illegible] 3400.0 TYPE= 1 TARGET= -936.000

46.00	22.34	621.74	0.0	0.0	621.94	0.21	0.18	0.02	613.50
55000.	6401.	46947.	1652.	8862.	11925.	3036.	12729.	1252.	614.00
1.80	0.72	3.94	0.54	0.110	0.033	0.110	0.032	599.40	936.00
0.000153	700.	1500.	1900.	1	0	0	0.0	2170.45	3106.45

Near Belmont Avon.

FLOW DISTRIBUTION FOR SECNO= 46.1 CWSEL= 621.74

STA=	936.	1210.	1470.	1790.	1920.	2548.	3080.	3106.
PER Q=	3.2	3.1	4.2	1.1	85.4	3.0	0.0	
AREA=	2484.8	2363.4	3056.1	958.2	11924.7	3025.8	9.8	
VEL=	0.7	0.7	0.8	0.6	3.9	0.5	0.1	

*SECNO 46.100

3470 ENCROACHMENT STATIONS= 1311.0 4000.0 TYPE= 1 TARGET= -1311.000

46.10	22.42	622.02	0.0	0.0	622.18	0.15	0.23	0.01	613.70
55000.	6144.	42641.	6215.	7247.	11973.	9060.	13653.	1334.	614.20
1.94	0.85	3.56	0.65	0.110	0.036	0.110	0.033	599.60	1311.00
0.000149	1500.	1500.	1700.	2	0	0	0.0	2385.79	3696.79

FLOW DISTRIBUTION FOR SECNO= 46.1 CWSEL= 622.02

STA=	1311.	1550.	1880.	1920.	2548.	3050.	3620.	3697.
PER Q=	4.4	6.2	0.6	77.5	6.9	4.4	0.0	
AREA=	2873.0	3966.8	406.8	11972.5	4980.2	4001.8	77.6	
VEL=	0.8	0.9	0.8	3.6	0.8	0.6	0.2	

*SECNO 46.200

3470 ENCROACHMENT STATIONS= 1550.0 4211.0 TYPE= 1 TARGET= 2661.000

46.20	22.59	622.29	0.0	0.0	622.40	0.11	0.22	0.00	613.80
55000.	430.	38320.	16250.	651.	12078.	18300.	14650.	1410.	614.30
2.13	0.66	3.17	0.89	0.090	0.036	0.090	0.033	599.70	1781.38
0.000117	1900.	1850.	1000.	2	0	0	0.0	2429.62	4211.00

FLOW DISTRIBUTION FOR SECNO= 46.20 CWSEL= 622.29

STA=	1781.	1850.	1900.	1920.	2548.	2600.	3100.	3500.	4211.
PER Q=	0.0	0.4	0.3	69.7	0.8	10.6	8.5	9.7	
AREA=	78.5	364.4	207.7	12077.5	527.1	6143.7	4914.9	6714.2	
VEL=	0.2	0.7	0.8	3.2	0.8	0.9	0.9	0.8	

*SECNO 47.000

3470 ENCROACHMENT STATIONS= 900.0 2713.0 TYPE= 1 TARGET= 1813.000

47.00	22.47	622.47	0.0	0.0	622.73	0.26	0.29	0.04	615.90
55000.	1427.	38770.	14803.	1679.	8029.	11885.	15611.	1483.	610.00
2.27	0.85	4.83	1.25	0.080	0.030	0.080	0.033	600.00	900.00
0.000188	2700.	2350.	1000.	2	0	0	0.0	1813.00	2713.00

FLOW DISTRIBUTION FOR SECNO= 47.00 CWSEL= 622.47

[illegible] 2350 2500 2650 2713

PER =	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3.2	3.1	1.0
AREA=	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1488.2	1470.7	540.9
VEL=	[illegible]	[illegible]	1.4	1.1	1.3	1.3	1.2	1.2	1.0

*SECNO 47.100

SECNO	DEPTH	CHSEL	CHIWS	WSELK	EG	HV	HL	QLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AHOB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3470 ENCROACHMENT STATIONS= 387.0 2788.0 TYPE= 1 TARGET= 2401.000

SECTION 1/S OF RIDEAU RIVER

47.10	22.96	622.96	0.0	0.0	623.16	0.20	0.43	0.01	615.90
54000.	7955.	38756.	11307.	8195.	8235.	7617.	16876.	1593.	610.00
2.47	0.95	4.35	1.35	0.000	0.033	0.080	0.033	600.00	563.02
0.000178	2000.	2200.	2400.	2	0	0	0.0	2224.98	2788.00

622.96
621

FLOW DISTRIBUTION FOR SECNO= 47.10 CHSEL= 622.96

STA=	563.	870.	1740.	1760.	2200.	2600.	2750.	2788.
PER Q=	0.2	14.0	0.4	56.3	13.1	4.9	1.0	
AREA=	351.0	7643.7	201.2	8235.1	6184.9	1444.3	487.7	
VEL=	0.3	1.0	1.1	4.3	1.4	1.4	1.1	

*SECNO 47.900

3470 ENCROACHMENT STATIONS= 805.0 2945.0 TYPE= 1 TARGET= 2140.000

SECTION 1/S RIDEAU RIVER

47.90	24.47	623.07	0.0	0.0	623.25	0.18	0.09	0.00	608.70
51400.	9115.	36257.	5017.	11735.	9012.	5272.	17188.	1620.	611.20
2.52	0.78	4.02	1.14	0.100	0.033	0.080	0.033	598.60	805.00
0.000141	500.	550.	600.	0	0	0	0.0	2140.00	2945.00

8930.ROST LOT ON GR CANL 0.0

FLOW DISTRIBUTION FOR SECNO= 47.90 CHSEL= 623.07

STA=	805.	2050.	2173.	2587.	2700.	2945.
PER Q=	17.1	0.6	70.6	5.5	6.2	
AREA=	11419.3	315.4	9012.2	2405.3	2866.9	
VEL=	0.8	1.0	4.0	1.2	1.1	

*SECNO 49.000

3265 DIVIDED FLOW

3470 ENCROACHMENT STATIONS= 1700.0 3200.0 TYPE= 1 TARGET= -1700.000

3495 OVERBANK AREA ASSUMED NOT=EFFECTIVE.ELEFA= 622.50 ELRFA= 623.50

M44 on Northland Bridge

D/S OF ~~[illegible]~~ F

49.00	25.84	623.14	0.0	0.0	623.64	0.50	0.29	0.09	626.80
51400.	888.	50516.	0.	1000.	8847.	0.	17816.	1668.	620.00
2.60	0.81	5.71	0.0	0.060	0.030	0.100	0.033	597.30	1700.00
0.000237	1250.	1650.	1750.	2	0	0	0.0	765.00	2965.00

```
STA=      1700.      2050.      2965.
  PER Q=        1.7       96.3
   AREA=    1099.3     8847.6
    VEL=        0.8        5.7

SPECIAL BRIDGE

SB   XK        XKOR       COEF       BELEV      BWC        BWR        BAREA      SS         ELCHU      ELCHD
     0.90       1.25       2.[illegible]       [illegible]      334.25     25.00      7422.00    0.0        597.30     597.30

*SECNO 49.100

3265 DIVIDED FLOW

PRESSURE AND WEIR FLOW

 EGRRS      EGLWC      [illegible]      OWEIR      QER        EAREA      TRAPEZOID      ELLC       ELTRD
                                                                          AREA
   624.07     623.67     0.03       1003.      50264.     7422.      7422.      621.30     622.50

3470 ENCROACHMENT STATIONS=     1700.0     2965.0   TYPE=      1   TARGET=     1265.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE.ELLEA=       622.50 ELREA=       626.80

M-44      U/S OF US-1[illegible] BRIDGE

          DOCUMENTED HIGH WATER MARKS
          54100      38600      31800      36300      11500
          622.3(1904).620.25(1947).619.3(1960).616.25(1938).612.2(1933)

    49.10      26.25     623.55      0.0        0.0      624.03      0.48       0.39       0.0      626.80
   51400.       797.     50603.       0.       1243.      9017.        0.      17829.      1669.   100000.00
     2.60       0.64       5.61      0.0       0.080      0.030      0.100      0.033     597.30     1700.00
 0.000226        56.        56.       56.          2          0          3        0.0     772.51     2965.00

8930.RDST NOT ON GR CARD    1250.00
8930.RDST NOT ON GR CARD    1850.00
8930.RDST NOT ON GR CARD    2200.00
8930.RDST NOT ON GR CARD    3090.00
FLOW DISTRIBUTION FOR SECNO=      49.10          CWSEL=     623.55

STA=      1700.      2050.      2965.
  PER Q=        1.5       98.5
   AREA=    1242.3     9016.8
    VEL=        0.6        5.6

*SECNO 50.100
    50.10      26.11     623.91      0.0        0.0      624.13      0.23       0.08       0.03     616.60
   51400.      8164.     43236.       1.       7131.     10471.        8.      17962.      1678.      623.00
     2.63       1.14       4.13      0.11       0.080      0.030      0.100      0.033     597.80     178.04
 0.000151       415.       415.      415.          2          0          0        0.0    1258.80    1436.84

FLOW DISTRIBUTION FOR SECNO=      50.10          CWSEL=     623.91

STA=       178.       300.       400.       600.       730.       830.      1420.      1437.
  PER Q=        3.1        3.2        3.[illegible]        3.4        2.4       84.1        0.0
   AREA=    1347.9     1310.7     19[illegible]     14[illegible]     1[illegible]     10470.9        7.6
    VEL=        1.2        1.[illegible]        [illegible]        1.2        1.1        [illegible]        0.1
```

*SECNO 50.900

SECNO	DEPTH	CWSEL	CRIWS	VSEL	EG	HV	HL	QLOSS	BANK ELEV
Q	QLOB	QCH	QROB	LOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IBC	ICONT	CORAR	TOPWID	ENDST

3470 ENCROACHMENT STATIONS= 1217.0 4500.0 TYPE= 1 TARGET= 3283.000

50.90	24.17	624.27	0.0	0.0	624.44	0.17	0.30	0.01	617.30
51400.	3664.	42779.	4955.	6994.	11760.	9695.	14342.	1810.	614.20
2.87	0.53	3.64	0.51	0.080	0.030	0.100	0.033	600.10	1217.00
0.000067	2000.	2750.	3200.	2	0	0	0.0	3225.67	4442.67

FLOW DISTRIBUTION FOR SECNO= 50.90 CWSEL= 624.27

STA=	1217.	1380.	2535.	4460.	4443.
PER Q=	0.3	0.5	98.2	0.0	
AREA=	406.7	4487.7	11760.5	9803.9	91.0
VEL=	0.3	0.5	3.6	0.5	0.2

*SECNO 51.000

3470 ENCROACHMENT STATIONS= 300.0 2600.0 TYPE= 1 TARGET= 2600.000

51.00	22.79	624.49	0.0	0.0	624.60	0.11	0.15	0.01	618.90
51400.	5362.	35337.	10701.	7231.	11044.	16011.	20718.	1939.	615.80
3.10	0.74	3.28	0.67	0.080	0.030	0.100	0.034	601.70	300.00
0.000073	2200.	1979.	1760.	1	0	0	0.0	2599.99	2900.00

FLOW DISTRIBUTION FOR SECNO= 51.00 CWSEL= 624.49

STA=	300.	470.	660.	950.	1035.	1560.	1900.	2230.	2410.	2770.	2900.
PER Q=	3.0	3.4	3.5	0.5	66.7	3.6	6.2	3.2	6.0	1.8	
AREA=	1952.5	2156.5	2605.4	516.3	11043.8	3236.1	4433.2	2341.5	4500.5	1499.3	
VEL=	0.8	0.8	0.7	0.5	3.2	0.6	0.7	0.7	0.7	0.6	

*SECNO 51.100

3470 ENCROACHMENT STATIONS= 150.0 2920.0 TYPE= 1 TARGET= 2770.000

51.10	24.22	624.62	0.0	0.0	624.76	0.14	0.15	0.01	617.60
51400.	6380.	40165.	4855.	3601.	11791.	9454.	22249.	2067.	614.50
3.30	0.74	3.41	0.49	0.080	0.030	0.100	0.033	600.40	150.00
0.000076	1850.	2000.	2250.	2	0	0	0.0	2769.99	2920.00

FLOW DISTRIBUTION FOR SECNO= 51.10 CWSEL= 624.62

STA=	150.	200.	700.	1035.	1560.	2500.	2920.
PER Q=	0.1	6.2	5.5	72.1	9.4	6.0	
AREA=	168.4	4805.5	3823.7	11790.8	9872.0	82.3	
VEL=	0.4	0.7	0.8	3.4	0.5	0.3	

*SECNO 51.900

3470 ENCROACHMENT STATIONS= 1480.0 3749.0 TYPE= 1 TARGET= 2269.000

51.90	25.67	624.82	0.0	0.0	625.07	0.26	0.28	0.03	611.30
51400.	8739.	39771.	2891.	9644.	8657.	4085.	23852.	2223.	616.20
3.49	0.90	4.59	0.71	0.100	0.030	0.080	0.032	599.20	1480.00
0.000166	2500.	2600.	2900.	0	0	0	0.0	2269.00	3749.00

FLOW DISTRIBUTION FOR SECNO= 51.90 CWSEL= 624.82

STA=	1480.	1500.	2411.	2515.	2941.	3040.	3749.

```
   AREA=     289.7    7851.6    1558.1    8656.6     671.4    3413.4
    VEL=       0.3       [illegible]       1.1       [illegible]       0.9       0.7

*SECNO 52.000

3470 ENCROACHMENT STATIONS=     1016.0     3680.0  TYPE=      1  TARGET=    -1016.000

          \      U/S OF TOWNSHIP LINE

    52.00     27.16    625.[illegible]      0.0       0.0    625.48      0.42      0.36      0.05    619.10
   51400.     4709.    45[illegible].     1011.     7470.     8306.     1324.    24671.     2312.    619.10
     3.60      0.63      5.50      0.76     0.100     0.030     0.080     0.032    597.90   1324.68
 0.000208     1550.     2000.     2000.         2         0         0       0.0   2166.72   3491.40

FLOW DISTRIBUTION FOR SECNO=      52.00            CWSEL=     625.06

STA=     1325.     1350.     1[illegible].     2280.     2770.     2809.     3191.     3380.     3491.
  PER Q=       0.0       2.1       3.7       3.0       0.3      88.9       1.7       0.3
   AREA=      64.1    1671.[illegible]    3038.2    2481.2     215.0    8305.7    1042.1     282.1
    VEL=       0.4       0.6       0.6       0.6       0.7       5.5       0.8       0.5

*SECNO 52.100
   SECNO     DEPTH     CWSEL     CRIWS     XSELK     EG        HV        HL        OLOSS    BANK ELEV
   Q         QLOB      QCH       QROB      QLOB      ACH       AROB      VOL       TWA    LEFT/RIGHT
   TIME      VLOB      VCH       VROB      XNL       XLCH      XNR       WTN       ELMIN       SSTA
   SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID      ENDST

3470 ENCROACHMENT STATIONS=     1135.0     3260.0  TYPE=      1  TARGET=    -1135.000
    52.10     27.59    625.59      0.0       0.0    625.78      0.19      0.28      0.02    610.10
   51400.    12319.    37992.     1089.    13341.     9467.     1452.    25513.     2395.    615.00
     3.76      0.92      4.01      0.75     0.080     0.030     0.080     0.032    598.00   1135.00
 0.000112     1650.     1900.     1900.         2         0         0       0.0   2020.94   3155.94

FLOW DISTRIBUTION FOR SECNO=      52.10            CWSEL=     625.59

STA=     1135.     1300.     2510.     2940.     3100.     3156.
  PER Q=       0.5      23.5      73.9       2.0       0.1
   AREA=     582.7   12758.2    9467.3    1295.0     156.5
    VEL=       0.5       0.9       4.0       0.8       0.4

*SECNO 52.900

3470 ENCROACHMENT STATIONS=       23.0     2400.0  TYPE=      1  TARGET=      -23.000
    52.90     27.85    625.95      0.0       0.0    626.06      0.11      0.27      0.01    615.00
   51400.    10798.    29926.    10677.    11757.     8928.    11097.    27061.     2505.    614.20
     4.09      0.92      3.35      0.96     0.080     0.033     0.080     0.033    598.10     23.00
 0.000087     1650.     3100.     2400.         2         0         0       0.0   2236.55   2259.55

8930,RDST NOT ON GR CARD       0.0
FLOW DISTRIBUTION FOR SECNO=      52.90            CWSEL=     625.95

STA=       23.      950.      [illegible].     1370.     2000.     2200.     2260.
  PER Q=      20.2       [illegible]      [illegible].2      17.0       3.6       0.1
   AREA=   11352.9     403.6    [illegible]927.[illegible]    [illegible]726.5    2191.0     177.3
    VEL=       0.9       1.0       3.4       1.0       0.9       0.4

*SECNO 53.000

3470 ENCROACHMENT STATIONS=      600.0     2650.0  TYPE=      1  TARGET=     2050.000

          CANNON-ADA TOWNSHIP LINE

    [illegible]                                                  15      0.12      0.01    615.10
```

51400.	3924.	33575.	13901.	4408.	8925.	17157.	27913.	2563.	614.30
4.22	0.85	3.76	0.81	0.080	0.030	0.100	0.033	598.20	600.00
0.000091	1650.	1400.	800.	2	0	0	0.0	2050.00	2650.00

FLOW DISTRIBUTION FOR SECNO= 53.00 CWSEL= 626.04

STA=	600.	800.	980.	1370.	1600.	1800.	1960.	2100.	2500.	2650.
PER Q=	4.1	3.5	65.3	5.6	4.1	3.2	3.5	9.9	1.3	
AREA=	2373.2	2034.4	8926.5	3152.9	2651.2	2091.6	2109.7	5936.4	1215.5	
VEL=	0.9	0.9	3.5	0.8	0.8	0.8	0.9	0.9	0.6	

00BREAK00

1) COUNTY: KENT COUNTY

2) STUDY NAME: PLAINFIELD TOWNSHIP

3) WATERCOURSE: GRAND RIVER

4) DOCUMENT TYPE: REPORT

00BREAK00

HYDRAULIC ANALYSIS REPORT

GRAND RIVER AT PLAINFIELD TOWNSHIP

KENT COUNTY, MICHIGAN

Prepared by

COMMONWEALTH ASSOCIATES INC.
209 East Washington
Jackson, Michigan 49201

January 1979

Introduction

Hydraulic calculations were performed for the Grand River within the entire corporate boundaries of Plainfield Township. Field cross section data, surveyed in 1968, were obtained from the Corps of Engineers office in Detroit. These cross sections were extended based on U.S.G.S. 10-foot contour topographic maps. This study was matched with the City of Grand Rapids FIS at the downstream limit. The flood flows for 10, 50, 100 and 500 year recurrence intervals were approved by the Michigan Department of Natural Resources. This study was performed by Commonwealth Associates Inc., Jackson, Michigan, and the Project Manager was E. A. Meyer, P.E.

Method of Analysis

The HEC-2 computer program was utilized for the entire hydraulic analysis.

Variables and Coefficients

Manning's Roughness Coefficient

For Channel	0.030 - 0.036
For Overbanks	0.060 - 0.110

Coefficients for Floodway

Contraction	0.10
Expansion	0.30

Coefficients for Bridges

Contraction	0.30
Expansion	0.50

Ratios

Contraction	1:1
Expansion	1:4

Coefficients for Weir Flow 2.6

The estimated coefficient for weir flow was somewhat higher than 2.6. This lower value was used in the model to represent the flow continuity better.

High Water Marks

A number of high water marks including the 1904 flood at the US-131 bridge were documented in the Technical Appendix to FPI study by the Corps of Engineers.[1] These high water marks were fairly well reproduced by a preliminary HEC-2 model as shown in Figure 1.

Starting Conditions

Starting elevations were based on the FIS of the City of Grand Rapids.[2]

Special Problems

There were no special problems in the study.

References

1. U.S. Department of the Army, Corps of Engineers, Technical Appendix, Flood Plain Information, Grand River, Grand Rapids, Michigan, 1972.

2. U.S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Insurance Study, City of Grand Rapids, Michigan, 1977.

CROSS SECTION REFERENCE

Miles Above Mouth	Cross Section ID in Profile/ Table	Sec. No. in HEC-2 Program	Corps of Engineers Cross Section No.
45.68	A	43	43
46.31	B	44	44
47.71	C	45	45
49.39	D	46	46
50.47	E	47	47
51.31	F	49	49
52.29	G	51	51
53.54	H	52	52
54.75	I	53	1 (Ada Twp. FPI Study)

Bridge Notes and Sketches

U.S. 131 bridge

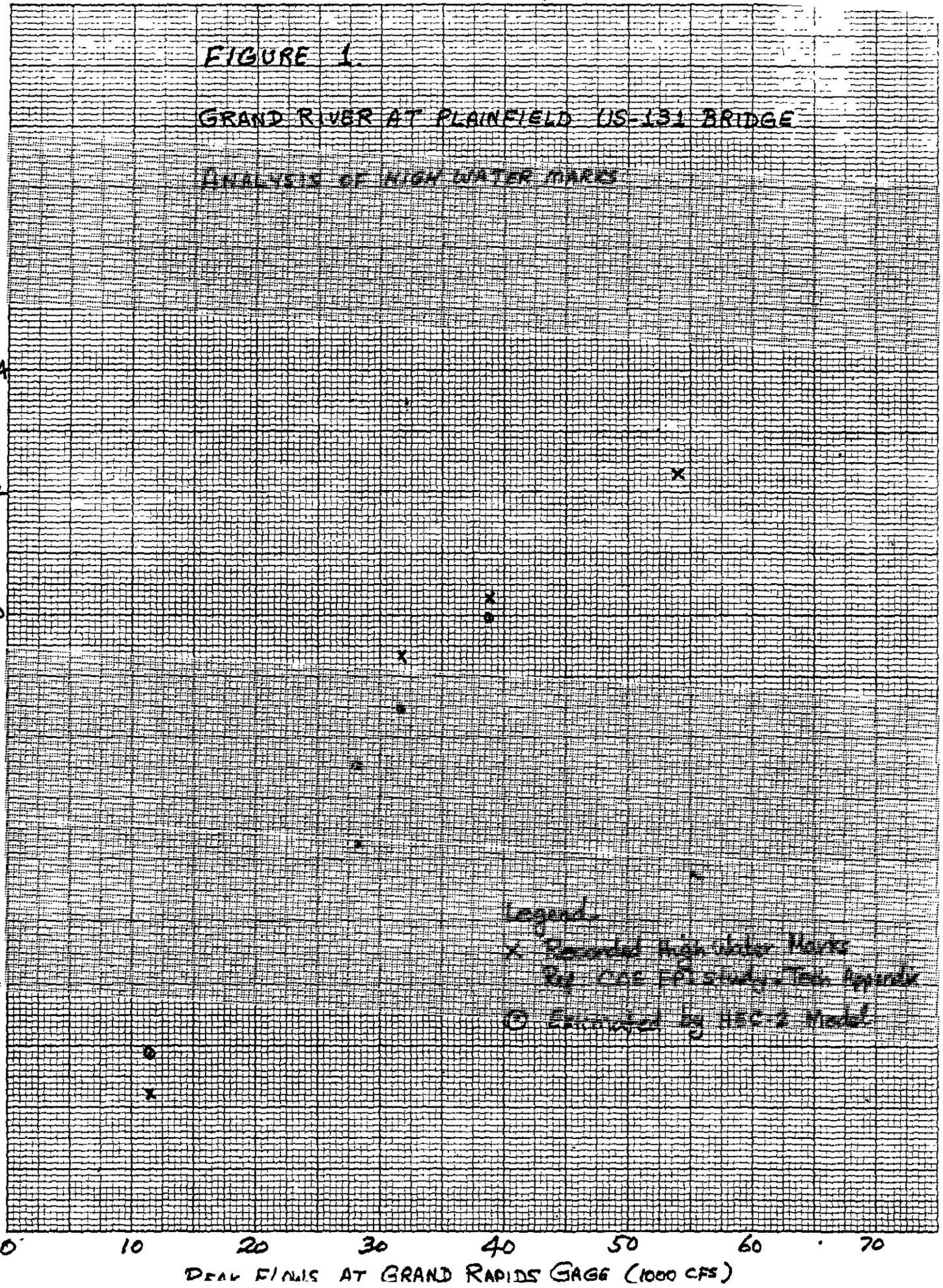
Pier coefficient for low flow 0.90

A total loss coefficient, "XKOR", of 1.25 was used since the friction loss was negligibly small.

FIGURE 1.

GRAND RIVER AT PLAINFIELD US-131 BRIDGE

ANALYSIS OF HIGH WATER MARKS



53000 cfs	GCA			(-)				(+)	COE			63000 cfs
X-SEC		100 YEAR		WIDTH		ΔEL.		ΔFloodWAY		50 YEAR		WIDTH R1016-1
												Approx
A (43)		619.21		2250		-1.01				620.22		2100
	3300											
B (44)		619.71		2900		-0.89				620.6		3400
	7400											
C (45)		620 71		2986		-0.82				621.53		2800
	8900											
D (46)		621.82		2100		-0,55				622.37		2300
	5700											
E (47)		622.55		1810		-0.52				623.07		2700
	4400	New Q = 51400 cfs								New Q = 50700 cfs		
F (49)		623.21		765		-0.43				623.64	V	1800 M-44
	1979											
G (51)		624 55		2600		-0.74				625.24		2000
	5000											
H (52)		625.12		1850		-0.67				623.79		1600-1900
	1400											
I (53)		626.12		2000		-0.36				626.48		2000 #1 ADA

No range from 0.03 to 0.07

H.W. Marks (49.10)

Year	Q	stage	GCA		Q	
			623.14	d/s		
1904	54000	622.3	623.55	u/s	51400	
1933	11500	612.2				
1938	36300	616.25				
1947	38600	620.25	621.95 622.21	d/s u/s	44900	
1960	31800	619.3	619.11 619.12	d/s u/s	30800	

GCA 22700 51400 44900 30800

Bridge replaced in 1964



1) COUNTY: KENT

2) STUDY NAME: PLAINFIELD TOWNSHIP

3) WATERCOURSE: GRAND RIVER

4) DOCUMENT TYPE: SUMMARY INPUT & OUTPUT TABLES



COMMONWEALTH ASSOC. INC.

FIS PLAINFIELD TWP, KENT Co., MI

GRAND RIVER

SUMMARY OF INPUT & OUTPUT FOR 10, 50, 100 & 500-YR FLOWS AND FHF TABLE

Dan 1-25-79

THIS RUN EXECUTED 01/10/79

```
*****************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED  AUG1977
  ERROR CORR -  01,02
  MODIFICATION -  50,51,52,53
*****************************************************
```

```
C
T1      GRAND RIVER, KENT COUNTY, MICHIGAN.          10-YEAR FLOOD
T2      PLAINFIELD TOWNSHIP HUD1 62-0104-010
T3      GRAND RIVER,MICHIGAN.
```

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
	0.	2.	0.	0.	0.0	0.0	0.0	0.	614.700	0.0

J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	1.000	0.0	-1.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0

J3 VARIABLE CODES FOR SUMMARY PRINTOUT

	110.000	150.000	201.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0

J5 LPRNT NUMSEC ********REQUESTED SECTION NUMBERS********

	-10.000	-10.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
QT	4.000	33000.000	48000.000	55000.000	74000.000	0.0	0.0	0.0	0.0	0.0		
NC	0.100	0.080	0.030	0.100	0.300	0.0	0.0	0.0	0.0	0.0		
ET	0.0	9.100	9.100	9.100	9.100	0.0	0.0	0.0	800.000	2720.000		

GRAND RAPIDS CITY-PLAINFIELD TWP LINE

STARTING ELEVATIONS TAKEN FROM FIS OF GRAND RAPIDS CITY

REC INT YEARS	FLOW(CFS)	ELEVATION
10	33000	614.7
50	48000	617.7
100	55000	619.0
500	74000	623.6

X1	42.900	84.000	1500.000	2040.000	0.0	0.0	0.0	0.0	0.0	0.0
GR	623.000	100.000	620.000	150.000	618.000	200.000	616.000	400.000	611.500	800.000
GR	611.000	1100.000	610.800	1190.000	611.000	1220.000	611.200	1250.000	611.000	1350.000
GR	610.800	1400.000	611.400	1450.000	611.400	1500.000	611.000	1510.000	605.000	1525.000
GR	601.000	1540.000	601.000	1558.000	601.000	1580.000	601.000	1600.000	600.300	1670.000
GR	600.000	1680.000	600.000	1700.000	599.900	1710.000	599.400	1730.000	599.400	1750.000
GR	599.000	1770.000	599.000	1800.000	599.300	1820.000	599.000	1830.000	599.000	1860.000
GR	598.000	1870.000	598.000	1900.000	597.000	1930.000	597.900	1940.000	597.900	1990.000
GR	598.700	2000.000	599.400	2010.000	599.200	2020.000	601.000	2023.000	602.000	2024.000
GR	603.000	2026.000	604.000	2029.000	604.700	2030.000	606.700	2040.000	604.700	2050.000
GR	604.700	2105.000	606.000	2110.000	607.000	2114.000	609.000	2120.000	610.000	2130.000
GR	611.300	2150.000	612.000	2175.000	612.000	2190.000	612.400	2200.000	613.000	2210.000
GR	613.000	2280.000	612.600	2300.000	612.000	2335.000	612.000	2400.000	611.700	2435.000
GR	611.400	2450.000	610.900	2480.000	610.900	2530.000	611.000	2540.000	611.000	2570.000

GR	610.500	2610.000	610.000	2640.000	610.500	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
GR	612.700	2720.000	614.400	2800.000	616.400	2900.000	617.000	2950.000	615.000	3080.000
GR	616.600	3200.000	617.200	3300.000	618.000	3350.000	617.200	3400.000	622.000	3450.000
GR	622.200	3500.000	623.300	3550.000	622.700	3600.000	624.000	3650.000	0.0	0.0
NC	0.100	0.080	0.030	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	9.100	9.100	9.100	9.100	0.0	0.0	0.0	100.000	2640.000

VALLEY SECTION 43 OF CORPS OF ENGINEERS

X1	43.000	0.0	0.0	0.0	660.000	710.000	660.000	0.0	0.0	0.0
NC	0.100	0.080	0.030	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	9.100	9.100	9.100	9.100	0.0	0.0	0.0	200.000	3160.000
X1	43.900	14.000	2125.000	2710.000	1300.000	2500.000	2000.000	0.0	0.0	0.0
GR	630.000	-100.000	620.000	500.000	610.000	1150.000	610.000	2000.000	610.000	2000.000
GR	612.700	2125.000	598.900	2200.000	599.900	2460.000	598.900	2660.000	610.900	2710.000
GR	610.000	2900.000	620.000	3730.000	630.000	3900.000	650.000	3910.000	0.0	0.0
NC	0.100	0.100	0.030	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	9.100	9.100	9.100	9.100	0.0	0.0	0.0	325.000	0.0
X1	44.000	43.000	2125.000	2710.000	1200.000	1300.000	1300.000	0.0	0.0	0.0
GR	647.000	20.000	639.000	50.000	633.000	100.000	629.000	200.000	628.500	250.000
GR	623.000	350.000	621.400	450.000	618.800	500.000	619.000	550.000	615.500	600.000
GR	615.000	700.000	612.000	850.000	613.000	900.000	613.000	1480.000	612.300	1500.000
GR	613.000	1600.000	615.500	1650.000	608.500	1800.500	609.000	1850.000	609.800	1950.000
GR	612.000	2000.000	613.000	2100.000	613.800	2125.000	600.000	2200.000	601.000	2460.000
GR	600.000	2660.000	612.000	2710.000	612.000	2865.000	609.000	2880.000	609.000	3150.000
GR	610.000	3200.000	610.000	3240.000	609.000	3270.000	609.000	3350.000	611.000	3365.000
GR	614.000	3500.000	616.000	3550.000	621.500	3700.000	621.500	3820.000	623.000	3850.000
GR	625.000	3900.000	627.500	3950.000	628.700	4000.000	0.0	0.0	0.0	0.0
NC	0.100	0.100	0.030	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X1	44.100	15.000	2125.000	2710.000	2000.000	2400.000	2200.000	0.0	0.0	0.0
GR	640.000	0.0	630.000	120.000	620.000	420.000	610.000	1600.000	610.000	2100.000
GR	613.800	2125.000	600.000	2200.000	601.000	2460.000	600.000	2660.000	612.000	2710.000
GR	610.000	2800.000	610.000	2950.000	610.000	3780.000	620.000	3850.000	630.000	4000.000
NC	0.100	0.100	0.030	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	9.100	9.100	9.100	9.100	0.0	0.0	0.0	1080.000	4166.000
X1	44.900	27.000	2965.000	3570.000	3300.000	3250.000	3600.000	0.0	0.0	0.0
GR	630.000	1080.000	620.000	1100.000	610.000	2150.000	610.000	2250.000	610.000	2900.000
GR	616.000	2965.000	614.000	2980.000	605.000	2995.000	603.000	3000.000	600.600	3020.000
GR	600.600	3030.000	601.500	3040.000	601.400	3070.000	601.000	3080.000	601.600	3090.000
GR	601.000	3110.000	601.200	3130.000	600.500	3160.000	601.000	3170.000	600.000	3285.000
GR	601.700	3300.000	601.500	3350.000	611.000	3570.000	610.000	4100.000	610.000	4500.000
GR	620.000	4900.000	630.000	5000.000	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.110	0.110	0.033	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	9.100	9.100	9.100	9.100	0.0	0.0	0.0	606.000	0.0
X1	45.000	80.000	2965.000	3570.000	1800.000	1600.000	1600.000	0.0	0.0	0.0
GR	623.000	0.0	622.800	20.000	618.000	40.000	615.500	100.000	614.800	250.000
GR	614.200	300.000	615.400	350.000	615.000	400.000	615.000	600.000	614.800	640.000
GR	614.200	700.000	612.500	850.000	611.000	863.000	610.000	867.000	611.000	870.000
GR	612.500	900.000	613.000	940.000	613.000	990.000	612.600	1050.000	614.000	1100.000
GR	614.000	1250.000	615.200	1290.000	616.000	1315.000	617.500	1400.000	617.600	1490.000
GR	617.000	1550.000	614.800	1590.000	614.800	1600.000	618.000	1645.000	616.000	1685.000
GR	616.000	1700.000	618.900	1800.000	615.500	1865.000	618.000	1900.000	620.800	1950.000
GR	618.900	2000.000	615.000	2050.000	612.700	2100.000	610.600	2140.000	610.300	2230.000
GR	610.800	2250.000	612.000	2350.000	613.000	2450.000	613.000	2490.000	612.800	2520.000
GR	613.500	2600.000	614.500	2700.000	613.500	2750.000	611.000	2760.000	610.000	2800.000
GR	611.000	2850.000	613.900	2900.000	616.000	2965.000	614.000	2980.000	605.000	2995.000
GR	603.000	3000.000	600.600	3020.000	600.600	3030.000	601.500	3040.000	601.400	3070.000

GR	601.000	3080.000	601.600	3090.000	601.000	3110.000	601.200	3130.000	601.300	3140.000
GR	601.000	3170.000	600.000	3285.000	601.700	3300.000	601.500	3350.000	601.500	3380.000
GR	600.500	3430.000	602.000	3480.000	602.000	3530.000	605.000	3550.000	611.000	3570.000
GR	611.000	3600.000	613.000	3650.000	615.000	3753.000	622.200	3770.000	623.000	3780.000
NC	0.110	0.110	0.033	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	9.100	9.100	9.100	9.100	0.0	0.0	0.0	400.000	0.0
X1	45.100	31.000	2965.000	3570.000	1600.000	2600.000	2300.000	0.0	0.0	0.0
GR	630.000	-100.000	620.000	0.0	610.000	2850.000	610.000	2850.000	610.000	2850.000
GR	615.800	2965.000	613.800	2980.000	604.800	2995.000	602.800	3000.000	600.400	3020.000
GR	600.400	3030.000	601.300	3040.000	601.200	3070.000	600.800	3080.000	601.400	3090.000
GR	600.800	3110.000	601.000	3130.000	600.300	3160.000	600.800	3170.000	599.800	3285.000
GR	601.500	3300.000	601.300	3350.000	601.300	3380.000	600.300	3430.000	601.800	3480.000
GR	601.800	3530.000	604.800	3550.000	610.800	3570.000	620.000	3750.000	630.000	3830.000
GR	640.000	4000.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.110	0.110	0.033	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	9.100	9.100	9.100	9.100	0.0	0.0	0.0	1306.000	0.0
X1	45.200	30.000	2965.000	3570.000	1200.000	3300.000	2950.000	0.0	0.0	0.0
GR	630.000	620.000	620.000	700.000	610.000	2900.000	615.600	2965.000	613.600	2980.000
GR	604.600	2995.000	602.600	3000.000	600.200	3020.000	600.200	3030.000	601.100	3040.000
GR	601.000	3070.000	600.600	3080.000	601.200	3090.000	600.600	3110.000	600.800	3130.000
GR	600.100	3160.000	600.600	3170.000	599.600	3285.000	601.300	3300.000	601.100	3350.000
GR	601.100	3380.000	600.100	3430.000	601.600	3480.000	601.600	3530.000	604.600	3550.000
GR	610.600	3570.000	610.000	3600.000	610.000	4400.000	620.000	4800.000	630.000	5200.000
NC	0.110	0.110	0.033	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	9.100	9.100	9.100	9.100	0.0	0.0	0.0	761.000	0.0
X1	45.900	33.000	1920.000	2548.000	2150.000	1900.000	2150.000	0.0	0.0	0.0
GR	630.000	-100.000	620.000	0.0	610.000	800.000	610.000	1780.000	610.000	1820.000
GR	613.400	1920.000	605.600	1930.000	604.700	1940.000	603.700	1950.000	603.700	2010.000
GR	603.900	2020.000	602.500	2070.000	602.600	2080.000	602.600	2240.000	602.900	2250.000
GR	602.900	2340.000	602.600	2350.000	602.600	2370.000	601.900	2380.000	601.900	2410.000
GR	600.900	2430.000	601.400	2440.000	599.900	2460.000	600.400	2470.000	600.400	2480.000
GR	599.300	2500.000	599.300	2520.000	604.900	2540.000	613.900	2548.000	610.000	2550.000
GR	610.000	3050.000	620.000	3250.000	630.000	3450.000	0.0	0.0	0.0	0.0
NC	0.110	0.110	0.033	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	9.100	9.100	9.100	9.100	0.0	0.0	0.0	936.000	0.0
X1	46.000	64.000	1920.000	2548.000	700.000	1900.000	1500.000	0.0	0.0	0.0
GR	646.000	0.0	645.000	10.000	647.000	20.000	617.800	450.000	617.000	500.000
GR	616.000	550.000	615.000	610.000	613.000	700.000	613.000	730.000	612.800	740.000
GR	612.000	800.000	612.000	1020.000	613.500	1100.000	613.000	1160.000	613.000	1210.000
GR	612.800	1220.000	612.800	1310.000	612.000	1320.000	612.000	1370.000	613.000	1400.000
GR	613.000	1470.000	612.000	1500.000	612.000	1610.000	612.800	1650.000	612.200	1660.000
GR	612.200	1790.000	615.500	1850.000	615.000	1890.000	613.500	1920.000	605.700	1930.000
GR	604.800	1940.000	603.800	1950.000	603.800	2010.000	604.000	2020.000	603.000	2070.000
GR	602.700	2080.000	602.700	2240.000	603.000	2250.000	603.000	2340.000	602.700	2350.000
GR	602.700	2370.000	602.000	2380.000	602.000	2410.000	601.000	2430.000	601.500	2440.000
GR	600.000	2460.000	600.500	2470.000	600.500	2480.000	599.400	2500.000	599.400	2520.000
GR	605.000	2540.000	614.000	2548.000	615.000	2570.000	615.000	2730.000	615.900	2740.000
GR	615.900	2850.000	616.000	2860.000	616.000	2900.000	616.500	2910.000	617.000	3000.000
GR	617.000	3020.000	618.000	3050.000	621.000	3080.000	630.000	3400.000	0.0	0.0
NC	0.110	0.110	0.036	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	9.100	9.100	9.100	9.100	0.0	0.0	0.0	1311.000	0.0
X1	46.100	32.000	1920.000	2548.000	1500.000	1700.000	1500.000	0.0	0.0	0.0
GR	630.000	650.000	620.000	750.000	610.000	1100.000	610.000	1550.000	610.000	1880.000
GR	613.700	1920.000	605.900	1930.000	605.000	1940.000	604.000	1950.000	604.000	2010.000
GR	604.200	2020.000	603.200	2070.000	602.900	2080.000	602.900	2240.000	603.200	2250.000
GR	603.200	2340.000	602.900	2350.000	602.900	2370.000	602.200	2380.000	602.200	2410.000
GR	601.200	2430.000	601.700	2440.000	600.200	2460.000	600.700	2470.000	600.700	2480.000
GR	599.600	2500.000	599.600	2520.000	605.200	2540.000	614.200	2548.000	610.000	3050.000

GR	620.000	3620.000	630.000	4000.000	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.090	0.090	0.036	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	9.100	9.100	9.100	9.100	0.0	0.0	0.0	1550.000	4211.000
X1	46.200	34.000	1920.000	2548.000	1900.000	1000.000	1850.000	0.0	0.0	0.0
GR	630.000	1550.000	620.000	1850.000	610.000	1900.000	610.000	1900.000	610.000	1900.000
GR	613.800	1920.000	606.000	1930.000	605.100	1940.000	604.100	1950.000	604.100	2010.000
GR	604.300	2020.000	603.300	2070.000	603.000	2080.000	603.000	2240.000	603.300	2250.000
GR	603.300	2340.000	603.000	2350.000	603.000	2370.000	602.300	2380.000	602.300	2410.000
GR	601.300	2430.000	601.800	2440.000	600.300	2460.000	600.800	2470.000	600.800	2480.000
GR	599.700	2500.000	599.700	2520.000	605.300	2540.000	614.300	2548.000	610.000	2600.000
GR	610.000	3100.000	610.000	3500.000	620.000	4750.000	630.000	5200.000	0.0	0.0
NC	0.080	0.080	0.030	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	9.100	9.100	9.100	9.100	0.0	0.0	0.0	900.000	2713.000
X1	47.000	81.000	1180.000	1600.000	2700.000	1000.000	2350.000	0.0	0.0	0.0
GR	626.000	200.000	623.000	250.000	622.900	300.000	621.100	330.000	621.000	340.000
GR	621.000	440.000	621.500	450.000	621.500	550.000	621.000	560.000	621.000	750.000
GR	619.000	800.000	618.000	850.000	618.000	950.000	617.000	1000.000	616.000	1050.000
GR	615.000	1140.000	615.900	1180.000	613.500	1200.000	610.000	1205.000	605.500	1210.000
GR	604.000	1220.000	603.000	1230.000	602.000	1250.000	601.000	1290.000	600.000	1320.000
GR	600.000	1370.000	601.000	1380.000	601.000	1420.000	602.500	1450.000	602.000	1460.000
GR	604.000	1480.000	604.000	1520.000	605.000	1530.000	605.000	1570.000	610.000	1600.000
GR	609.000	1620.000	612.000	1635.000	612.000	1650.000	608.000	1690.000	608.000	1730.000
GR	612.000	1735.000	613.000	1750.000	615.000	1850.000	614.000	1875.000	612.900	1880.000
GR	611.000	1990.000	611.000	2000.000	611.000	2100.000	609.000	2150.000	610.000	2210.000
GR	610.000	2215.000	612.500	2220.000	611.000	2250.000	611.000	2350.000	612.500	2400.000
GR	613.000	2420.000	613.000	2500.000	612.000	2550.000	613.000	2600.000	613.000	2650.000
GR	614.500	2700.000	613.000	2800.000	613.000	3000.000	614.000	3050.000	613.000	3150.000
GR	616.000	3200.000	616.000	3350.000	614.000	3400.000	613.000	3450.000	613.000	3500.000
GR	615.000	3550.000	617.000	3600.000	618.400	3650.000	618.400	3750.000	617.000	3810.000
GR	619.000	3850.000	620.000	3860.000	620.000	3990.000	620.300	4000.000	621.000	4500.000
GR	630.000	4800.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
QT	4.000	32400.000	47100.000	54000.000	72700.000	0.0	0.0	0.0	0.0	0.0
NC	0.080	0.080	0.033	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	9.100	9.100	9.100	9.100	0.0	0.0	0.0	387.000	2788.000

SECTION D/S OF ROGUE RIVER

X1	47.100	28.000	1780.000	2200.000	2000.000	2800.000	2200.000	0.0	0.0	0.0
GR	630.000	0.0	620.000	800.000	610.000	1760.000	610.000	1760.000	610.000	1760.000
GR	615.900	1780.000	613.500	1800.000	610.000	1805.000	605.500	1810.000	604.000	1820.000
GR	603.000	1830.000	602.000	1850.000	601.000	1890.000	600.000	1920.000	600.000	1970.000
GR	601.000	1980.000	601.000	2020.000	602.500	2050.000	602.000	2060.000	604.000	2080.000
GR	604.000	2120.000	605.000	2130.000	605.000	2170.000	610.000	2200.000	610.000	2600.000
GR	610.000	2750.000	620.000	4250.000	630.000	4320.000	0.0	0.0	0.0	0.0
QT	4.000	30800.000	44900.000	51400.000	72700.000	0.0	0.0	0.0	0.0	0.0
NC	0.100	0.080	0.033	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	9.100	9.100	9.100	9.100	0.0	0.0	0.0	805.000	2945.000

SECTION U/S ROGUE RIVER

X1	47.900	16.000	2073.000	2507.000	500.000	600.000	550.000	0.0	0.0	0.0
GR	630.000	-200.000	620.000	450.000	610.000	2050.000	610.000	2050.000	610.000	2050.000
GR	608.700	2073.000	605.400	2080.000	598.600	2240.000	602.700	2370.000	602.700	2420.000
GR	603.700	2450.000	603.700	2480.000	611.200	2507.000	610.000	2700.000	620.000	3600.000
GR	630.000	3700.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.060	0.100	0.030	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	9.100	9.100	9.100	9.100	0.0	0.0	0.0	1700.000	0.0

D/S OF US-131 BRIDGE

X1	49.000	21.000	2550.000	2965.000	1250.000	1750.000	1650.000	0.0	0.0	0.0

X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GR	630.000	0.0	624.000	350.000	620.000	720.000	620.000	2050.000	623.500	2600.000
GR	626.800	2550.000	620.000	2550.000	613.000	2560.000	605.000	2600.000	603.500	2605.000
GR	601.000	2680.000	598.000	2750.000	597.300	2760.000	597.300	2810.000	600.000	2825.000
GR	599.000	2850.000	601.000	2850.000	599.000	2890.000	600.000	2900.000	601.000	2910.000
GR	602.000	2930.000	609.000	2960.000	620.000	2965.000	630.000	3200.000	0.0	0.0
NC	0.080	0.100	0.030	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SB	0.900	1.250	2.600	0.0	334.250	25.000	7422.000	0.0	597.300	597.300
ET	0.0	9.100	9.100	9.100	9.100	0.0	0.0	0.0	1700.000	2965.000

U/S OF US-131 BRIDGE

DOCUMENTED HIGH WATER MARKS

622.3(1904),620.25(1947),619.3(1960),616.25(1938),612.2(1933)

X1	49.100	0.0	0.0	0.0	56.000	56.000	56.000	0.0	0.0	0.0
X2	0.0	0.0	1.000	621.300	622.500	0.0	0.0	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	622.500	626.800	0.0
BT	14.000	0.0	630.000	0.0	1250.000	624.000	0.0	1700.000	624.000	0.0
BT	1700.000	622.500	0.0	1850.000	623.000	0.0	1950.000	623.200	0.0	2050.000
BT	623.500	0.0	2200.000	624.000	0.0	2400.000	625.000	0.0	2550.000	626.800
BT	0.0	2550.000	626.800	621.300	2965.000	626.800	621.300	2965.000	626.800	0.0
BT	3090.000	626.800	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X1	50.100	29.000	830.000	1420.000	415.000	415.000	415.000	0.0	0.0	0.0
GR	627.900	170.000	613.000	200.000	612.000	250.000	609.500	300.000	610.000	350.000
GR	613.700	400.000	615.000	450.000	615.000	500.000	613.600	550.000	614.200	600.000
GR	611.800	650.000	613.000	700.000	610.000	730.000	610.000	750.000	615.400	800.000
GR	616.600	830.000	616.600	900.000	606.000	930.000	603.600	1010.000	599.500	1110.000
GR	597.800	1150.000	600.000	1220.000	600.000	1250.000	600.800	1270.000	601.900	1290.000
GR	611.000	1350.000	622.800	1400.000	623.000	1420.000	630.000	1550.000	0.0	0.0
NC	0.080	0.100	0.030	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	9.100	9.100	9.100	9.100	0.0	0.0	0.0	1217.000	4500.000
X1	50.900	27.000	2535.000	3060.000	2000.000	3200.000	2750.000	0.0	0.0	0.0
GR	650.000	0.0	640.000	550.000	630.000	920.000	620.000	1380.000	620.000	1380.000
GR	617.300	2535.000	601.400	2570.000	601.400	2610.000	600.400	2640.000	601.400	2650.000
GR	600.400	2680.000	600.400	2700.000	601.200	2710.000	600.400	2720.000	600.600	2750.000
GR	601.200	2760.000	600.100	2780.000	600.400	2790.000	600.400	2840.000	600.200	2850.000
GR	600.200	2970.000	601.200	2990.000	601.200	3010.000	614.200	3060.000	620.000	4400.000
GR	630.000	4500.000	640.000	4510.000	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.080	0.100	0.030	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	9.100	9.100	9.100	9.100	0.0	0.0	0.0	300.000	2900.000
X1	51.000	63.000	1035.000	1560.000	2200.000	1700.000	1979.000	0.0	0.0	0.0
GR	630.000	0.0	630.000	0.0	630.000	0.0	630.000	0.0	630.000	0.0
GR	625.400	100.000	620.500	130.000	615.000	310.000	613.000	350.000	612.000	400.000
GR	613.000	470.000	613.000	600.000	613.500	610.000	613.500	660.000	614.000	670.000
GR	614.000	720.000	615.000	770.000	615.000	820.000	615.700	850.000	618.800	950.000
GR	618.000	1000.000	618.900	1035.000	603.000	1070.000	603.000	1110.000	602.000	1140.000
GR	603.000	1150.000	602.000	1180.000	602.000	1200.000	602.800	1210.000	602.000	1220.000
GR	602.000	1250.000	602.800	1260.000	601.700	1280.000	602.000	1290.000	602.000	1340.000
GR	601.800	1350.000	601.800	1470.000	602.800	1490.000	602.800	1510.000	615.800	1560.000
GR	616.800	1600.000	617.400	1650.000	615.000	1700.000	615.000	1800.000	612.000	1850.000
GR	612.000	1900.000	611.000	1940.000	611.000	2230.000	611.500	2240.000	611.500	2410.000
GR	612.000	2420.000	612.000	2770.000	613.000	2810.000	613.000	2870.000	614.000	2900.000
GR	614.700	2940.000	614.700	3178.000	622.000	3180.000	627.000	3390.000	627.000	3410.000
GR	626.700	3450.000	630.700	3470.000	631.500	3480.000	0.0	0.0	0.0	0.0
NC	0.080	0.100	0.030	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	9.100	9.100	9.100	9.100	0.0	0.0	0.0	150.000	2920.000
X1	51.100	28.000	1035.000	1560.000	1850.000	2250.000	2000.000	0.0	0.0	0.0

GR	640.000	0.0	630.000	0.0	620.000	2[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
GR	617.600	1035.000	601.700	1070.000	601.700	1110.000	600.700	1140.000	601.700	1150.000
GR	600.700	1180.000	600.700	1200.000	601.500	1210.000	600.700	1220.000	600.700	1250.000
GR	601.500	1260.000	600.400	1280.000	600.700	1290.000	600.700	1340.000	600.500	1350.000
GR	600.500	1470.000	601.500	1490.000	601.500	1510.000	614.500	1560.000	620.000	2900.000
GR	630.000	3100.000	640.000	3200.000	650.000	3350.000	0.0	0.0	0.0	0.0
NC	0.100	0.080	0.030	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	9.100	9.100	9.100	9.100	0.0	0.0	0.0	1480.000	3749.000
X1	51.900	25.000	2510.000	2940.000	2500.000	2900.000	2600.000	0.0	0.0	0.0
GR	650.000	1200.000	640.000	1300.000	630.000	1350.000	620.000	1600.000	610.000	2400.000
GR	611.300	2510.000	610.300	2600.000	599.200	2600.000	600.500	2635.000	600.700	2658.000
GR	601.000	2680.000	600.100	2710.000	601.100	2725.000	602.300	2748.000	603.400	2778.000
GR	603.600	2795.000	605.300	2885.000	605.400	2885.000	609.300	2940.000	616.200	2940.000
GR	620.000	3040.000	620.000	3900.000	630.000	4110.000	640.000	4290.000	650.000	4700.000
NC	0.100	0.080	0.030	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	9.100	9.100	9.100	9.100	0.0	0.0	0.0	1016.000	0.0

U/S OF TOWNSHIP LINE

X1	52.000	26.000	2809.000	3191.000	1550.000	2000.000	2000.000	0.0	0.0	0.0
GR	640.000	1250.000	630.000	1300.000	620.000	1350.000	620.000	1680.000	620.000	2280.000
GR	620.000	2770.000	619.100	2809.000	614.900	2815.000	608.000	2830.000	604.000	2877.500
GR	602.300	2902.500	601.000	2926.000	599.800	2945.000	599.400	2971.000	597.900	3000.000
GR	599.400	3029.000	599.800	3055.000	601.000	3074.000	602.300	3097.500	604.000	3122.500
GR	608.000	3170.000	614.900	3185.000	619.100	3191.000	620.000	3380.000	630.000	3600.000
GR	640.000	3680.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.080	0.080	0.030	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	9.100	9.100	9.100	9.100	0.0	0.0	0.0	1135.000	0.0
X1	52.100	24.000	2510.000	2940.000	1650.000	1900.000	1900.000	0.0	0.0	0.0
GR	650.000	750.000	640.000	820.000	630.000	900.000	620.000	1300.000	620.000	1300.000
GR	610.100	2510.000	609.100	2600.000	598.000	2600.000	599.300	2635.000	599.500	2658.000
GR	599.800	2680.000	599.900	2710.000	600.900	2725.000	601.100	2748.000	601.200	2778.000
GR	602.400	2795.000	604.000	2855.000	604.200	2885.000	608.100	2940.000	615.000	2940.000
GR	620.000	3100.000	630.000	3200.000	640.000	3250.000	650.000	3260.000	0.0	0.0
NC	0.080	0.080	0.033	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	9.100	9.100	9.100	9.100	0.0	0.0	0.0	23.000	0.0
X1	52.900	35.000	980.000	1370.000	1650.000	2900.000	3100.000	0.0	0.0	0.0
GR	650.000	-850.000	640.000	-800.000	630.000	-580.000	620.000	-300.000	610.000	950.000
GR	615.000	980.000	611.600	980.000	608.800	990.000	599.800	1010.000	598.100	1020.000
GR	598.100	1040.000	598.800	1070.000	600.600	1090.000	600.900	1100.000	600.900	1110.000
GR	601.600	1130.000	601.500	1140.000	601.800	1170.000	603.600	1240.000	603.600	1250.000
GR	603.800	1260.000	604.100	1270.000	604.600	1280.000	605.100	1300.000	605.600	1310.000
GR	605.600	1320.000	606.100	1330.000	608.800	1350.000	612.700	1360.000	614.200	1370.000
GR	610.000	2000.000	620.000	2200.000	630.000	2300.000	640.000	2350.000	650.000	2400.000
NC	0.080	0.100	0.030	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	9.100	9.100	9.100	9.100	0.0	0.0	0.0	600.000	2650.000

CANNON-ADA TOWNSHIP LINE

X1	53.000	56.000	980.000	1370.000	1650.000	800.000	1400.000	0.0	0.0	0.0
GR	644.800	0.0	644.200	10.000	640.100	30.000	638.000	100.000	633.100	200.000
GR	629.000	300.000	620.800	400.000	617.000	500.000	614.600	600.000	613.700	700.000
GR	614.700	800.000	614.600	900.000	615.100	980.000	611.700	980.000	608.900	990.000
GR	599.900	1010.000	598.200	1020.000	598.200	1040.000	598.900	1070.000	600.700	1090.000
GR	601.000	1100.000	601.000	1110.000	601.700	1130.000	601.600	1140.000	601.900	1170.000
GR	602.500	1190.000	602.500	1200.000	602.800	1210.000	603.000	1220.000	603.500	1230.000
GR	603.700	1240.000	603.700	1250.000	603.900	1260.000	604.200	1270.000	604.700	1280.000
GR	605.200	1300.000	605.700	1310.000	605.700	1320.000	606.200	1330.000	608.900	1350.000
GR	612.700	1360.000	614.300	1370.000	614.300	1400.000	612.600	1425.000	611.700	1500.000
GR	611.500	1600.000	612.600	1620.000	612.800	1700.000	613.200	1800.000	613.000	1900.000

GR	612.500	1260.000	611.300	2000.000	[illegible]	2100.000	[illegible]	[illegible]	[illegible]	[illegible]
GR	640.000	2780.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EJ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

THIS RUN EXECUTED 01/10/79

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  HEC2 RELEASE DATED NOV 76 UPDATED  AUG1977
  ERROR CORR -  01,02
  MODIFICATION -  50,51,52,53
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NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

GRAND RIVER,MICHIGAN.

SUMMARY PRINTOUT TABLE 110

SECNO	CWSEL	DIFKWS	EG	TOPWID	QLOB	QCH	QROB	PERENC	STENCL	STCHL	STCHR	STENC
42.900	614.70	0.0	614.91	1920.00	1111.47	30080.96	1807.56	1920.00	800.00	1500.00	2040.00	2720.0
42.900	617.70	3.00	617.94	1920.00	3044.19	40746.71	4209.08	1920.00	800.00	1500.00	2040.00	2720.0
42.900	619.00	4.30	619.26	1920.00	4071.13	45449.18	5479.67	1920.00	800.00	1500.00	2040.00	2720.0
42.900	623.60	8.90	623.84	1920.00	7579.18	56652.64	9768.16	1920.00	800.00	1500.00	2040.00	2720.0
43.000	614.81	0.0	615.01	2134.40	1285.36	30024.88	1689.74	2540.00	100.00	1500.00	2040.00	2640.0
43.000	617.82	3.00	618.05	2421.05	3881.88	40333.80	3784.32	2540.00	100.00	1500.00	2040.00	2640.0
43.000	619.12	4.31	619.36	2467.86	5424.80	44709.33	4865.86	2540.00	100.00	1500.00	2040.00	2640.0
43.000	623.71	8.90	623.92	2540.00	11167.08	54464.43	8368.47	2540.00	100.00	1500.00	2040.00	2640.0
43.900	615.15	0.0	615.31	2343.99	2764.32	29215.55	1020.13	2960.00	200.00	2125.00	2710.00	3160.0
43.900	618.15	3.00	618.34	2539.63	6284.11	39218.25	2497.62	2960.00	200.00	2125.00	2710.00	3160.0
43.900	619.44	4.29	619.64	2623.77	8147.71	43597.79	3254.49	2960.00	200.00	2125.00	2710.00	3160.0
43.900	623.94	8.80	624.12	2896.23	14924.00	53406.49	5669.53	2960.00	200.00	2125.00	2710.00	3160.0
44.000	615.33	0.0	615.52	2894.43	1784.57	28871.22	2344.18	-325.00	325.00	2125.00	2710.00	4000.0
44.000	618.33	2.99	618.52	3054.08	5237.45	37994.70	4767.83	-325.00	325.00	2125.00	2710.00	4000.0
44.000	619.62	4.29	619.81	3164.54	7106.88	41911.23	5981.87	-325.00	325.00	2125.00	2710.00	4000.0
44.000	624.08	8.75	624.24	3546.35	13563.65	50473.06	9963.29	-325.00	325.00	2125.00	2710.00	4000.0
44.100	615.71	0.0	615.85	2893.56	2306.74	27326.77	3366.48	0.0	0.0	2125.00	2710.00	0.0
44.100	618.67	2.96	618.83	3263.40	5151.25	36261.34	6587.39	0.0	0.0	2125.00	2710.00	0.0
44.100	619.94	4.23	620.11	3422.83	6713.81	40132.36	8153.81	0.0	0.0	2125.00	2710.00	0.0
44.100	624.31	8.60	624.45	3623.59	12856.32	48342.46	12801.24	0.0	0.0	2125.00	2710.00	0.0
44.900	616.24	0.0	616.40	2670.48	3978.00	26893.56	2128.43	3086.00	1080.00	2965.00	3570.00	4166.0
44.900	619.15	2.91	619.32	2976.03	7959.57	36059.05	3981.36	3086.00	1080.00	2965.00	3570.00	4166.0
44.900	620.40	4.16	620.58	3066.79	10098.79	40040.75	4860.44	3086.00	1080.00	2965.00	3570.00	4166.0
44.900	624.63	8.39	624.78	3075.24	17455.08	49152.60	7392.34	3086.00	1080.00	2965.00	3570.00	4166.0
45.000	616.50	0.0	616.67	2602.25	2532.72	30187.11	280.16	-606.00	606.00	2965.00	3570.00	3780.0
45.000	619.39	2.89	619.59	3094.72	6869.59	40407.71	722.70	-606.00	606.00	2965.00	3570.00	3780.0
45.000	620.63	4.13	620.83	3152.57	9349.35	44695.68	954.95	-606.00	606.00	2965.00	3570.00	3780.0
45.000	624.80	8.29	624.98	3174.00	17955.09	54317.45	1727.48	-606.00	606.00	2965.00	3570.00	3780.0
45.100	616.87	0.0	617.03	2795.49	2696.85	30179.43	123.70	-400.00	400.00	2965.00	3570.00	4000.0
45.100	619.75	2.88	619.93	3344.91	7237.12	40414.74	348.13	-400.00	400.00	2965.00	3570.00	4000.0
45.100	620.98	4.11	621.17	3357.77	9979.84	44509.98	510.15	-400.00	400.00	2965.00	3570.00	4000.0
45.100	625.05	8.19	625.22	3390.37	19170.98	53689.38	1139.69	-400.00	400.00	2965.00	3570.00	4000.0

SECNO	CWSEL	DIFKWS	EG	TOPWID	QLOB	QCH	QROB	PERENC	STENCL	STCHL	STCHR	STENCR
45.200	617.28	0.0	617.39	3384.77	2035.89	27455.92	3508.19	-1306.00	1306.00	2965.00	3570.00	5200.0
45.200	620.15	2.88	620.28	3499.71	5313.05	36329.18	6357.76	-1306.00	1306.00	2965.00	3570.00	5200.0(
45.200	621.37	4.10	621.50	3548.54	7015.22	40158.52	7826.23	-1306.00	1306.00	2965.00	3570.00	5200.0(
45.200	625.35	8.08	625.48	3707.90	12548.62	49051.85	12399.54	-1306.00	1306.00	2965.00	3570.00	5200.0(
45.900	617.52	0.0	617.62	2439.36	4530.39	26249.30	2220.28	-761.00	761.00	1920.00	2548.00	3450.0
45.900	620.39	2.87	620.51	2496.75	7991.77	35980.18	4028.03	-761.00	761.00	1920.00	2548.00	3450.0
45.900	621.60	4.08	621.74	2521.05	9672.29	40362.78	4964.92	-761.00	761.00	1920.00	2548.00	3450.0
45.900	625.54	8.02	625.68	2599.71	14686.84	51382.43	7930.76	-761.00	761.00	1920.00	2548.00	3450.0
46.000	617.66	0.0	617.81	2103.94	2302.08	30451.50	246.40	-936.00	936.00	1920.00	2548.00	3400.0
46.000	620.52	2.87	620.71	2139.30	5016.84	41863.38	1119.76	-936.00	936.00	1920.00	2548.00	3400.0
46.000	621.74	4.08	621.94	2170.45	6400.76	46946.83	1652.41	-936.00	936.00	1920.00	2548.00	3400.0
46.000	625.64	7.98	625.86	2308.99	10777.32	59514.66	3708.00	-936.00	936.00	1920.00	2548.00	3400.0
46.100	617.91	0.0	618.03	2190.10	2978.35	27786.71	2234.94	-1311.00	1311.00	1920.00	2548.00	4000.0
46.100	620.80	2.89	620.95	2339.46	5124.02	38087.53	4788.43	-1311.00	1311.00	1920.00	2548.00	4000.0
46.100	622.02	4.11	622.18	2385.79	6143.80	42641.35	6214.82	-1311.00	1311.00	1920.00	2548.00	4000.0
46.100	625.90	7.98	626.06	2533.14	9093.92	53932.03	10974.04	-1311.00	1311.00	1920.00	2548.00	4000.0
46.200	618.16	0.0	618.25	2351.82	148.41	25380.91	7470.67	2661.00	1550.00	1920.00	2548.00	4211.0
46.200	621.07	2.90	621.17	2392.97	320.47	34303.82	13375.69	2661.00	1550.00	1920.00	2548.00	4211.0
46.200	622.29	4.12	622.40	2429.62	430.48	38319.55	16249.95	2661.00	1550.00	1920.00	2548.00	4211.0
46.200	626.13	7.97	626.25	2544.99	925.56	48299.93	24774.56	2661.00	1550.00	1920.00	2548.00	4211.0
47.000	618.38	0.0	618.59	1813.00	243.96	25997.66	6758.37	1813.00	900.00	1180.00	1600.00	2713.0
47.000	621.26	2.88	621.50	1813.00	992.08	34831.96	12175.95	1813.00	900.00	1180.00	1600.00	2713.0
47.000	622.47	4.09	622.73	1813.00	1426.61	38769.90	14803.47	1813.00	900.00	1180.00	1600.00	2713.0
47.000	626.27	7.89	626.54	1813.00	2936.72	48478.30	22584.94	1813.00	900.00	1180.00	1600.00	2713.0
47.100	618.85	0.0	619.02	1877.59	2618.15	24286.89	5494.93	2401.00	387.00	1780.00	2200.00	2788.0
47.100	621.74	2.89	621.94	2127.55	5972.36	32331.97	8795.66	2401.00	387.00	1780.00	2200.00	2788.0
47.100	622.96	4.11	623.16	2224.98	7898.37	35794.92	10306.69	2401.00	387.00	1780.00	2200.00	2788.0
47.100	626.71	7.86	626.91	2401.00	14497.71	43836.08	14366.18	2401.00	387.00	1780.00	2200.00	2788.0
47.900	618.96	0.0	619.10	2140.00	3363.28	24492.09	2944.63	2140.00	805.00	2073.00	2507.00	2945.0
47.900	621.86	2.90	622.03	2140.00	7194.33	32674.74	5030.91	2140.00	805.00	2073.00	2507.00	2945.0
47.900	623.07	4.11	623.25	2140.00	9115.21	36267.29	6017.48	2140.00	805.00	2073.00	2507.00	2945.0
47.900	626.78	7.82	626.99	2140.00	15881.98	47489.77	9328.23	2140.00	805.00	2073.00	2507.00	2945.0
49.000	619.11	0.0	619.39	413.32	0.0	30800.00	0.0	-1700.00	1700.00	2550.00	2965.00	3200.0
49.000	621.95	2.84	622.39	415.00	0.0	44899.98	0.0	-1700.00	1700.00	2550.00	2965.00	3200.0
49.000	623.14	4.03	623.64	765.00	888.21	50511.78	0.0	-1700.00	1700.00	2550.00	2965.00	3200.0
49.000	626.77	7.66	627.42	1419.97	3786.48	68621.44	292.02	-1700.00	1700.00	2550.00	2965.00	3200.0
49.100	619.12	0.0	619.41	413.35	0.0	30799.99	0.0	1265.00	1700.00	2550.00	2965.00	2965.0
49.100	622.21	3.09	622.65	415.00	0.0	44899.99	0.0	1265.00	1700.00	2550.00	2965.00	2965.0
49.100	623.55	4.42	624.03	772.51	796.52	50603.47	0.0	1265.00	1700.00	2550.00	2965.00	2965.0
49.100	626.91	7.78	627.57	1265.00	3019.96	69680.00	0.0	1265.00	1700.00	2550.00	2965.00	2965.0
50.100	619.32	0.0	619.49	1197.97	3370.53	27429.46	0.0	0.0	0.0	830.00	1420.00	0.0
50.100	622.54	3.22	622.75	1218.08	6506.66	38393.33	0.0	0.0	0.0	830.00	1420.00	0.0
50.100	623.91	4.59	624.13	1258.80	8163.61	43235.55	0.82	0.0	0.0	830.00	1420.00	0.0
50.100	627.40	8.09	627.70	1330.79	13108.15	59535.00	56.84	0.0	0.0	830.00	1420.00	0.0

SECNO	CWSEL	DIFKWS	EG	TOPWID	QLOB	QCH	QROB	PERENC	STENCL	STCHL	STCHR	STENC
50.900	619.64	0.0	619.80	2785.96	230.01	29630.17	939.81	3283.00	1217.00	2535.00	3060.00	4500.0
50.900	622.89	3.24	623.06	3181.65	2288.77	39093.12	3518.10	3283.00	1217.00	2535.00	3060.00	4500.0
50.900	624.27	4.62	624.44	3225.67	3664.36	42779.27	4956.36	3283.00	1217.00	2535.00	3060.00	4500.0
50.900	627.82	8.18	628.01	3261.22	8525.56	54452.51	9721.99	3283.00	1217.00	2535.00	3060.00	4500.0
51.000	619.87	0.0	619.96	2599.99	2020.84	23840.64	4938.50	2600.00	300.00	1035.00	1560.00	2900.0
51.000	623.12	3.25	623.22	2599.99	4242.61	31825.83	8831.54	2600.00	300.00	1035.00	1560.00	2900.0
51.000	624.49	4.62	624.60	2599.99	5362.35	35337.11	10700.53	2600.00	300.00	1035.00	1560.00	2900.0
51.000	628.04	8.17	628.17	2599.99	9054.26	46866.60	16779.18	2600.00	300.00	1035.00	1560.00	2900.0
51.100	620.00	0.0	620.12	2700.13	2307.88	27549.47	942.65	2770.00	150.00	1035.00	1560.00	2920.0
51.100	623.25	3.24	623.38	2769.99	5018.67	36416.69	3464.62	2770.00	150.00	1035.00	1560.00	2920.0
51.100	624.62	4.61	624.76	2769.99	6379.71	40164.94	4855.33	2770.00	150.00	1035.00	1560.00	2920.0
51.100	628.17	8.17	628.34	2769.99	10837.19	52306.23	9556.65	2770.00	150.00	1035.00	1560.00	2920.0
51.900	620.22	0.0	620.45	2154.34	3489.11	27209.37	101.51	2269.00	1480.00	2510.00	2940.00	3749.0
51.900	623.45	3.23	623.71	2235.16	7027.56	36114.63	1757.79	2269.00	1480.00	2510.00	2940.00	3749.0
51.900	624.82	4.60	625.07	2269.00	8738.89	39770.02	2891.08	2269.00	1480.00	2510.00	2940.00	3749.0
51.900	628.37	8.15	628.66	2269.00	14335.96	51475.89	6888.12	2269.00	1480.00	2510.00	2940.00	3749.0
52.000	620.53	0.0	620.86	2044.27	112.19	30639.12	48.68	-1016.00	1016.00	2809.00	3191.00	3680.0
52.000	623.72	3.19	624.12	2130.39	2840.50	41446.29	613.21	-1016.00	1016.00	2809.00	3191.00	3680.0
52.000	625.06	4.53	625.48	2166.72	4709.21	45680.10	1010.69	-1016.00	1016.00	2809.00	3191.00	3680.0
52.000	628.60	8.07	629.06	2262.10	11404.70	58732.59	2562.69	-1016.00	1016.00	2809.00	3191.00	3680.0
52.100	621.01	0.0	621.16	1850.32	4685.73	25857.51	256.75	-1135.00	1135.00	2510.00	2940.00	3260.0
52.100	624.25	3.24	624.43	2007.48	9761.97	34346.26	791.76	-1135.00	1135.00	2510.00	2940.00	3260.0
52.100	625.59	4.59	625.78	2020.94	12319.22	37991.92	1088.85	-1135.00	1135.00	2510.00	2940.00	3260.0
52.100	629.15	8.14	629.37	2056.47	20805.56	49740.14	2154.29	-1135.00	1135.00	2510.00	2940.00	3260.0
52.900	621.36	0.0	621.45	2190.62	4966.07	20607.56	5226.35	-23.00	23.00	980.00	1370.00	2400.0
52.900	624.61	3.25	624.71	2223.09	8914.37	27070.25	8915.37	-23.00	23.00	980.00	1370.00	2400.0
52.900	625.95	4.59	626.06	2236.55	10797.90	29925.53	10676.55	-23.00	23.00	980.00	1370.00	2400.0
52.900	629.53	8.17	629.66	2272.29	16968.40	39227.90	16503.68	-23.00	23.00	980.00	1370.00	2400.0
53.000	621.46	0.0	621.57	2023.58	1649.50	22305.41	6845.07	2050.00	600.00	980.00	1370.00	2650.0
53.000	624.70	3.24	624.84	2050.00	3177.66	30113.51	11608.82	2050.00	600.00	980.00	1370.00	2650.0
53.000	626.04	4.58	626.19	2050.00	3923.87	33575.11	13901.01	2050.00	600.00	980.00	1370.00	2650.0
53.000	629.61	8.15	629.80	2050.00	6401.75	44830.25	21468.04	2050.00	600.00	980.00	1370.00	2650.0

GRAND RIVER,MICHIGAN.

SUMMARY PRINTOUT TABLE 150

SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10K*S	VCH	AREA	.01K
42.900	0.0	0.0	0.0	597.00	33000.00	614.70	0.0	614.91	1.66	3.80	13030.25	25622.6
42.900	0.0	0.0	0.0	597.00	48000.00	617.70	0.0	617.94	1.64	4.28	18790.23	37532.5
42.900	0.0	0.0	0.0	597.00	55000.00	619.00	0.0	619.26	1.61	4.44	21286.34	43405.4
42.900	0.0	0.0	0.0	597.00	74000.00	623.60	0.0	623.84	1.71	4.46	30118.48	67303.3
43.000	660.00	0.0	0.0	597.00	33000.00	614.81	0.0	615.01	1.61	3.77	13452.46	25998.5
43.000	660.00	0.0	0.0	597.00	48000.00	617.82	0.0	618.05	1.57	4.21	20270.36	38313.7
43.000	660.00	0.0	0.0	597.00	55000.00	619.12	0.0	619.36	1.52	4.34	23465.11	44567.8
43.000	660.00	0.0	0.0	597.00	74000.00	623.71	0.0	623.92	1.10	4.26	35004.20	70542.8
43.900	2000.00	0.0	0.0	598.90	33000.00	615.15	0.0	615.31	1.39	3.46	15970.67	27968.4
43.900	2000.00	0.0	0.0	598.90	48000.00	618.15	0.0	618.34	1.34	3.84	23320.25	41543.1
43.900	2000.00	0.0	0.0	598.90	55000.00	619.44	0.0	619.64	1.30	3.97	26662.09	48241.2
43.900	2000.00	0.0	0.0	598.90	74000.00	623.94	0.0	624.12	0.95	3.93	39072.74	75802.1
44.000	1300.00	0.0	0.0	600.00	33000.00	615.33	0.0	615.52	1.68	3.64	16039.70	25424.9
44.000	1300.00	0.0	0.0	600.00	48000.00	618.33	0.0	618.52	1.50	3.93	24995.25	39197.9
44.000	1300.00	0.0	0.0	600.00	55000.00	619.62	0.0	619.81	1.42	4.02	29004.96	46139.6
44.000	1300.00	0.0	0.0	600.00	74000.00	624.08	0.0	624.24	0.98	3.87	43972.41	74741.7
44.100	2200.00	0.0	0.0	600.00	33000.00	615.71	0.0	615.85	1.38	3.36	19146.20	28096.1
44.100	2200.00	0.0	0.0	600.00	48000.00	618.67	0.0	618.83	1.28	3.67	28254.62	42466.[illegible]
44.100	2200.00	0.0	0.0	600.00	55000.00	619.94	0.0	620.11	1.23	3.78	32518.39	49641.6
44.100	2200.00	0.0	0.0	600.00	74000.00	624.31	0.0	624.45	0.87	3.67	47887.25	79374.2
44.900	3600.00	0.0	0.0	600.00	33000.00	616.24	0.0	616.40	1.68	3.49	18080.99	25449.2
44.900	3600.00	0.0	0.0	600.00	48000.00	619.15	0.0	619.32	1.52	3.81	26296.75	38902.1
44.900	3600.00	0.0	0.0	600.00	55000.00	620.40	0.0	620.58	1.45	3.92	30100.59	45642.[illegible]
44.900	3600.00	0.0	0.0	600.00	74000.00	624.63	0.0	624.78	1.04	3.85	43077.04	72564.6
45.000	1600.00	0.0	0.0	600.00	33000.00	616.50	0.0	616.67	1.68	3.45	15258.26	25454.7
45.000	1600.00	0.0	0.0	600.00	48000.00	619.39	0.0	619.59	1.64	3.85	23676.32	37462.[illegible]
45.000	1600.00	0.0	0.0	600.00	55000.00	620.63	0.0	620.83	1.59	3.97	27559.52	43550.6
45.000	1600.00	0.0	0.0	600.00	74000.00	624.80	0.0	624.98	1.20	3.94	40746.70	67511.9
45.100	2300.00	0.0	0.0	599.80	33000.00	616.87	0.0	617.03	1.48	3.32	16631.37	27159.1
45.100	2300.00	0.0	0.0	599.80	48000.00	619.75	0.0	619.93	1.48	3.73	25736.38	39482.[illegible]
45.100	2300.00	0.0	0.0	599.80	55000.00	620.98	0.0	621.17	1.44	3.84	29863.60	45890.4
45.100	2300.00	0.0	0.0	599.80	74000.00	625.05	0.0	625.22	1.10	3.82	43616.06	70613.6
45.200	2950.00	0.0	0.0	599.60	33000.00	617.28	0.0	617.39	1.07	2.90	22646.75	31875.5
45.200	2950.00	0.0	0.0	599.60	48000.00	620.15	0.0	620.28	1.07	3.24	32538.97	46415.2
45.200	2950.00	0.0	0.0	599.60	55000.00	621.37	0.0	621.50	1.06	3.36	36840.04	53514.1
45.200	2950.00	0.0	0.0	599.60	74000.00	625.35	0.0	625.48	0.85	3.42	51295.33	80087.[illegible]
45.900	2150.00	0.0	0.0	599.30	33000.00	617.52	0.0	617.62	1.08	2.81	22214.92	31750.4
45.900	2150.00	0.0	0.0	599.30	48000.00	620.39	0.0	620.51	1.13	3.23	29297.31	45202.[illegible]
45.900	2150.00	0.0	0.0	599.30	55000.00	621.60	0.0	621.74	1.14	3.39	32344.62	51555.[illegible]
45.900	2150.00	0.0	0.0	599.30	74000.00	625.54	0.0	625.68	0.98	3.57	42414.87	74597.[illegible]
46.000	1500.00	0.0	0.0	599.40	33000.00	617.66	0.0	617.81	1.44	3.25	15124.04	27453.[illegible]
46.000	1500.00	0.0	0.0	599.40	48000.00	620.52	0.0	620.71	1.52	3.75	21212.24	38936.[illegible]
46.000	1500.00	0.0	0.0	599.40	55000.00	621.74	0.0	621.94	1.53	3.94	23822.74	44413.[illegible]
46.000	1500.00	0.0	0.0	599.40	74000.00	625.64	0.0	625.86	1.32	4.14	32549.74	64338.[illegible]

SECNO	XLCH	ELTRD	ELLC	FLMIN	Q	CWSEL	CRIWS	EG	10K*S	VCH	AREA	.01K
46.100	1500.00	0.0	0.0	599.60	33000.00	617.91	0.0	618.03	1.42	2.96	18843.30	27731.84
46.100	1500.00	0.0	0.0	599.60	48000.00	620.80	0.0	620.95	1.48	3.40	25398.63	39492.64
46.100	1500.00	0.0	0.0	599.60	55000.00	622.02	0.0	622.18	1.49	3.56	28279.21	45125.8
46.100	1500.00	0.0	0.0	599.60	74000.00	625.90	0.0	626.06	1.28	3.74	37816.25	65357.05
46.200	1850.00	0.0	0.0	599.70	33000.00	618.16	0.0	618.25	1.14	2.68	21222.36	30868.45
46.200	1850.00	0.0	0.0	599.70	48000.00	621.07	0.0	621.17	1.16	3.03	28082.25	44522.66
46.200	1850.00	0.0	0.0	599.70	55000.00	622.29	0.0	622.40	1.17	3.17	31028.06	50948.3
46.200	1850.00	0.0	0.0	599.70	74000.00	626.13	0.0	626.25	1.01	3.33	40593.48	73692.75
47.000	2350.00	0.0	0.0	600.00	33000.00	618.38	0.0	618.59	1.89	4.12	14168.36	24004.5
47.000	2350.00	0.0	0.0	600.00	48000.00	621.26	0.0	621.50	1.89	4.63	19392.25	34913.9
47.000	2350.00	0.0	0.0	600.00	55000.00	622.47	0.0	622.73	1.88	4.83	21593.00	40094.9
47.000	2350.00	0.0	0.0	600.00	74000.00	626.27	0.0	626.54	1.61	5.04	28479.80	58357.5
47.100	2200.00	0.0	0.0	600.00	32400.00	618.85	0.0	619.02	1.80	3.73	15584.25	24153.4
47.100	2200.00	0.0	0.0	600.00	47100.00	621.74	0.0	621.94	1.80	4.19	21396.73	35088.1
47.100	2200.00	0.0	0.0	600.00	54000.00	622.96	0.0	623.16	1.78	4.35	24046.92	40435.0
47.100	2200.00	0.0	0.0	600.00	72700.00	626.71	0.0	626.91	1.49	4.47	32847.05	59488.9
47.900	550.00	0.0	0.0	598.60	30800.00	618.96	0.0	619.10	1.34	3.39	17220.35	26613.2
47.900	550.00	0.0	0.0	598.60	44900.00	621.86	0.0	622.03	1.40	3.85	23426.14	38001.5
47.900	550.00	0.0	0.0	598.60	51400.00	623.07	0.0	623.25	1.41	4.02	26019.11	43324.5
47.900	550.00	0.0	0.0	598.60	72700.00	626.78	0.0	626.99	1.39	4.47	33986.64	61601.8
49.000	1650.00	0.0	0.0	597.30	30800.00	619.11	0.0	619.39	1.74	4.29	7174.36	23345.8
49.000	1650.00	0.0	0.0	597.30	44900.00	621.95	0.0	622.39	2.26	5.38	8351.32	29863.2
49.000	1650.00	0.0	0.0	597.30	51400.00	623.14	0.0	623.64	2.37	5.71	9946.45	33392.8
49.000	1650.00	0.0	0.0	597.30	72700.00	626.77	0.0	627.42	2.62	6.63	14074.92	44936.1
49.100	56.00	622.50	621.30	597.30	30800.00	619.12	0.0	619.41	1.74	4.29	7181.12	23380.8
49.100	56.00	622.50	621.30	597.30	44900.00	622.21	0.0	622.65	2.18	5.31	8462.54	30412.2
49.100	56.00	622.50	621.30	597.30	51400.00	623.55	0.0	624.03	2.26	5.61	10259.31	34195.5
49.100	56.00	622.50	621.30	597.30	72700.00	626.91	0.0	627.57	2.71	6.69	13707.65	44187.5
50.100	415.00	0.0	0.0	597.80	30800.00	619.32	0.0	619.49	1.46	3.49	12021.36	25476.
50.100	415.00	0.0	0.0	597.80	44900.00	622.54	0.0	622.75	1.48	3.97	15908.60	36856.
50.100	415.00	0.0	0.0	597.80	51400.00	623.91	0.0	624.13	1.51	4.13	17609.52	41762.
50.100	415.00	0.0	0.0	597.80	72700.00	627.40	0.0	627.70	1.58	4.75	22137.99	57893.
50.900	2750.00	0.0	0.0	600.10	30800.00	619.64	0.0	619.80	0.90	3.17	13934.41	32520.
50.900	2750.00	0.0	0.0	600.10	44900.00	622.89	0.0	623.06	0.89	3.54	23916.72	47503.
50.900	2750.00	0.0	0.0	600.10	51400.00	624.27	0.0	624.44	0.87	3.64	28349.89	55251.
50.900	2750.00	0.0	0.0	600.10	72700.00	627.82	0.0	628.01	0.86	4.00	39880.91	78480.
51.000	1979.00	0.0	0.0	601.70	30800.00	619.87	0.0	619.96	0.76	2.77	22276.33	35390.
51.000	1979.00	0.0	0.0	601.70	44900.00	623.12	0.0	623.22	0.74	3.08	30711.07	52197.
51.000	1979.00	0.0	0.0	601.70	51400.00	624.49	0.0	624.60	0.73	3.20	34285.11	60232.
51.000	1979.00	0.0	0.0	601.70	72700.00	628.04	0.0	628.17	0.76	3.63	43494.56	83256.
51.100	2000.00	0.0	0.0	600.40	30800.00	620.00	0.0	620.12	0.77	2.94	17637.95	35193.
51.100	2000.00	0.0	0.0	600.40	44900.00	623.25	0.0	623.38	0.77	3.29	26547.91	51265.
51.100	2000.00	0.0	0.0	600.40	51400.00	624.62	0.0	624.76	0.76	3.41	30345.80	59100.
51.100	2000.00	0.0	0.0	600.40	72700.00	628.17	0.0	628.34	0.79	3.83	40192.97	82000.

SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10K*S	VCH	AREA	.01K
51.900	2600.00	0.0	0.0	599.20	30800.00	620.22	0.0	620.45	1.85	4.07	12265.04	22669.8
51.900	2600.00	0.0	0.0	599.20	44900.00	623.45	0.0	623.71	1.73	4.48	19359.96	34122.8
51.900	2600.00	0.0	0.0	599.20	51400.00	624.82	0.0	625.07	1.66	4.59	22440.87	39886.3
51.900	2600.00	0.0	0.0	599.20	72700.00	628.37	0.0	628.66	1.62	5.05	30527.50	57191.4
52.000	2000.00	0.0	0.0	597.90	30800.00	620.53	0.0	620.86	2.04	4.66	7551.19	21579.4
52.000	2000.00	0.0	0.0	597.90	44900.00	623.72	0.0	624.12	2.11	5.32	14208.13	30874.3
52.000	2000.00	0.0	0.0	597.90	51400.00	625.06	0.0	625.48	2.08	5.50	17099.43	35671.2
52.000	2000.00	0.0	0.0	597.90	72700.00	628.60	0.0	629.06	2.08	6.08	24921.76	50432.2
52.100	1900.00	0.0	0.0	598.00	30800.00	621.01	0.0	621.16	1.13	3.45	15288.07	28915.1
52.100	1900.00	0.0	0.0	598.00	44900.00	624.25	0.0	624.43	1.13	3.86	21549.13	42170.3
52.100	1900.00	0.0	0.0	598.00	51400.00	625.59	0.0	625.78	1.12	4.01	24259.66	48480.1
52.100	1900.00	0.0	0.0	598.00	72700.00	629.15	0.0	629.37	1.17	4.52	31502.64	67205.0
52.900	3100.00	0.0	0.0	598.10	30800.00	621.36	0.0	621.45	0.87	2.89	21615.26	32960.6
52.900	3100.00	0.0	0.0	598.10	44900.00	624.61	0.0	624.71	0.87	3.22	28781.04	48024.0
52.900	3100.00	0.0	0.0	598.10	51400.00	625.95	0.0	626.06	0.87	3.35	31781.19	55013.8
52.900	3100.00	0.0	0.0	598.10	72700.00	629.53	0.0	629.66	0.92	3.80	39839.53	75598.1
53.000	1400.00	0.0	0.0	598.20	30800.00	621.46	0.0	621.57	0.84	3.12	21124.58	33520.5
53.000	1400.00	0.0	0.0	598.20	44900.00	624.70	0.0	624.84	0.89	3.58	27740.23	47488.7
53.000	1400.00	0.0	0.0	598.20	51400.00	626.04	0.0	626.19	0.91	3.76	30491.40	53924.7
53.000	1400.00	0.0	0.0	598.20	72700.00	629.61	0.0	629.80	1.00	4.34	37813.04	72738.5

00BREAK00

1) COUNTY: KENT

2) STUDY NAME: FLOOD HAZARD STUDY

3) WATERCOURSE: ROGUE RIVER

4) DOCUMENT TYPE: 10, ~~25~~, 50, 100, 500 YEAR PROFILES

00BREAK00

FLOOD HAZARD STUDY

ROGUE RIVER

KENT COUNTY, MICHIGAN
AUGUST 1981

RECEIVED
NOV 13 1981
WATER MANAGEMENT

CONTENTS

WSP 2 RUN

PREPARED BY

U.S. Department of Agriculture
Soil Conservation Service
East Lansing, Michigan

274 eg.1

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          1104.3     626.4                                                  10006
 NDTABLE                                                                    10007
 ECTION      10.00                                                         1000-8
          0.00       627.0      1.00       620.63     100.0      620.32     10009
              200.00     620.03     300.00     620.13     400.00     620.32
              500.00     620.92     600.00     621.41     700.00     621.81
              800.00     622.31     900.00     622.41     951.00     623.10
          951.1      626.4      955.6      609.9      965.0      608.8      100013
          980.0      608.5      990.0      608.1      996.0      607.2      100014
          1000.0     607.5      1000.5     611.8      1005.5     611.9      100015
          1017.0     611.9      1035.0     610.6      1043.0     608.8      100016
          1050.0     608.2      1056.0     608.4      1061.0     608.8      100017
          1076.0     608.1      1090.0     609.0      1099.8     609.5      100018
          1104.3     626.4      1105.0     623.19     1200.0     621.99     100019
              1300.00     621.59     1400.00     620.99     1500.00     620.49
              1600.00     620.11     1700.00     620.01     1800.00     620.61
          1900.0     620.91     2000.0     621.21     2001.0     627.0      100022
 NDTABLE
 EACH     10.01      1.0        50.0       50.0                             10011
 EACH 2   9.90       0.0                                                    10012
 EACH     10.04      1.0        1070.0     890.0
 EACH 2   9.90       +2.8
 EACH     10.10      1.0        880.0      860.0                            10101
 EGMENT   10.10      1          N          265.0                            10102
 VALUE    0.08       2.0        0.05                                        1010-3
 EGMENT   10.10      2          C          350.0                            10104
 VALUE    .06        2.5        .04        6.         .03                   10105
 EGMENT   10.10      3          N          600.0                            10106
 VALUE    0.10                                                              10107
 ECTION      10.10                                                         010-8
              0.00      632.04      80.00     620.23     100.00     619.73
             200.00     619.04     250.00     616.44     265.00     613.73
             270.00     613.34     280.00     612.64     290.00     612.64
             300.00     612.44     310.00     612.34     320.00     612.23
             330.00     613.23     340.00     613.34     344.00     613.14
             350.00     617.73     400.00     617.23     500.00     617.73
             517.00     613.34     573.00     625.84     588.00     627.94
             600.00     630.44
 NDTABLE
 EACH     10.13      1.0        800.0      680.0                            10131
 EACH 2   10.10      +2.1                                                   10132
 EACH     10.90      1.0        480.0      480.0                            10901
 EGMENT   10.90      1          N          200.0                            10902
 VALUE    0.10                                                              10903
 EGMENT   10.90      2          N.         500.0                            10904
 VALUE    0.09       1.3        0.07                                        10905
 EGMENT   10.90      3          N          1025.0                           10906
 VALUE    0.15                                                              10907
 EGMENT   10.90      4          C          1135.0                           10908
 VALUE    .06        2.5        .04        6.         .03                   10909
 EGMENT   10.90      5          N          1165.0                           109010
 VALUE    0.12                                                              109011
 ECTION      10.90                                                         90-12
              0.00      641.70      35.00     624.20      50.00     623.20
             70.00      619.70     100.00     620.10     200.00     620.81
            300.00      622.83     400.00     622.03     500.00     621.23
            600.00      622.13     652.00     619.53     677.00     617.30
            684.00      616.80     692.00     618.00     700.00     619.90
            800.00      617.70     900.00     [illegible]     1000.00     619.70
           1020.00      [illegible]     1030.00     617.      1040.[illegible]     [illegible]
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                1060.00     616.48    1080.00     616.78    1100.00     616.46
                1120.00     615.78    1130.00     616.39    1135.00     617.39
                1160.00     630.28    1165.00     633.89
ENDTABLE
REACH           10.93       1.0       130.0       130.0                           10931
REACH 2         10.90       0.0                                                   10932
ROAD            11.00       2.60      50.0        50.0                            11001
EPR             11.00       A         1.0         3.0                             11002
PIER            615.3       2.3       616.9       2.3                             11003
GIRDER          629.0       626.8     28.0        0.6         2.6                 11004
                1317.7      629.8     1317.9      625.2       1464.9    630.0     11005
                1471.7      634.6                                                 11006
ENDTABLE                                                                          11007
SECTION         11.00                                                             1100-8
                0.00        639.0     1.0         629.57      100.0     628.27    11009
                    200.00      626.57    300.00      626.27    400.00      625.17
                    500.00      624.29    559.00      623.79    566.00      623.79
                    572.00      623.69    600.00      623.19    700.00      622.69
                    800.00      622.79    900.00      622.79    1000.00     623.09
                1100.00     623.69    1200.0      624.56      1277.0    626.5     110014
                1317.7      629.6     1320.5      623.3       1323.9    623.1     110015
                1339.0      616.9     1342.0      616.1       1358.0    615.7     110016
                1369.0      614.9     1385.0      614.2       1397.0    615.1     110017
                1415.0      616.5     1415.0      617.3       1438.0    618.1     110018
                1461.0      628.0     1464.0      628.1       1471.7    634.6     110019
                1512.0      633.7     1550.0      635.8                           110020
ENDTABLE                                                                          11021
REACH           11.01       1.0       50.0        50.0                            11011
REACH 2         10.90       0.0                                                   11012
REACH           A-11.01     1.0       400.        400.                              R1
REACH 2         10.90       0.5                                                     R2
REACH           11.02       1.0       300.0       100.0                           R3
SEGMENT         11.02       1         N           -29.0                           R4
N VALUE         0.09                                                              R5
SEGMENT         11.02       2         C           35.0                            R6
N VALUE         .06         2.5       .04         6.          .03                 R7
SEGMENT         11.02       3         N           190.0                           R8
N VALUE         0.09                                                              R9
SECTION         11.02                                                             R10
                -780.       638.00    -720.       623.80      -680.     623.80    R10A
                -580.       623.40    -480.       624.20      -380.     624.40    R11
                -280.       624.00    -180.       623.60      -80.      625.50    R12
                -29         624.20    -20.        617.20      -10.      616.60    R13
                0           616.00    20.         616.50      25.       619.00    R14
                35.         624.00    120.        623.30      140.      623.50    R15
                190.        640.00                                                R16
ENDTABLE                                                                          R17
REACH           11.03       1.0       290.0       290.0                           R18
REACH 2         10.90       1.0                                                   11032
REACH           11.05       1.0       450.        450.                            R19
REACH 2         10.90       1.50                                                  R20
REACH           11.06       1.0       100.        100.                            R21
SEGMENT         11.06       1         N           746.0                           R22
N VALUE         0.09                                                              R23
SEGMENT         11.06       2         C           820.0                           R24
N VALUE         .06         2.5       .04         6.          .03                 R25
SEGMENT         11.06       3         N           970.0                           R26
N VALUE         0.09                                                              R27
SECTION         11.06                                                             R28
                0.          17.50     60.         624.70      100.      623.50    R29
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        210.      624.20    300.      626.10    400.      625.20          R30
        500.      624.60    600.      623.80    700.      624.60          R31
        746.      624.80    750.      622.90    760.      620.00          R32
        780.      618.60    800.      619.20    810.      619.80          R33
        820.      623.50    900.      622.90    918.      623.80          R34
        970.      640.00                                                  R35
ENDTABLE                                                                R35A
REACH   11.10     1.0       550.0     400.0                             11101
SEGMENT 11.10     1         N         100.0                             11102
NVALUE  0.09      1.3       0.07                                        11103
SEGMENT 11.10     2         N         200.0                             11104
NVALUE  0.09                                                            11105
SEGMENT 11.10     3         N         500.0                             11106
NVALUE  0.09      1.3       0.07                                        11107
SEGMENT 11.10     4         N         746.0                             11108
NVALUE  0.15                                                            11109
SEGMENT 11.10     5         C         833.0                             111010
NVALUE  .06       2.5       .04       6.        .03                     111011
SEGMENT 11.10     6         N         1000.0                            111012
NVALUE  0.09                                                            111013
SECTION     11.10                                                       1110-14
            0.00     637.93     60.00     623.72    100.00     623.63
          200.00     624.22    300.00     626.13    400.00     625.22
          500.00     624.63    600.00     623.77    700.00     624.56
          746.00     624.36    750.00     621.17    760.00     619.96
          780.00     618.56    800.00     619.17    810.00     619.77
          820.00     620.36    830.00     621.27    833.00     623.46
          900.00     622.86    918.00     623.77    970.00     639.96
         1000.00     642.06
ENDTABLE
REACH   11.13     1.0       800.0     660.0                             11131
REACH 2 11.10     +1.1                                                  11132
REACH   11.60     1.0       1360.0    1280.0                            11601
SEGMENT 11.60     1         N         377.0                             11602
NVALUE  0.09                                                            11603
SEGMENT 11.60     2         C         477.0                             11604
NVALUE  .06       2.5       .04       6.        .03                     11605
SEGMENT 11.60     3         N         700.0                             11606
NVALUE  0.09      1.3       0.07                                        11607
SEGMENT 11.60     4         N         901.0                             11608
NVALUE  0.15                                                            11609
SECTION     11.60                                                       1160-10
            0.00     644.19     46.00     630.79    100.00     629.69
          200.00     629.09    300.00     630.09    377.00     627.48
          380.00     625.06    390.00     623.56    400.00     623.77
          420.00     622.66    440.00     621.96    450.00     622.16
          460.00     622.56    470.00     623.86    472.00     625.06
          477.00     627.77    500.00     629.66    600.00     [illegible]
          700.00     627.96    800.00     629.19    900.00     [illegible]
        901.00     646.0                                                 116019
ENDTABLE
REACH   11.63     1.0       800.0     800.0                             11631
REACH 2 11.60     +1.0                                                  11632
REACH   11.81     1.0       930.      800.                              R36
REACH 2 11.90     -0.50                                                 R37
REACH   11.83     1.0       100.      100.                              R38
SEGMENT 11.83     1         N         260.                              R39
NVALUE  0.09                                                            R40
SEGMENT 11.83     2         C         330.0                             R41
NVALUE  .06       2.5       .04       6.        .03                     R42
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SEGMENT   11.83     3         N         890.                                  R43
NVALUE    0.09                                                                R44
SECTION   11.83                                                               R45
          0.        640.00    20.       632.00    190.      631.00            R46
          250.      631.00    260.      627.80    290.      624.80            R47
          300.      624.30    310.      625.00    325.      626.00            R48
          330.      628.10    350.      629.20    360.      631.50            R49
          440.      632.00    590.      632.00    690.      631.00            R50
          790.      631.00    890.      632.40    970.      636.10           R51.1
ENDTABLE                                                                     R51A
REACH     11.90     1.0       810.      700.                                  R52
SEGMENT   11.90     1         N         188.0                                11902
NVALUE    0.15                                                               11903
SEGMENT   11.90     2         C         300.0                                11904
NVALUE    .06       2.5       .04       6.        .03                        11905
SEGMENT   11.90     3         N         730.0                                11906
NVALUE    0.10                                                               11907
SEGMENT   11.90     4         N         1306.0                               11908
NVALUE    0.15                                                               11909
SECTION      11.90                                                          90-10
              0.00     641.22     17.00     633.42     130.00     631.22
            188.00     633.32    200.00     628.72     210.00     627.22
            220.00     626.42    230.00     625.52     240.00     625.22
            250.00     626.32    263.00     627.52     269.00     628.63
            272.00     629.82    300.00     630.32     311.00     633.63
            330.00     634.02    430.00     633.31     530.00     633.31
            630.00     632.61    730.00     632.21     830.00     633.44
            930.00     637.75   1030.00     636.44    1130.00     632.95
           1230.00     638.51   1306.00     640.51
ENDTABLE
ROAD      12.00     2.7       50.0      50.0                                  12001
EPR       12.00     A         3.0       3.0                                   12002
PIER      625.3     2.7       628.1     2.7                                   12003
GIRDER    636.8     636.7     0.0       0.6       2.7                         12004
          270.00    640.3     270.5     636.1     312.0     636.3             1200-5
          356.0     636.6     397.5     636.8     398.0     641.0             1200-6
ENDTABLE                                                                     12007
SECTION      12.00                                                          200-8
          0.0       650.0     1.0       644.7     34.0      642.6             12009
          134.0     639.4     170.0     639.0     270.0     640.3             120010
          271.0     634.5     273.0     634.1     280.0     630.1             120011
          285.0     629.5     291.0     627.9     303.0     625.6             120012
          317.0     625.1     331.0     625.9     343.0     627.3             120013
          354.0     627.8     377.0     628.7     387.0     629.7             120014
          395.0     633.2     397.0     633.2     398.0     641.0             120015
          433.0     638.1     433.5     638.0     434.0     637.8             120016
            534.00     636.83    634.00     635.50     734.00     635.59
            834.00     635.79    934.00     635.79    1034.00     635.79
           1134.00     635.90   1234.00     635.79    1334.00     635.69
          1550.0    636.2     1550.1    650.0                                 120020
ENDTABLE
REACH     12.03     1.0       50.0      50.0                                  12031
REACH 2   12.10     0.0                                                       12032
REACH     12.10     1.0       1110.0    1100.0                                12101
SEGMENT   12.10     1         N         438.0                                 12102
NVALUE    0.12                                                               12103
SEGMENT   12.10     2         C         538.0                                 12104
NVALUE    .06       2.5       .04       6.        .03                         12105
SEGMENT   12.10     3         N         985.0                                 12106
NVALUE    0.12                                                               12107
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SECTION      12.10                                                                  1210-8
                0.00     644.72      85.00     633.83     185.00     632.93
              285.00     633.53     385.00     634.43     438.00     635.30
              445.00     630.90     450.00     628.80     455.00     628.20
              470.00     627.01     485.00     628.30     495.00     627.38
              505.00     628.18     515.00     629.68     525.00     630.97
              532.00     633.57     538.00     636.18     545.00     633.68
              585.00     633.88     635.00     636.18     685.00     635.47
              785.00     640.55     885.00     642.35     985.00     644.35
ENDTABLE
REACH      12.13      1.0        1240.0     1120.0                                  12131
REACH 2    12.10      +2.8                                                          12132
REACH      12.30      1.0        1120.0     960.0                                   12301
SEGMENT    12.30      1          N          62.0                                    12302
NVALUE     0.12                                                                     12303
SEGMENT    12.30      2          C          160.0                                   12304
NVALUE     0.06       2.5        .04        6.0        .03                          12305
SEGMENT    12.30      3          N          500.0                                   12306
NVALUE     0.15                                                                     12307
SECTION      12.30                                                                  1230-8
                0.00     653.65      10.00     648.75      35.00     648.75
               55.00     638.15      62.00     633.85      63.00     633.45
               70.00     632.35      90.00     632.05     110.00     632.45
              130.00     632.95     140.00     633.05     150.00     633.25
              160.00     633.65     167.00     638.95     200.00     639.75
              300.00     641.85     400.00     646.75     500.00     647.75
ENDTABLE
REACH      12.33      1.0        840.0      800.0                                   12331
REACH 2    12.30      +0.6                                                          12332
REACH      12.50      1.0        720.0      480.0                                   12501
SEGMENT    12.50      1          N          880.0                                   12502
NVALUE     0.12                                                                     12503
SEGMENT    12.50      2          C          930.0                                   12504
NVALUE     .04        2.5        .04        6.         .03                          12505
SEGMENT    12.50      3          N          983.0                                   12506
NVALUE     0.12                                                                     12507
SECTION      12.50                                                                  1250-8
                0.00     657.85      67.00     653.65     100.00     648.75        1250-9
              200.00     646.25     300.00     643.45     400.00     643.35
              500.00     642.83     600.00     641.43     700.00     643.33
              800.00     642.22     823.00     642.83     867.00     636.29
              870.00     636.18     880.00     634.18     890.00     633.58
              900.00     633.39     913.00     634.58     927.00     634.48
              930.00     636.08     933.00     636.39     983.00     636.98
ENDTABLE
COMMENT    20 FT NOTE IS DUE TO SIDEBOAR                                            1250-17
REACH      12.57      1.0        2400.0     1760.0                                  12571
REACH 2    12.50      +8.2                                                          12572
REACH      12.70      1.0        2080.0     1840.0                                  12701
SEGMENT    12.70      1          N          355.0                                   12702
NVALUE     0.15                                                                     12703
SEGMENT    12.70      2          C          485.0                                   12704
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County:KENT COUNTY

State:MICHIGAN

Case Number:

Effective Date:

Description:1. Study

Contents:18. Misc. ref.: Other federal agency reports

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ADA TOWNSHIP, KENT COUNTY, MICHIGAN

1974

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FLOOD PLAIN INFORMATION
GRAND AND THORNAPPLE RIVERS
ADA TOWNSHIP, KENT COUNTY, MICHIGAN



PREPARED FOR

WATER RESOURCES COMMISSION
MICHIGAN DEPARTMENT OF NATURAL RESOURCES

AND

GRAND RIVER WATERSHED COUNCIL

BY

CORPS OF ENGINEERS, U.S. ARMY
DETROIT DISTRICT

1974

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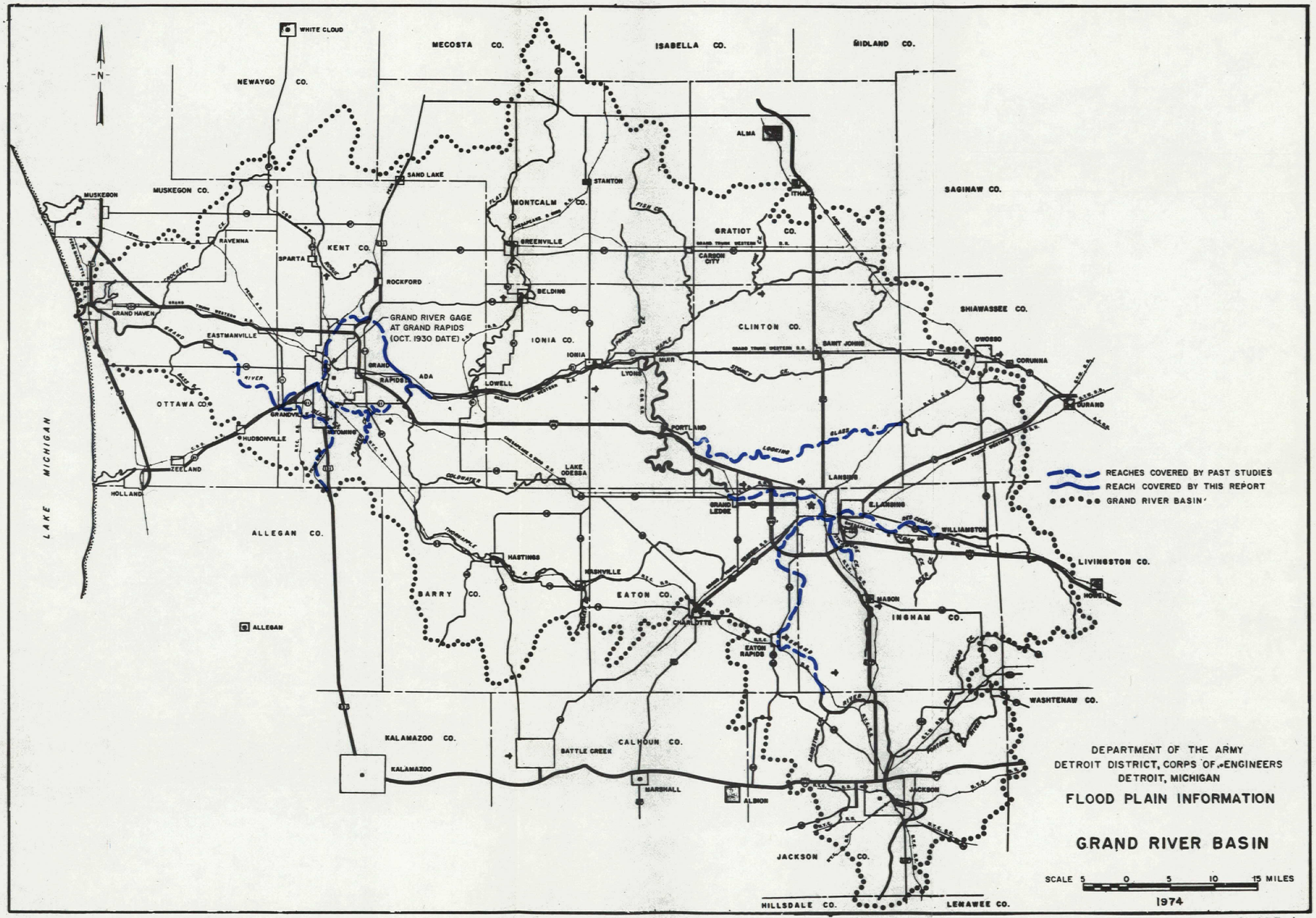
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NEWAYGO CO.
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SAND LAKE
STANTON
MONTCALM CO.
RAVENNA
SPARTA
KENT CO.
GREENVILLE
GRATIOT CO.
CARSON CITY
ROCKFORD
BELDING
GRAND HAVEN
EASTMANVILLE
GRAND RIVER GAGE AT GRAND RAPIDS (OCT. 1930 DATE)
IONIA CO.
IONIA
CLINTON CO.
SHIAWASSEE CO.
OWOSSO
CORUNNA
SAINT JOHNS
MUIR
LYONS
GRAND RAPIDS
ADA
LOWELL
OTTAWA CO.
GRANDVILLE
HUDSONVILLE
PORTLAND
GLADWIN
ZEELAND
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MARSHALL
ALBION
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JACKSON CO.
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REACH COVERED BY THIS REPORT
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DEPARTMENT OF THE ARMY
DETROIT DISTRICT, CORPS OF ENGINEERS
DETROIT, MICHIGAN
FLOOD PLAIN INFORMATION
GRAND RIVER BASIN
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1974

PLATE I

PREFACE

The portion of the Grand River flood plain covered by this report is the ninth of a series completed for the Basin at large. It is the fifth to be completed by the Corps of Engineers and other agencies for the metropolitan Grand Rapids area. It extends 10.6 miles along the Grand River upstream from the Cannon-Ada Township line (mile 54.7) through the communities of Ada and Ada Township to the Cascade-Ada Township line (mile 65.3); and 1.7 miles along the Thornapple River from its mouth upstream to the Cascade-Ada Township line, (mile 1.7). In all, an area of some 4,600 square miles, approximately 2,950,000 acres, of heavily populated area of the southcentral portion of the lower peninsula of Michigan is drained by this reach. Rainfall, runoff records and flood history have been studied and data developed so as to reflect the physical and hydrologic characteristics of the Basin in evaluating occurrence and magnitude of future floods.

This report has been prepared because a knowledge of flood potential and its hazards is an essential ingredient of comprehensive land-use planning and management decisions concerning flood plain utilization. It will not only assist local authorities and residents to better understand the causes of their flood problems, but will also provide necessary guidance in determining the best use of flood prone lands along the Grand and Thornapple Rivers in Ada Township, focusing attention on these irreplaceable natural resources and their environmental qualities.

This report contains very useful information including maps, profiles, photographs, and cross sections. They not only easily identify the extent of the flooding that has been experienced, but more important can, with sound engineering judgement, be projected to reflect increased flooding that may be encountered with future development. It is readily seen that by knowing past as well as future potential flood outlines, we are able to establish limits of permissible encroachment as well as minimum elevations for any use, particularly for habitable living space.

This report does not predict floods nor make specific recommendations for resolving flood problems. Its primary purpose is to indicate probable risk of recurrent flooding, thereby providing the basis for further study and planning so as to minimize vulnerability to flood damages. In this way, it guards against undesirable development within the designated flood plain. Appropriate control and guidance can take one of two directions or a combination of both. Where the area along the river banks is occupied by existing structures, this report will assist local authorities to determine to what extent the construction of flood protection works (structural) and/or floodproofing may be desirable. If on the other hand, the flood plain is free of encumberances, the report provides the data for the development of a comprehensive plan for the wise and economical use of the flood plain, including the application of stringent zoning and subdivision regulations (non-structural measures). In this manner it promotes the use of this area in its natural habitat or open space such as for recreation. This approach normally constitutes the most beneficial combination of cost and amenities that can be appreciated. Unfortunately, conditions of advanced development normally makes mandatory a mixture of restrictions for both present and future use. The final solution can embody a combination of structural and non-structural alternatives.

The Michigan Department of Natural Resources and the Grand River Watershed Council subscribe to the concept that flood plains must be preserved for their most compatible uses. Present State enabling legislation provides the Department of Natural Resources with the responsibility and authority to regulate all development in flood plains. These are intended only as minimum requirements. Counties, cities and villages have been given the responsibility to enact, administer, and enforce reasonable and effective flood plain zoning ordinances:

The Subdivision Control Act of 1967 (Act 288, Public Acts of 1967) requires that preliminary plats be submitted to the Michigan Department of Natural Resources for review and determination of flood plain limits. If found suitable for residential development, the plat will be approved and minimum building elevations specified.

The Flood Plain Occupation Act, Act 245, Public Acts of 1929 as amended (Act 167, Public Acts of 1968), requires that a permit be obtained from the Department of Natural Resources before filling or occupying the flood plain, or altering the channel of any watercourse. Its purpose is to assure that the channels and the floodway portions of the flood plain are free of interference or obstructions which will cause undue restriction of flood carrying capacities.

This report was prepared at the request of the Grand River Watershed Council through the Michigan Department of Natural Resources, under the continuing authority provided in Section 206 of the 1960 Flood Control Act (PL 86-645), as amended. This Agency and the Bureau of Water Management, Michigan Department of Natural Resources will make this information available to all interested agencies, Federal, State and local as well as individuals. Upon further request, the Detroit District, Corps of Engineers will provide technical assistance in the interpretation and use of the data presented as well as further assistance including the development of additional technical information where necessary.

BACKGROUND INFORMATION

Settlement

In the early organization of the State, particularly at the close of the Territorial days, the counties formed principalities in themselves. The Territorial Legislature, in March 1831 partitioned the lands adjoining the Grand River into counties, decreeing that all of the territory, comprising the sixteen most southerly townships, be designated "Kent" County. In 1840, several settlers, who had located in the adjoining Oceana County to the north, petitioned the Legislature to take eight townships from that area, and attach them to Kent, thus forming the northerly portion of Kent County. Ada Township was incorporated under authority of the Act of March 6, 1938. It originally embraced a large tract of land which now includes the adjacent townships of Cascade and Caledonia.

Very early in its history, it was evident that the mouth of the Thornapple River was a most desirable location, because of the available water resources. The building of the Village of Ada, undertaken simultaneously with the settlement of the township, was a notable failure. Lucius Lyon was among the early owners of township land. His purchase of some 1000 acres along the Thornapple is now the Village of Ada. Unfortunately, he was overtaken by the financial failures of 1837, and his banker, a Mr. Bronson, became owner of the wonderful village that was to be. Mr. Bronson died almost immediately leaving his estate to an infant heir. Purchasers of lots could not obtain titles, and all was brought to a standstill for over 20 years until the estate was probated.

Ada's "rediscovery" in the 1960's would have brought a smile of appreciation from Rix Robinson who first discovered Ada as an ideal place for his home and business 142 years ago. In the years after Robinson disappeared from the Grand Valley scene, Ada lost its head start as a center of west Michigan commerce and trade to a settlement around the rapids, 10 miles to the west which prospered and became the City of Grand Rapids.

After the 1940 census, the quickening pattern of metropolitan growth of Grand Rapids pointed once again in the direction of Ada Township. Since then the spreading metropolitan growth pattern has been multiplying with each successive year. In 1940, Ada Township had a population of 1491. In 1960 the Federal census showed the township had nearly doubled in population to 2887. Voter registrations in 1963 indicated that the township had another population increase of about 50 percent in the period between 1960 and 1963. Today it is about 4500.

The Stream and Its Valley

The Grand River Basin drains an area of about 5,572 square miles of southern and central Michigan, of which some 4,500 square miles, about 80 percent lie upstream of Ada Township.

The Grand River flows generally north to northwesterly throughout most of the reach covered by this report. The Thornapple River flows northerly thru Ada. The drainage area of the Grand River above the lower limit of this study is approximately 4,600 square miles. It is

bounded on the north by the Muskegon River and the Saginaw River Watersheds, and on the south by the Kalamazoo River Watershed. The Grand River Basin includes all or part of nineteen counties, Plate 1.

The flood plain of the Grand River in Ada Township is used principally for agricultural purposes. The area is mostly pasture, farm land and wooded areas. The Village of Ada lies primarily on the left bank of the Grand River with the majority of the commercial and residential establishments centered along the Thornapple River, approximately one-half mile upstream from its confluence with the Grand River. The plant and distribution center of the Amway Corporation is located on the north side of State Highway M-21, adjoining the Grand River.

The valley floor of the lower Grand River Basin westward from the city of Ionia is flat, gently sloping to Lake Michigan. In Ada Township, the flood plain extends for a distance of one-half mile beyond the river banks. Beyond the valley floor, which is one-half mile to one mile wide, rise the rolling hills of glacially deposited sands and gravels. In the immediate vicinity of Ada Township, the topography ranges from and elevation of 615 feet along the flood plain of Grand River to 840 feet in the nearby hills.

The Grand River varies in width from 350 to 500 feet as it passes through Ada Township. Stream banks vary from an average elevation of 610 feet in the downstream portion of the township to an elevation of about 620 feet in the upstream portion of the township for a fall of 10 feet in about 10.6 miles or about one foot per mile. The relatively flat gradient retards flow, increasing the possibility of flooding. Two highway bridges span the Grand River within the project area.

Three bridges span the Thornapple River within a distance of about 600 feet in the Village of Ada. The Thornapple River Drive Bridge is located at river mile 0.64. A covered bridge which dates back to the early 1900's is located at river mile 0.70. This bridge was closed to auto traffic in 1930. Today it is used by Ada residents as a shortcut to a recreation park. The third bridge, located at river mile 0.73, is the Grand Trunk Western Railroad bridge.

A dam, located on the Thornapple River about 4500 feet upstream from its mouth, maintains a head of about 22 feet during low water conditions. The Thornapple River averages about 100 feet in width downstream of the dam, with stream banks varying between elevation 616 to 624 feet. The pool maintained by the dam averages about 1200 feet wide at an elevation of about 636 feet.

The Grand River is fed by seven major tributaries: the Rogue, Flat, and Maple Rivers entering from the north, the Thornapple entering from the south, and the Lookingglass, Red Cedar and Portage Rivers entering from the east. The drainage areas of these tributaries are 261, 556, 970, 875, 312, 462 and 182 square miles, respectively, comprising 65 percent of the total drainage area of the Basin (Plate 1). Of these only the Thornapple River joins the Grand River within the study limit. Drainage areas pertinent to Ada Township are shown in Table 1.

Development in the Flood Plain

The flooded areas of this report are shown on the 5 sheets, Plates 3 through 7, and the Index Map, Plate 2. They are mostly pasture, farm land and wooded areas, with some commercial and residential development along the Thornapple River and are traversed by bridges and their approach roads.

TABLE 1

DRAINAGE AREAS IN THE WATERSHED OF THE GRAND RIVER

Stream	Location	Mile Above Mouth	Drainage Area sq. miles
Grand River	At Mouth	0.0	5,572
	At U.S.G.S. Gage near Fulton Street	41.0	4,900
	At Cannon-Ada Township Line	54.7	4,600 (1)
	Above Thornapple River	62.2	3,700 (1)
	At Cascade-Ada Township Line	63.3	3,600 (1)
Thornapple River	At Mouth	0.0	875
	At U.S.G.S. Gage	-	773

(1) Approximate

FLOOD SITUATION

Data Sources and Records

A National Weather Service Stream gage was recently established at the M-21 Highway Bridge in Ada. However, there is not a U.S. Geological Survey (U.S.G.S.) gaging station within Ada Township. The U.S.G.S. station nearest to Ada is on the Thornapple River in NW 1/4 sec. 22, T5N, R10W, on the right bank 200 feetdownstream from the Labarge powerplant, 2.3 miles northeast of Caledonia, and 3.3 miles downstream from the Coldwater River confluence. The drainage area of the Thornapple River at the gage is 773 square miles. Continuous records are available for the periods October 1930 to September 1938 and from October 1951 to date.

The nearest U.S.G.S. gage on the Grand River is located in Grand Rapids. Records of river stages and discharges for this gage have been maintained since March 1901 when a staff gage was installed by the U.S.G.S. 500 feet downstream of the Fulton Street Bridge until August 1918. From August 1918 to October 1930 the U.S.G.S. did not have a gage at Grand Rapids; however, flood heights and discharges were estimated by U.S.G.S. based on the U.S. Weather Bureau, Pearl Street gage. From October 1930 to October 1953 a water-stage recorder was installed 1 mile downstream of the sewage pumping station at a datum 2.99 feet higher than the present datum. In October 1953, the U.S.G.S. installed a graphic water-stage recorder 500 feet upstream from the Fulton Street Bridge at the present datum of 585.70 feet, replacing it with a digital water-stage recorder in September 1964.

To supplement the records at the gaging stations, newspaper files, historical documents and records were searched for information concerning past floods. These records have developed a knowledge of floods which have occurred on the Grand and Thornapple Rivers in Ada Township. The following paragraphs summarize significant findings, discussed in more detail in succeeding sections of this report.

Maps prepared for this report were based on U.S. Geological Survey quadrangle sheets entitled, "Rockford, Michigan", dated 1967, "Grand Rapids East, Michigan", dated 1967 and "Lowell, Michigan", dated 1918. A topographic map of parts of Sec. 33, 34 and 35, T7N, R10W, Ada Township was also used to develop the base maps for this report. Channel cross sections and bridge data were obtained from field surveys performed by the Detroit District personnel.

Table 2 lists crest stages and discharges for the known floods exceeding flood stage of 18 feet at the gaging station on the Grand River 500 feet upstream of Fulton Street Bridge in Grand Rapids. It is assumed that these events also caused some flooding in Ada Township.

TABLE 2

FLOOD CREST ELEVATIONS ABOVE FLOOD STAGE
1901-1918 and 1930-1972

This table includes all known floods above flood stage of 18 feet (603.70 feet) at the U.S. Geological Survey gaging station at Grand Rapids near Fulton Street. Drainage area = 4,900 square miles. Zero of gage = 585.70 feet above mean sea level, U.S.G.S. Datum of 1929.

Between August 1918 and October 1930, flood heights and discharges were estimated by U.S.G.S., based on the U.S. Weather Bureau gage at Pearl Street. None of these exceeded 18 feet.

Date of Crest	Gage Heights-Stage feet	Discharge cfs
March 28, 1904	22.5	54,000
June 9, 1905	21.6	50,200
April 7, 1912	19.20	30,600
March 30, 1916	18.90	30,600
March 20, 1942	18.12	34,000
April 9, 1947	19.42	38,600
March 23, 1948	20.02	42,200
April 3, 1960	19.25	31,800

Flood Seasons and Flood Characteristics

Generally, crucial flood periods occur with heavy winter and spring rains coupled with snowmelt. The most notable floods have been experienced when frontal storms of great intensity, lengthy duration, and wide-spread areal extent occur over the Grand River Basin when infiltration conditions are conducive to high rates of runoff, i.e. imperviousness due to penetrating frost.

Factors Affecting Flooding and Its Impact

Obstructions to Floodflows - Natural obstructions to floods such as trees, brush and other rank growth impede flows, creating backwater and increased flood heights and velocities. Man-made encroachments such as dams, bridges and culverts can magnify the problem causing more extensive flooding than would otherwise occur. Trees and other debris may be washed away and carried downstream to collect at bridges and other obstructions to flow. As flood flows increase, masses of debris can break loose, releasing a wall of water surging downstream until another obstruction is encountered. Debris may collect against a bridge until the load exceeds its structural capacity, causing severe damage or destruction. Erosive velocities at culverts and bridge piers and approaches can also undercut foundations causing their collapse. Increased flood stages due to the formation of ice jams in winter months have been observed at the U.S.G.S. gage on the Grand River at Grand Rapids.

As it is impossible to predict the extent or location of debris accumulation, none is assumed to clog any of the bridge or culvert openings in the development of the flood profiles.

The Grand River and Thornapple River are spanned by 5 bridges. Pertinent information on all bridges and culverts can be found in Table 5. Many of these bridges obstruct floodflow, as is shown by the abrupt changes in the flood profiles.

A dam, located on the Thornapple River at mile 0.85, is operated and maintained by the Kent County Drain Commissioner for the Thornapple Association. The spillway consist of four bays with the two outer bays 26 feet wide and the inner bays 22 feet. The tainter gates are 10 feet high and when closed, the top of the gates are at an elevation of 636.0 feet U.S.G.S. datum. A pool elevation of 636.0 is maintained automatically during periods of excess runoff until the capacity of the spillway is exceeded. The dam which was rebuilt in the early thirties was used for power generation until 1969. It is presently used for recreation and aesthetic which adds to the environmental quality of the area. During low flow conditions, the dam maintains a pool about 22 feet above the water surface elevations downstream of the dam. The pool elevation is automatically regulated during periods of high runoff. The 1948 flood reached an estimated elevation of 629.7 feet and 637.2 feet on the downstream and upstream sides, respectively.

Flood Damage Prevention Measures - There are no Federal or non-Federal flood control projects on either the Grand or Thornapple in Ada Township.

Chapter XV titled "Flood Zones" of the Ada Township zoning ordinance, adopted October 10, 1966 regulates the construction, building and/or occupancy of residential buildings in those areas along the rivers and streams or other designated areas subject to inundation, provided, however, that normal uses may be permitted if the lowest floor is built on a level 1.0 foot above the record (regulatory) flood level.

Flood Warning and Forecasting Services - The National Weather Service provides a river and flood forecast and warning service for the Grand River Basin through its offices at Lansing and Grand Rapids. A network of twenty river and rainfall stations telephonically report recorded rainfall, snowmelt, or river stage information every six hours to centralized locations. The Grand River Basin is well within the effective range of modern Weather Surveillance Radar (WSR-57) at Chicago and Detroit. In addition, supplemental equipment (WSR-3) is operated at Flint and Muskegon, Michigan and Fort Wayne, Indiana.

Other special forecasting services, including quantitative precipitation forecasts and severe weather warnings, are rendered by local Weather Service Offices. Commercial radio and television stations and State Police have a 24 hour telephone or operator line teletype warning service to the National Weather Service. This permits broadcasting of information on areas of intense precipitation and potential flooding.

Flood Fighting and Emergency Evacuation Plans - Although there are no formal flood fighting or emergency evacuation plans for the Grand Rapids Metropolitan Area, which includes Ada Township, provisions for alerting area residents and coordinating operations of township and county public service agencies in time of emergency are accomplished through the Kent County Civil Defense Office. This office maintains close communication with the local Office of the National Weather Service and establishes a "flood watch" during the early stages of a flood threat. Local residents are warned by radio broadcast of impending highwater conditions. A National Weather Service stream gage was recently established at the M-21 Highway Bridge in Ada, Michigan, to assist in forecasting river stages in the Grand Rapids area. When flooding is imminent, local residents are advised by a mobile public announcement system operated by the Kent County Sheriff's Department, to evacuate the area. Subsequent flood fighting, evacuation, and rescue activities are coordinated by the Kent County Civil Defense Office with local public agencies.

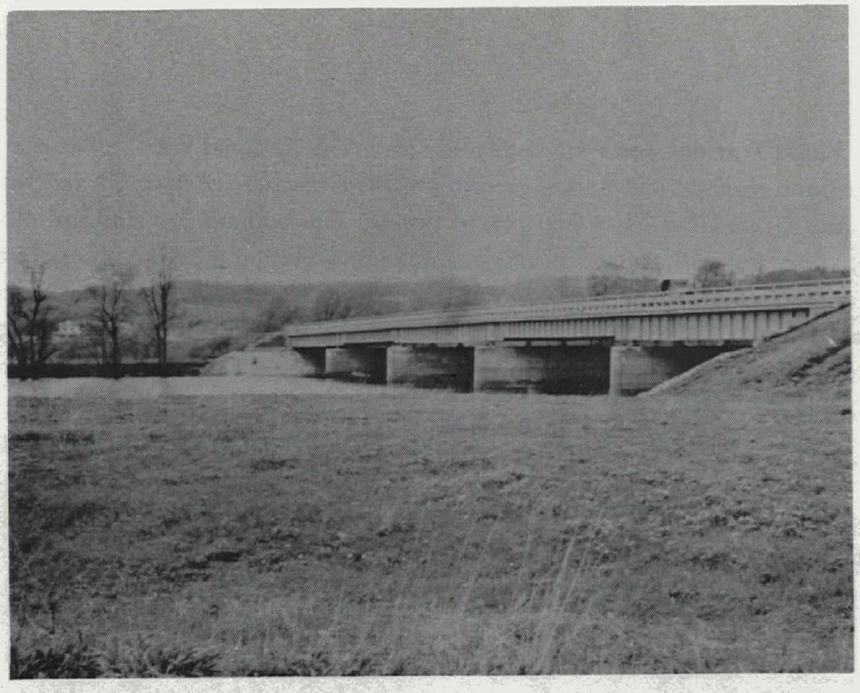


FIGURE 1 - Knapp Street Bridge at Mile 56.47 of Grand River

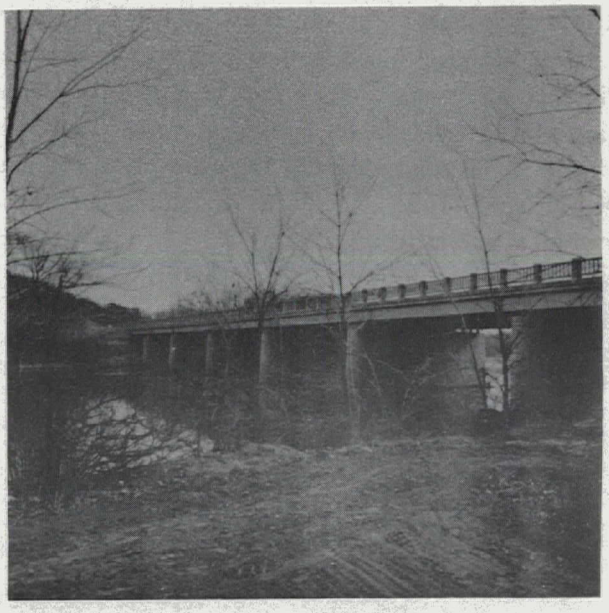


FIGURE 2 - M-21 Highway Bridge at Mile 62.14 of Grand River

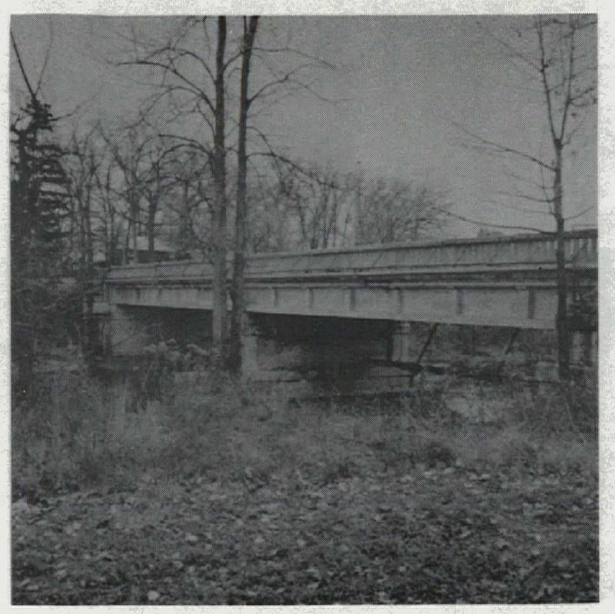


FIGURE 3 - Thornapple River Drive Bridge at Mile 0.64 of Thornapple River

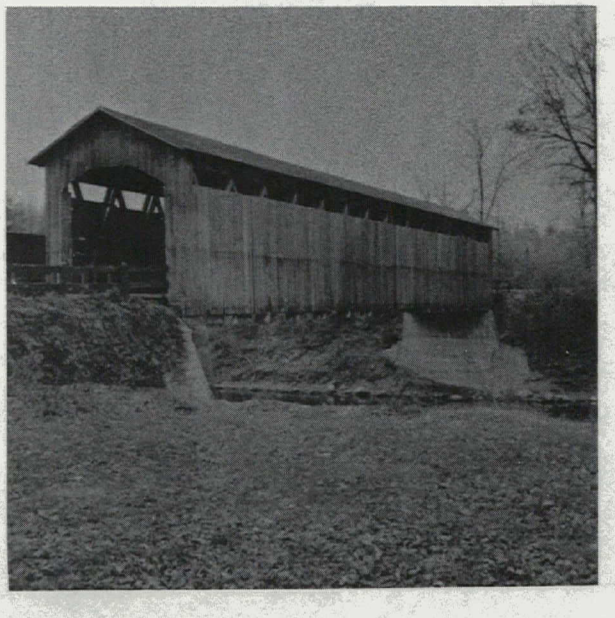


FIGURE 4 - Covered Bridge at Mile 0.70 of Thornapple River

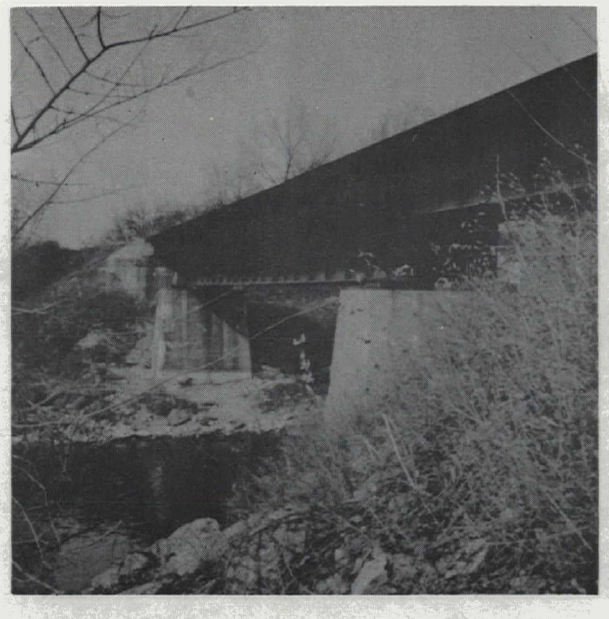


FIGURE 5 - Grand Trunk Western Railroad Bridge at Mile 0.73 of Thornapple River



FIGURE 6 - Thornapple River Dam at Mile 0.85 of Thornapple River

PAST FLOODS

Summary of Historical Floods

The greatest flood on the Grand River in Ada Township during the past 100 years occurred in March 1904. Newspapers pointed out the disastrous proportions of this flood and leave no doubt that it was far greater than any known to the oldest residents at that time. The second highest flood occurring June 1905 was within 0.9 foot of the March 1904 flood. The modern day flood of record, the March 1948 flood was within 2.5 feet of the 1904 flood. Other large floods in the Grand Rapids Metropolitan Area are recorded for March 1942, April 1947, and April 1960. These floods were about 4.4, 3.1, and 3.3 feet lower, respectively, than the March 1904 flood.

Flood Records

Information on historical floods in the Grand Rapids Metropolitan Area was obtained from stream gaging stations maintained by the U.S. Geological Survey in Grand Rapids. From August 1918 to October 1930, the U.S. Geological Survey did not have a gage at Grand Rapids, however, the National Weather Service maintained a record of gage heights. High water marks were obtained through residents along the streams and research of newspaper files and historical documents.

Flood Descriptions

Newspaper accounts, historical records and field investigations of past floods have not only provided information of inestimable value in preparing this study, but make interesting and exciting reading as shown by eyewitness reports. Unfortunately, newspaper coverage of actual flooding in Ada Township is non-existent, due to the overshadowing effects of flood damage in the more densely populated areas of Grand Rapids. However, the severity and frequency of flooding in Ada Township is reflected from the following descriptions of known large floods that have occurred in Grand Rapids, Michigan and vicinity.

March 1904 Flood - The greatest known flood occurred at Grand Rapids on March 28, 1904. During the period March 24-27, rainfall, averaging 1 inch over the Basin, accompanied heavy snow melt producing serious flooding. The peak discharge was 54,000 cubic feet per second at Grand Rapids. The duration above flood stage at Grand Rapids was about 10 days. A peak discharge of about 52,500 cubic feet per second was estimated for the Grand River in Ada Township downstream of the Thornapple River confluence. THE GRAND RAPIDS PRESS, March 27, 1904, reads as follows:

> *By 2 o'clock water was six inches deep in Front Street at Shawmut Avenue. At this time it was impossible for one not provided with a boat or a diving suit to pass from the west bank of the river to the territory bordering John Ball Park.*
>
> *The low land along the center of the district was simply a lake.*
>
> *The relief work went on all day and early night.*

June 1905 Flood - The flood of June 9, 1905 was the second greatest flood of record at Grand Rapids. The peak discharge was 50,200 cubic feet per second at Grand Rapids. The duration above flood stage was 7 days. THE GRAND RAPIDS HERALD, June 9, 1905, reads as follows:

> *Never was a more desperate battle waged against fate than that fought through yesterday's 24 hours upon the north end dike. The safety of the entire west side of Grand Rapids was at stake.*
>
> *Reinforced with countless bags of sand where decay was evident, strengthened by the labors of 200 tireless workers, the dike withstood the attack of the elements. It beat back the waters. And when night closed in upon the scene of conflict, it seemed that the west side was safe.*

March 1942 Flood - A heavy drifting snow storm occurring over southern lower Michigan, March 8-10, 1942, was followed by several days of thawing temperatures which reached the high 40's. This was followed by an intense rainfall which further aggravated the already swollen condition of the streams throughout the Grand River Basin. The resulting sudden flood peaked at a discharge of 34,000 cubic feet per second, cresting at 18.12 feet at Grand Rapids on March 20, 1942.

April 1947 Flood - The April 1947 flood at Grand Rapids was caused by a statewide storm which was centered just south of the Basin. About 9 inches of snow had fallen on the Basin two weeks previous to the storm. Temperatures remained at or near freezing until the first day of April. Temperatures rose sharply on the 5th to the 60's. Serious flooding conditions prevailed as a result of intense rainfall, averaging about 2.4 inches, and accompanying snowmelt. On April 9, 1947, a peak discharge of 38,600 cubic feet per second and a crest stage of 19.42 feet were recorded at Grand Rapids. The Thornapple River at Ada reached an estimated peak discharge of 11,200 cubic feet per second on April 8, 1947.

March 1948 Flood - The last major flood occurred March 21-23, 1948. Prior to the storm of March 19-21, 10 inches of snow had accumulated in the Basin. During the storm of March 19-21, 1.5 inches of rain fell at Grand Rapids with temperatures rising to the 60's. A peak discharge of 42,200 cfs and a crest stage of 20.02 feet were recorded at Grand Rapids. For that reach of the Grand River in Ada Township downstream of the Thornapple River confluence, an estimated peak discharge of 41,000 cubic feet per second was made. The peak discharge for the Thornapple River occurring on March 21, 1948 was estimated at 10,250 cubic feet per second. Figures 7 thru 9 are views of the flood situation that prevailed in Ada during the March 1948 flood. THE GRAND RAPIDS PRESS, March 22, 1948, reads as follows:

> *Sweating firemen worked Sunday filling sandbags to raise low sectors of the city's floodwalls as Grand River flood waters surged into the city limits. The river was predicted to reach a crest of 19 feet by Tuesday.*

We are making preparations for a 19-foot crest... and if the river goes higher than that nothing can hold it.

The city sewage treatment plant on Market Street, SW, stopped operating Sunday because flood water had reached the electric motors.

April 1960 Flood - The only significant flood since 1948 occurred during the period 31 March to 7 April 1960 and was caused by a combination of melting snow and a quarter inch of rain on the 30th and 31st. The Grand River at Grand Rapids cresting on 3 April 1960, at 1:00 p.m. reached a gage height of 19.25 feet. A discharge of 31,800 cubic feet per second was recorded, thus being comparable to many previous floods. The Thornapple River in Ada reached an estimated peak discharge of about 6,000 cubic feet per second during this flood.



FIGURE 7 - View looking north toward M-21 Highway from property facing Ada Drive about midway Thornapple Drive and M-21 Highway during the March 1948 flood.



FIGURE 8 - View along Ada Drive near the intersection of Headly Street during the March 1948 flood.



FIGURE 9 - View looking at Grand Trunk Western Railroad bridge just downstream of Thornapple River Dam during the March 1948 flood.

FUTURE FLOODS

This section of the report discusses the Standard Project and the Intermediate Regional Floods on the Grand and Thornapple Rivers in Ada Township. Floods of the Standard Project size represent a reasonable upper limit of anticipated flooding. Those of the Intermediate Regional size represent floods of a lesser magnitude that may reasonably be expected to occur more frequently than the Standard Project Flood.

Another flood commonly referred to is the 50-year frequency flood which in contrast to the 100-year frequency flood has a 2 percent chance of occurring in any given year. It may be used in lieu of the 100-year frequency flood to establish the lower limit of the regulatory flood.

Large floods have been experienced in the past over watersheds of other streams in the general geographic and physiographic region of this study. Intense storms similar to those causing these floods could easily occur over the watershed of the Grand River. In that event, floods would be comparable in size with those experienced on neighboring streams. It is therefore desirable, in determining future floods for this stream, to consider storms and floods that have occurred in the region over watersheds whose topography, watershed cover, and physical characteristics are similar.

Intermediate Regional Flood

The Intermediate Regional Flood is defined as a flood having an average frequency or probability of occurrence of once in 100 years or a flood that has a 1 percent probability of occurring in any one year at a designated location. Probability estimates for this study were based on statistical analysis of streamflow records available for the Grand River gage in Grand Rapids and the Thornapple River gage near Caledonia. The Intermediate Regional Flood represents a major flood, although considerably less severe than the Standard Project Flood. Peak flows thus developed for the Intermediate Regional Flood at selected locations in the study are shown in Table 3.

Standard Project Flood

Only in rare instances has a specific stream experienced the largest flood that is likely to occur. Severe as the maximum known flood may have been on any given stream, it is commonly agreed that a larger flood can occur. The Corps of Engineers, in cooperation with the National Weather Service, has made comprehensive studies and investigations based on records of experienced storms and floods, evolving a generalized procedure for estimating flood potential. These procedures have been used in determining the Standard Project Flood. It is defined as the largest flood that can be expected to occur from the most severe combination of meteorological and hydrological conditions that is considered reasonably characteristic of the geographical region involved. It represents a reasonable upper limit of flooding. It is not practical to assign a frequency to the Standard Project Flood because of the somewhat limited data available. The magnitude of the Standard Project Flood, reflecting a lesser frequency is represented by a recurrence interval well in excess of the Intermediate Regional Flood.

Standard Project Flood estimates were made for the Grand River at Grandville during the Interim Survey Report Study on Flood Control at Grandville. The value of 151,000 cubic feet per second passing the Fulton Street Bridge in Grand Rapids was determined. The Standard Project Flood on the Grand River in Ada Township was estimated by subtracting the coincidental Rogue River discharge from the peak discharge of 151,000 cubic feet per second, arriving at a value of 144,800 cubic feet per second. The Standard Project Flood estimate for the Thornapple River was estimated to be 49,300 cfs.

Comparison of these discharges shown in Table 3 notes that the Standard Project discharge for the two rivers varies from approximately 2.5 to 3.4 times the Intermediate Regional flow. The relative water surface elevations for the Intermediate Regional Flood and the Standard Project Flood are tabulated in Table 4 and are shown on Plates 8 and 9.

TABLE 3

PEAK FLOWS FOR INTERMEDIATE REGIONAL AND STANDARD PROJECT FLOODS

Location	River Mile	Drainage Area sq mile	Intermediate Regional Flood cfs	Standard Project Flood cfs
Grand River at Ada-Cannon Township Line	54.7	4,600 (1)	58,300	144,800
Grand River at Ada-Cascade Township Line	63.3	3,600 (1)	50,000	120,000
Mouth of Thornapple River	0.0	875	13,000	49,300

(1) Approximate

The estimated discharge for the March 1948 flood at the U.S. Weather Bureau gage located at the downstream side of M-21 Highway Bridge over the Grand River was 40,400 cubic feet per second. The estimated discharge for the March 1948 flood on the Thornapple River in Ada Township was 10,250 cubic feet per second. Table 4 shows the flood elevation comparisons between the March 1948 flood, the 50-year frequency flood, the Intermediate Regional Flood and the Standard Project Flood at the Weather Bureau gage on the Grand River and at the upstream side of Thornapple River Drive Bridge over the Thornapple River in Ada.

TABLE 4

FLOOD ELEVATIONS

Flood	Discharge cfs	Elevation feet (1)
GRAND RIVER		
Standard Project	144,800	643.6
Intermediate Regional	58,300	632.5
50-Year Frequency	50,700	630.7
March 1948	40,400	628.4
THORNAPPLE RIVER		
Standard Project	49,300	644.1
Intermediate Regional	13,000	633.0
50-Year Frequency	10,900	631.1
March 1948	10,250	628.5

(1) Above mean sea level

Frequency of Future Floods

Water Resource Bulletin No. 15, Dec. 67, "A Uniform Technique for Determining Flood Flow Frequencies", provides the basic method, log-Pearson Type III, for determining frequency relationships. Its adoption for flood frequency determinations by other Federal and State agencies as a basis for flood hazard solutions represents a consensus of agreement by recognized experts. A frequency curve of annual peak flows was constructed from gage records observed on the Grand River at Grand Rapids. These discharges were then reduced by a discharge-drainage area relationship to establish the Intermediate Regional Flood and 50-year frequency flood discharges on the Grand River in Ada Township. A frequency curve of annual peak flows was also developed from gage records observed on the Thornapple River near Caledonia, Michigan. A combination of factors necessary to produce a flood larger than the Standard Project Flood is statistically possible. Such an occurrence is referred to as the Probable Maximum Flood. Such flood criteria may be significant when an unusually high degree of protection is desired against an extremely rare combination of these natural phenomena.

Hazards of Large Floods

The amount and extent of damage caused by a flood depends upon the limit of the area flooded, depth and duration, velocity of flow, rate of rise, and development in the flood plain. An Intermediate Regional or Standard Project Flood on either the Grand or Thornapple Rivers in Ada Township would result in inundation of residential, commercial, and industrial sections of the area. Deep, debris laden floodwater flowing at high velocity would create conditions hazardous to persons and vehicles. Floodwater 3 or more feet deep and moving at a velocity of at least 3 feet per second, could easily sweep an adult off his feet. Utilities can be ruptured by erosive action, thus contaminating domestic water supplies. Sanitary sewers can flood causing basement sewage backup. Extended periods of flooding such as that experienced in March 1948 create severe hardships. Post-flood structural and sanitary problems, such as swelling, warping, settling of buildings and the widespread distribution of polluted debris and silt, confront all affected residents. Additionally, medical, fire, and law enforcement emergency measures are jeopardized by the disruptive results.

Flooded Areas and Flood Damages - The areas in Ada Township that would be flooded by the Intermediate Regional Flood are shown on Plate 2, which is also an index map to Plates 3 thru 7. Plates 3 thru 7 outline the approximate areas along the Grand and Thornapple Rivers that would be inundated by a recurrence of the March 1948, and an occurrence of the Intermediate Regional and the Standard Project Floods. The flooded outlines along the tributaries, excluding the Thornapple River, upstream of their confluence represent conditions that would prevail during major floods on the Grand River. They do not reflect peak runoff conditions of the tributary areas. The actual limits of these overflow areas on the ground may differ from those shown on the 10-foot contour interval map scale, therefore, precise plotting of boundaries can only be accomplished by applying elevations for specific locations, as shown on

the highwater profiles for the Intermediate Regional and Standard Project Floods. The areas that would be flooded by the Intermediate Regional and Standard Project Floods include commercial, industrial, and residential sections and the associated streets, roads and private and public utilities in the proximity of the Grand and Thornapple Rivers in Ada Township. Considerable damage to these facilities would occur during an Intermediate Regional Flood. The greater width and depth of flooding, as well as increased velocities and longer duration of flooding, characteristic of the Standard Project Flood, would not only cause more severe and extensive damage, but could endanger the lives of residents. Plates 8 and 9 show the high water profiles for the March 1948 flood reconstituted under 1972 conditions, the 50-year frequency flood, Intermediate Regional, and the Standard Project Floods. Plate 10 shows cross sections that are typical of the Grand and Thornapple Rivers in the reaches investigated. Their locations are shown on the flooded outline maps, Plates 3 thru 7. The elevation and extent of overflow of the March 1948, the Intermediate Regional and the Standard Project Floods are indicated on these sections.

Obstructions - Two roadway bridges span the Grand River and two roadway bridges and one railway bridge span the Thornapple River in Ada Township within the study reach. One roadway bridge, the covered bridge, is no longer used for vehicular traffic, but provides pedestrian access to a recreation area along the right bank of the Thornapple River. Table 5 lists water surface elevations at bridges that may be restrictive during flood periods.

The Thornapple River Dam, as previously mentioned, is presently used for recreation and aesthetic purposes. When flows approach Intermediate Regional and Standard Project Flood stage, the water surface above and below the dam will be 638.5 feet and 633.8 feet, respectively for the Intermediate Regional Flood and 647.1 feet and 645.7 feet, respectively for the Standard Project Flood.

No other significant structural obstructions to flood flow are located within the study reach. However, floating material often catches on bridge piers and low steel further blocking waterway openings or clogging the overbanks in wooded areas. Increased flood stages due to the formation of ice jams in the winter months have been observed at the U.S.G.S. gage on the Grand River at Grand Rapids. The profiles of the Standard Project Flood and the Intermediate Regional Flood depend in part upon the degree of destruction or clogging of various bridges during the floods. As it is impossible to forecast these events, it was assumed for these flood determinations that all bridge structures would stand, and that no clogging would occur. Damage to structures from past floods have been minimal; however, damage resulting from an occurrence of the Intermediate Regional Flood or Standard Project Flood would be excessive. The low steel of all bridges would be submerged by the Intermediate Regional Flood. The roadway of all bridges, except the Grand Trunk Railroad, would be inundated by the Standard Project Flood.

Velocities of flow - Water velocities during floods depend largely upon the size and shape of the cross section, the condition of the stream, and the bed slope, all of which vary on different streams and at different locations on the same streams. During the occurrence of an Intermediate Regional Flood, velocities in the main channel of the Grand and Thornapple Rivers would range up to 5.9 feet per second and 4.5 feet per second, respectively. Maximum average velocities in the overbank areas of both streams are generally less than 0.9 foot per second. During an occurrence of the Standard Project Flood, channel velocities would range up to 7.6 and 6.1 feet per second for the Grand and Thornapple Rivers, respectively. On the flood plain, the maximum average velocity would be about 1.6 and 1.0 feet per second, respectively. Water flowing at this rate is capable of causing severe erosion of streambanks and fill around bridge abutments and transporting large objects.

Rates of Rise and Duration of Flooding - A considerable time lag occurs between the flood producing storm and the subsequent flood peak arrival in Ada Township. Floods generally rise slowly and stay out of banks for long periods of time. Table 6 shows the maximum rate of rise, height of rise from critical stage to maximum flood stage, time of rise and duration of critical stage for the Intermediate Regional Flood and Standard Project Flood at the U.S. Weather Bureau Gage at the downstream side of M-21 Highway Bridge over the Grand River in Ada Township.

Photographs of Future Flood Heights - The levels that would be expected from a recurrence of the March 1948 flood and the occurrence of the Intermediate Regional Flood at various locations in Ada Township are indicated on the photographs that follow.

TABLE 5

ELEVATION DATA

Bridges Across Grand and Thornapple Rivers in Ada Township, Michigan

Identification	Miles Above Mouth	Underclearance Elevation (1)	Water Surface Elevation (1) Intermediate Regional Flood	Water Surface Elevation (1) Standard Project Flood
GRAND RIVER				
Knapp Street	56.47	626.84	629.5	640.6
M-21	62.14	630.05	632.8	643.6
THORNAPPLE RIVER				
Thornapple River Drive	0.64	626.36	633.0	644.1
Grand River Drive (Covered Bridge)	0.70	627.84	632.9	644.1
Grand Trunk Western Railroad	0.73	636.55	633.6	645.4

(1) Feet above mean sea level

TABLE 6

RATES OF RISE AND DURATION

Flood	Maximum Rate of Rise ft/hr	Height of Rise ft	Time of Rise hrs	Duration of Critical Stage hrs
Intermediate Regional	0.18	9.2	44	98
Standard Project	0.40	20.0	64	153

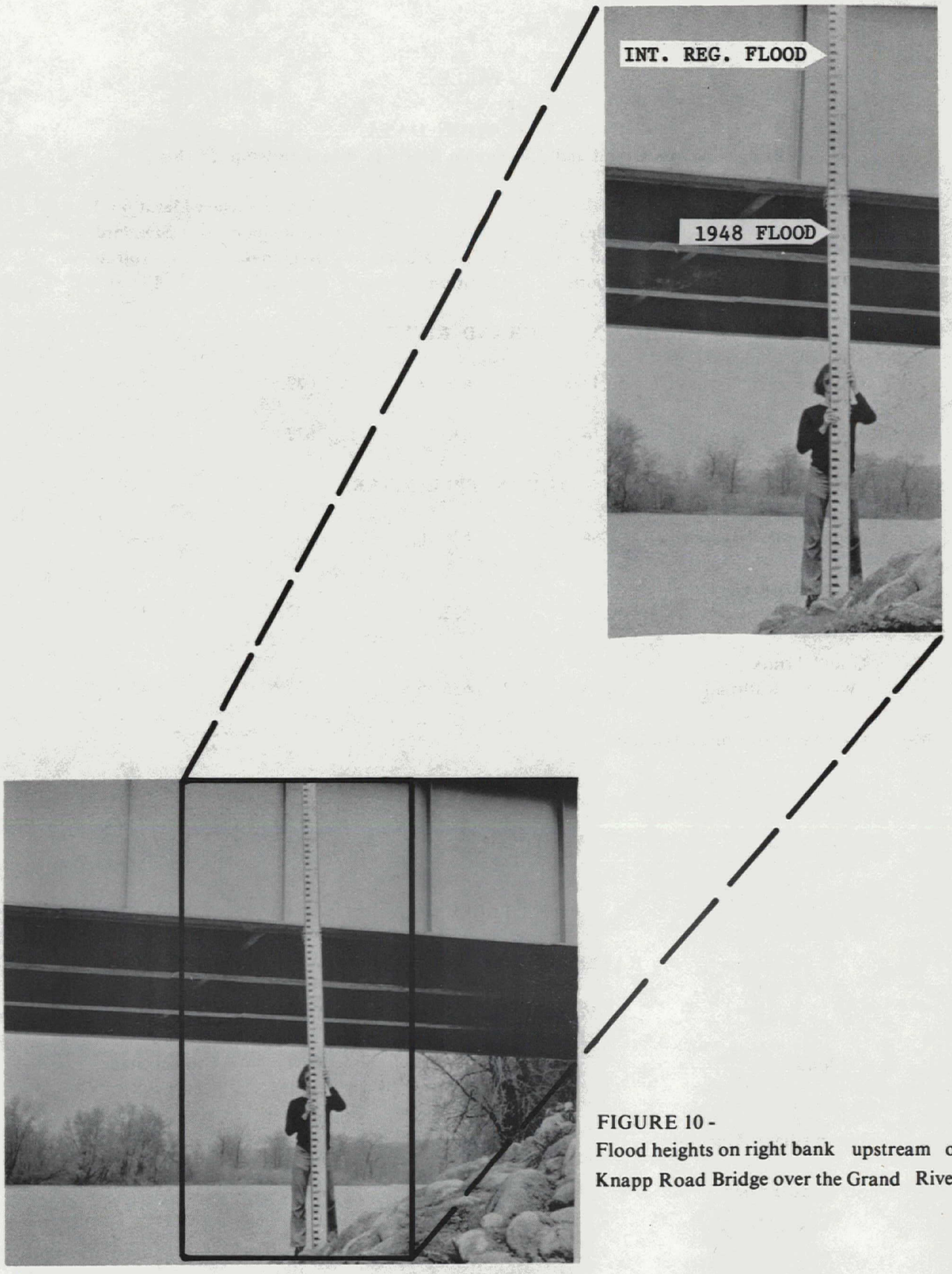


FIGURE 10 -
Flood heights on right bank upstream of Knapp Road Bridge over the Grand River

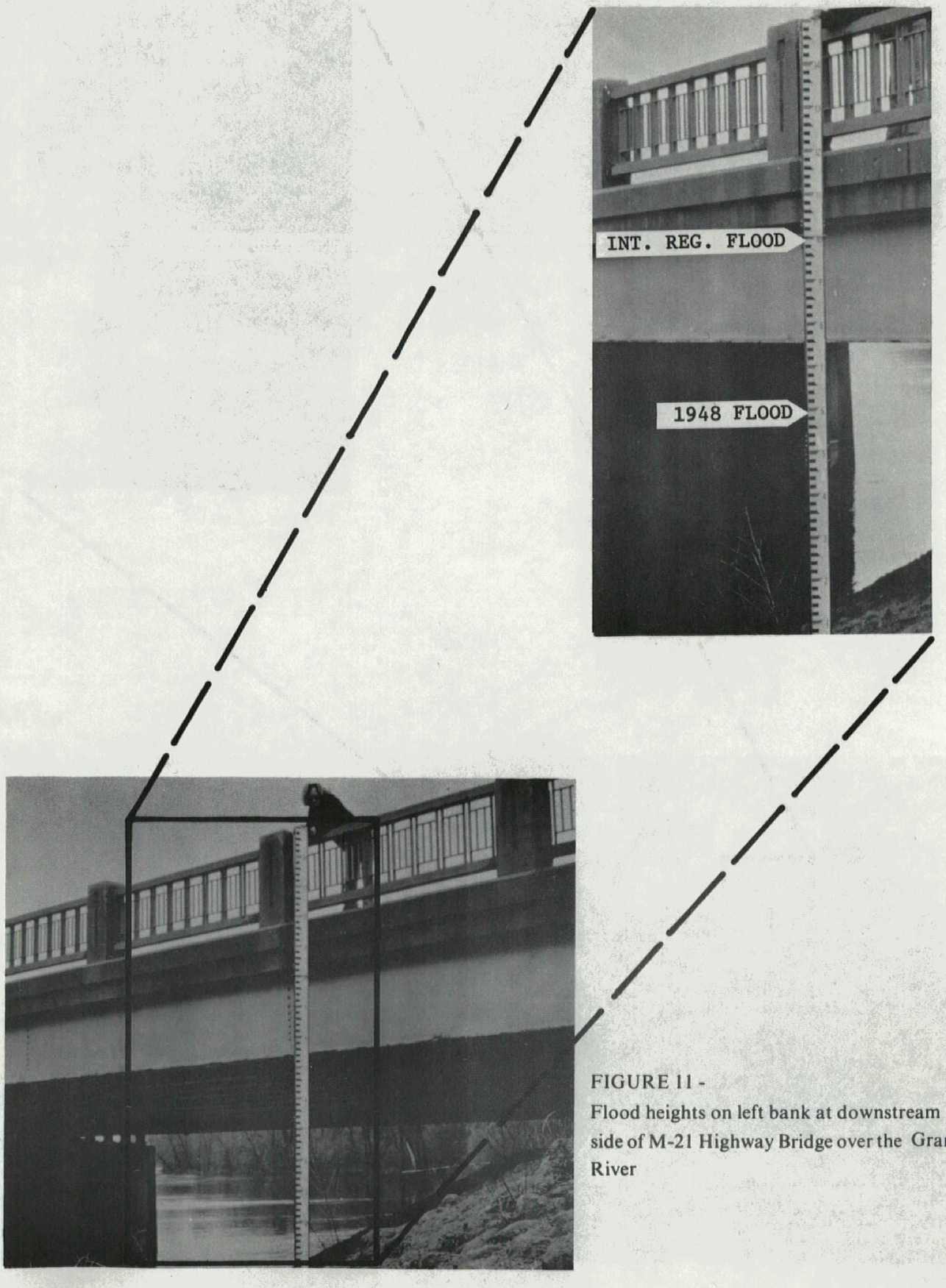


FIGURE 11 -
Flood heights on left bank at downstream side of M-21 Highway Bridge over the Grand River

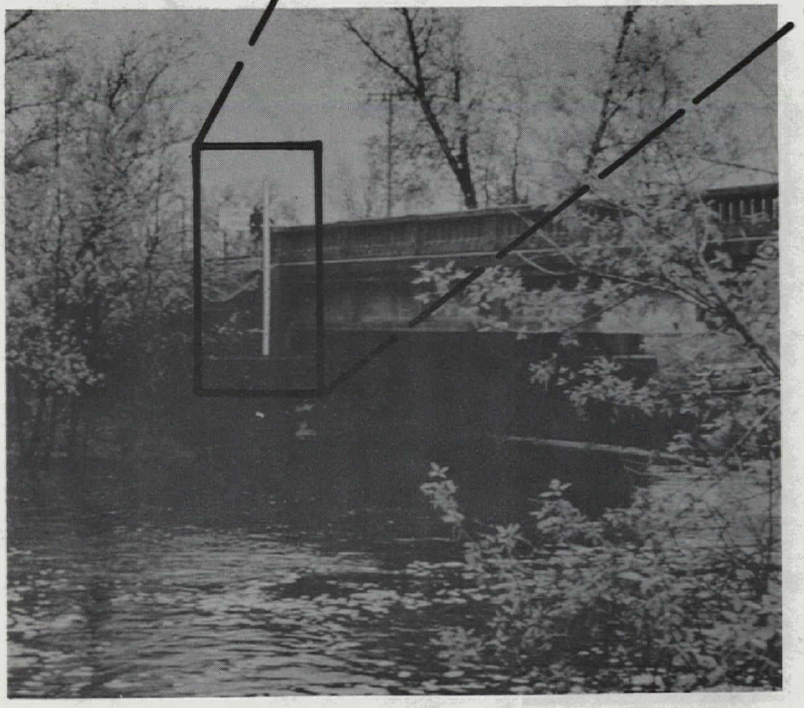




FIGURE 12 -
Flood heights on right bank at down-stream side of Thornapple River Drive Bridge over the Thornapple River

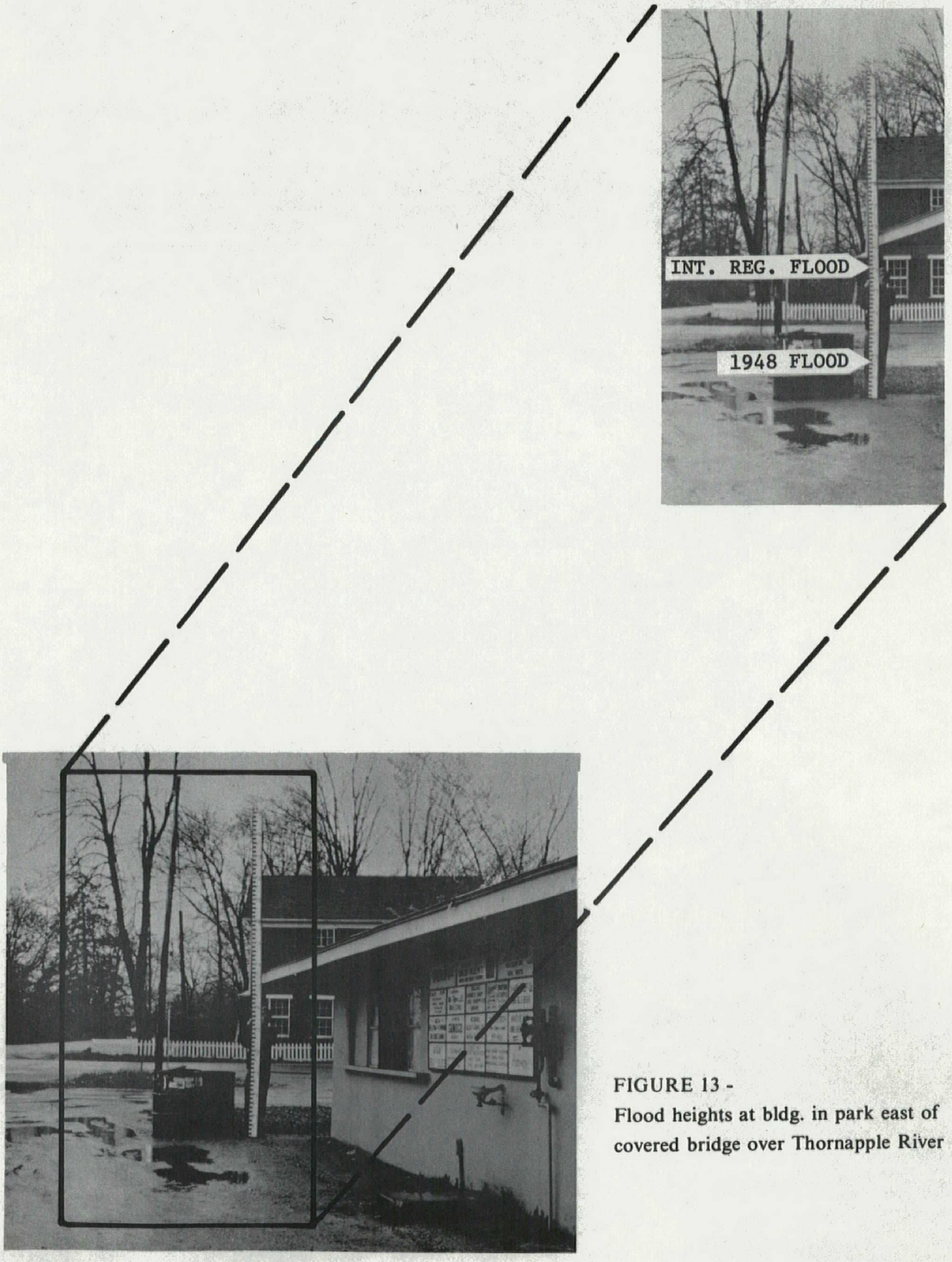


FIGURE 13 -
Flood heights at bldg. in park east of covered bridge over Thornapple River

GLOSSARY

Backwater. The resulting highwater surface upstream from a dam, bridge or other obstruction in a river channel or high stages in a receiving stream.

Channel or Water Course. An elongated depression either natural or man-made having a bed and well-defined banks varying in depth, width and length which gives direction to a current of water and is normally described as a creek, stream or riverbed.

Cross section. A graph showing the shape of the streambed, banks, and adjacent land on either side made by plotting elevations at measured distances along a line perpendicular to the centerline of the stream.

Datum. An assumed reference plane from which elevations and depths are measured such as from sea level.

Digital Water Stage Recorder. An automatic system of recording water stages every two hours on a paper tape.

Elevation-Discharge Relationship. The relationship between water surface elevation and rate of flow at a specified location for a range of flow rates.

Flood. A temporary overflow by a river, stream, ocean, lake or other body of lands not normally covered by water. It does not include the ponding of surface water due to inadequate drainage such as within a development. It is characterized by damaging inundation, backwater effects of surcharging sewers and local drainage channels, and by unsanitary conditions within adjoining flooded habitated area attributable to pollutants, debris and water table.

Flood Crest. The maximum stage or elevation reached by flood waters at a given location.

Flood Peak. The maximum instantaneous discharge or volume of flow in cubic feet per second passing a given location. It usually occurs at or near the time of the flood crest.

Flood Plain. The relatively flat area or low lands covered by flood waters originating with either the adjoining channel of a water course such as a river or stream, or a body of standing water such as an ocean or lake.

Flood Profile. A graph showing the relationship of water surface elevation to location along the stream. The latter is generally expressed as distance above the mouth of the stream in miles. While it is drawn to show surface elevations for the crest of a specific flood, it may be prepared for conditions at any other given time or stage.

Flood Routing. The process of determining progressively the timing and shape of a flood wave at successive points along a stream. This procedure is used to derive a downstream

hydrograph from an upstream hydrograph. Local inflow and tributary hydrographs are considered.

Flood Stage. The elevation at which overflow of the natural stream banks or body of water occurs.

Floodway. The portion of the flood plain including the channel of the stream that is required for the conveyance of flood flow.

Floodway Fringe. The area of the flood plain lying outside of the floodway which may be covered by flood waters originating from an adjoining river or stream.

Frequency. The expected recurrence interval for a given size flood based upon long-term statistical probability. Large floods occur less frequent and smaller floods occur more frequent.

Gage. An instrument installed upstream from, but within range of the cross-section or reach of the river in question to determine fluctuations and stage with respect to time.

Graphic Gage. Recording gage which draws a continuous graph for fluctuations in stage.

Head Loss. The effect of obstructions, such as narrow bridge openings, dams or buildings that limit the area through which water must flow, raising the surface of water upstream from the obstruction.

Headwater. The tributaries and upper reaches which are the sources of streams.

Hydraulics. The science of the laws governing the motion of water and their practical applications.

Hydrograph. A graph denoting the discharge or stage of flow over a period of time.

Hydrology. The science dealing with the occurrence and movement of water upon and beneath the land areas of the earth.

Intermediate Regional Flood. A flood having a one percent probability of occurring in any one year at a designated location. It is based on statistical analysis of streamflow records available for the watershed and analysis of rainfall and runoff characteristics in the general region of the watershed.

Left Bank. The bank of the left side of a river, stream or water course, looking downstream.

Low Ground Elevation. The elevation of the lowest significant area in the flood plain at a specified location.

Low Steel (or Underclearance). See "Underclearance".

Manning's "n". A coefficient of channel and overbank roughness used in Manning's open channel flow formula, commonly called a retardance factor.

Reach Length. A longitudinal length of stream channel selected for use in hydraulic or other computations.

Right Bank. The bank on the right side of the river, stream or water course, looking downstream.

Staff Gage. A non-recording gage which requires an observer to read and record at regular time intervals. They are made of either wood or metal with a graduated scale.

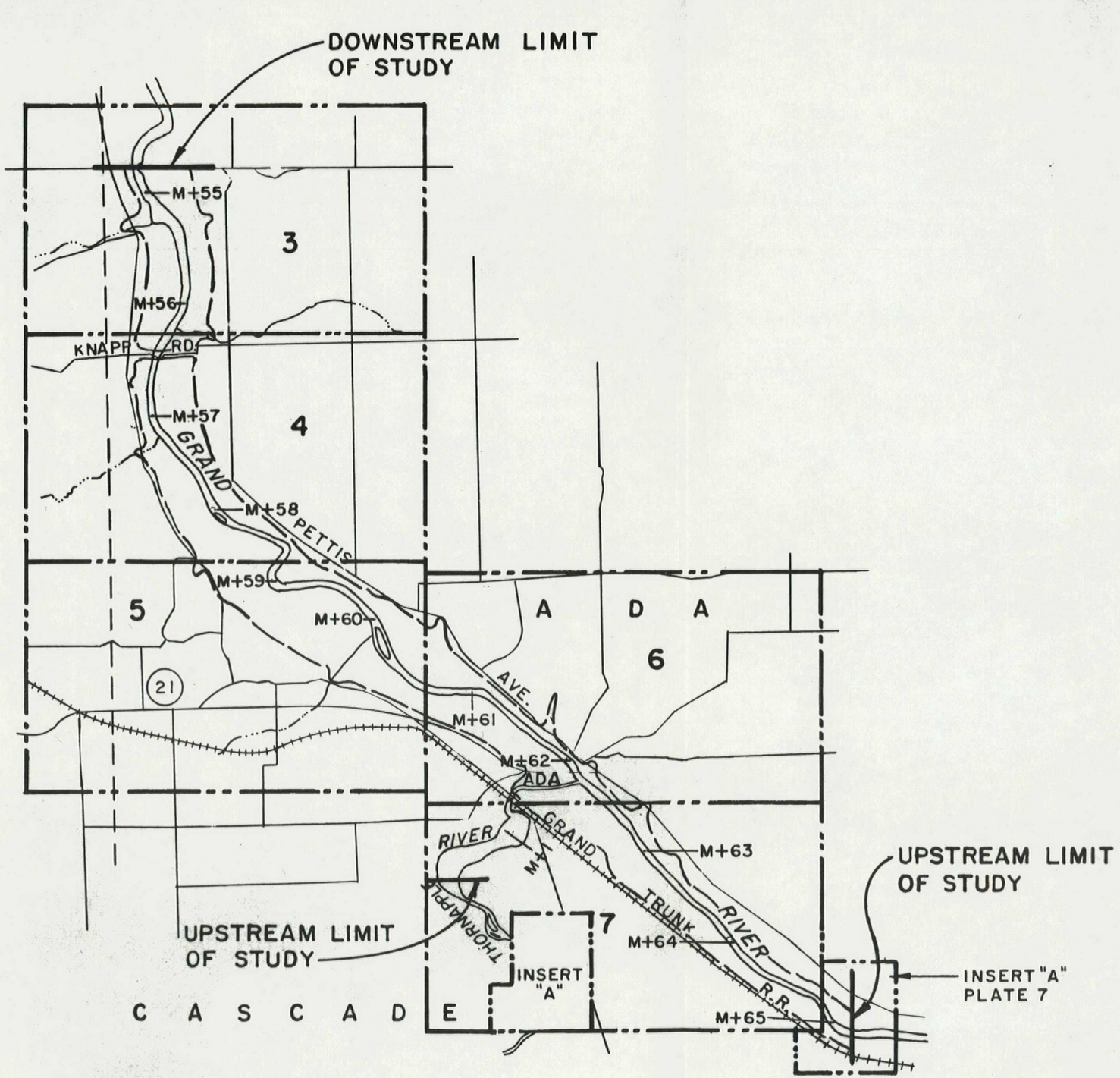
Standard Project Flood. The flood that may be expected from the most severe combination of meteorological and hydrological conditions that are considered reasonably characteristic of the geographical area in which the drainage basin is located, excluding extremely rare combinations. Peak discharges for those floods are generally about 40 percent to 60 percent of the Probable Maximum Floods for the same basins. Such flood definitions are intended as practicable expressions of the degree of protection that should be sought in the design of flood control works, the failure of which might be disastrous.

Structural Improvements. In the context of flood prevention the engineering constructions for purposes of water regulation, control, storage or conveyance.

Time of Concentration. Time required for water to flow from the most remote point of a watershed to the outlet or other point of reference.

Underclearance. The lowest point of a bridge or other structure over or across a river, stream, or water course that limits the opening through which water flows. This is referred to as "low steel" in some regions.

Watershed. The area, in acres or square miles, from which surface runoff flows toward a given point in a river or stream, initially over ground or paved areas and then into successively larger conduits, streams, and tributaries until it reaches the point of determination. Ridges separating adjacent watersheds are called "divides". The terms "drainage basins" and "watershed" are synonymous.



LEGEND

— — INTERMEDIATE REGIONAL FLOOD

5 INDEX NUMBER OF DETAIL SHEETS

M+60 MILES ABOVE MOUTH OF RIVER

DEPARTMENT OF THE ARMY
DETROIT DISTRICT, CORPS OF ENGINEERS
DETROIT, MICHIGAN

FLOOD PLAIN INFORMATION

GRAND RIVER
ADA TOWNSHIP, MICHIGAN

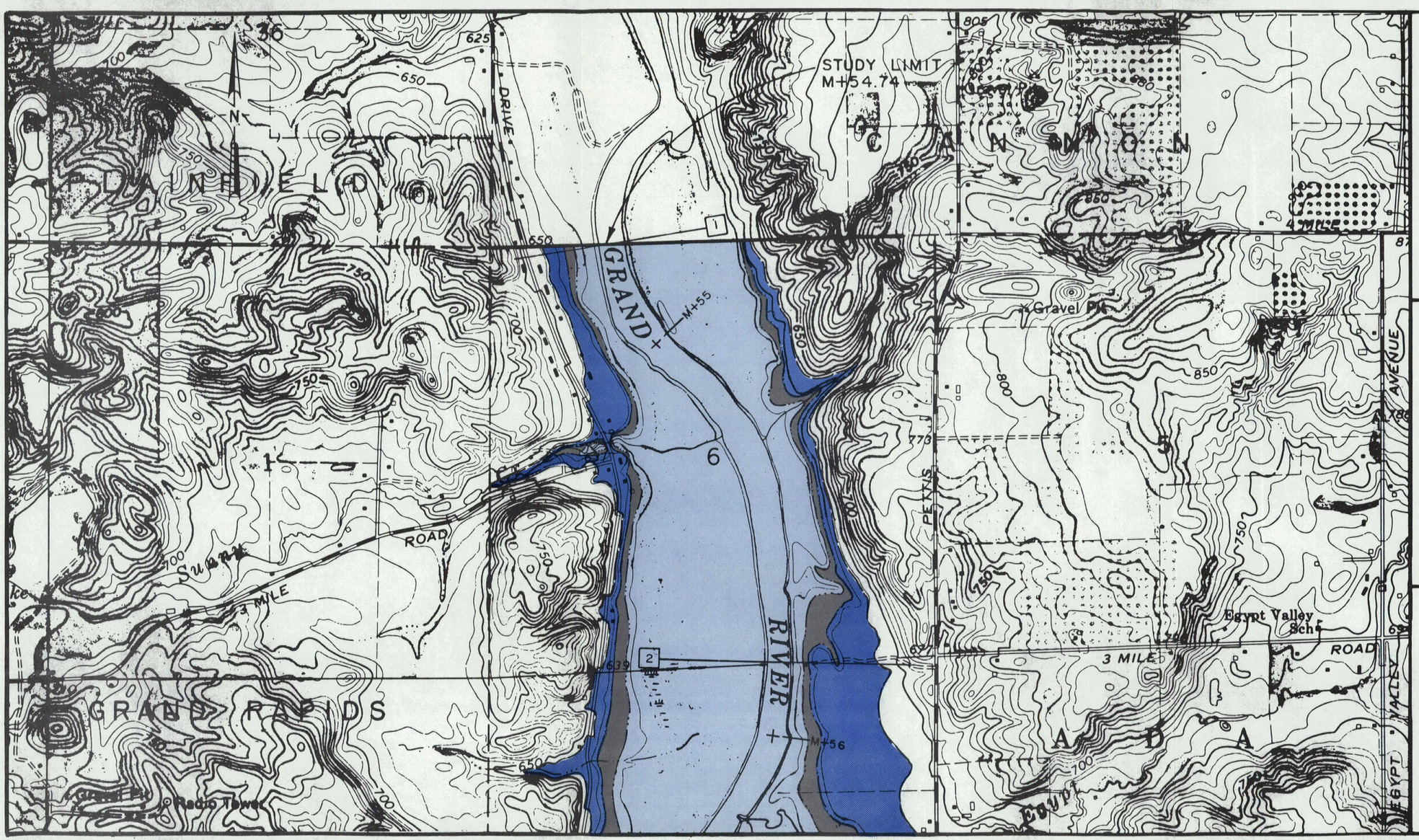
INDEX MAP

SCALE IN MILES

1 1/2 0 1 2

1974

PLATE 2



LEGEND

OVERFLOW LIMITS

- STANDARD PROJECT FLOOD
- INTERMEDIATE REGIONAL FLOOD
- MARCH 1948 FLOOD
- M+55 MILES ABOVE MOUTH
- 2 CROSS SECTION
- ~700~ GROUND ELEVATION IN FEET (U.S.G.S.) SEA LEVEL DATUM

NOTES

1. BASE TOPOGRAPHIC MAP IS AN ENLARGED U.S.G.S. 7.5 MIN. QUADRANGLE SHEET: ROCKFORD, MICHIGAN, 1967.
2. LIMITS OF OVERFLOW INDICATED MAY VARY FROM ACTUAL LOCATION ON GROUND AS THE CONTOUR INTERVAL AND MAP DO NOT PERMIT PRECISE PLOTTING.
3. AREAS OUTSIDE THE OVERFLOW LIMITS MAY BE SUBJECT TO FLOODING FROM LOCAL RUNOFF.
4. CONTOUR INTERVAL IS 10 FEET.

SCALE IN FEET

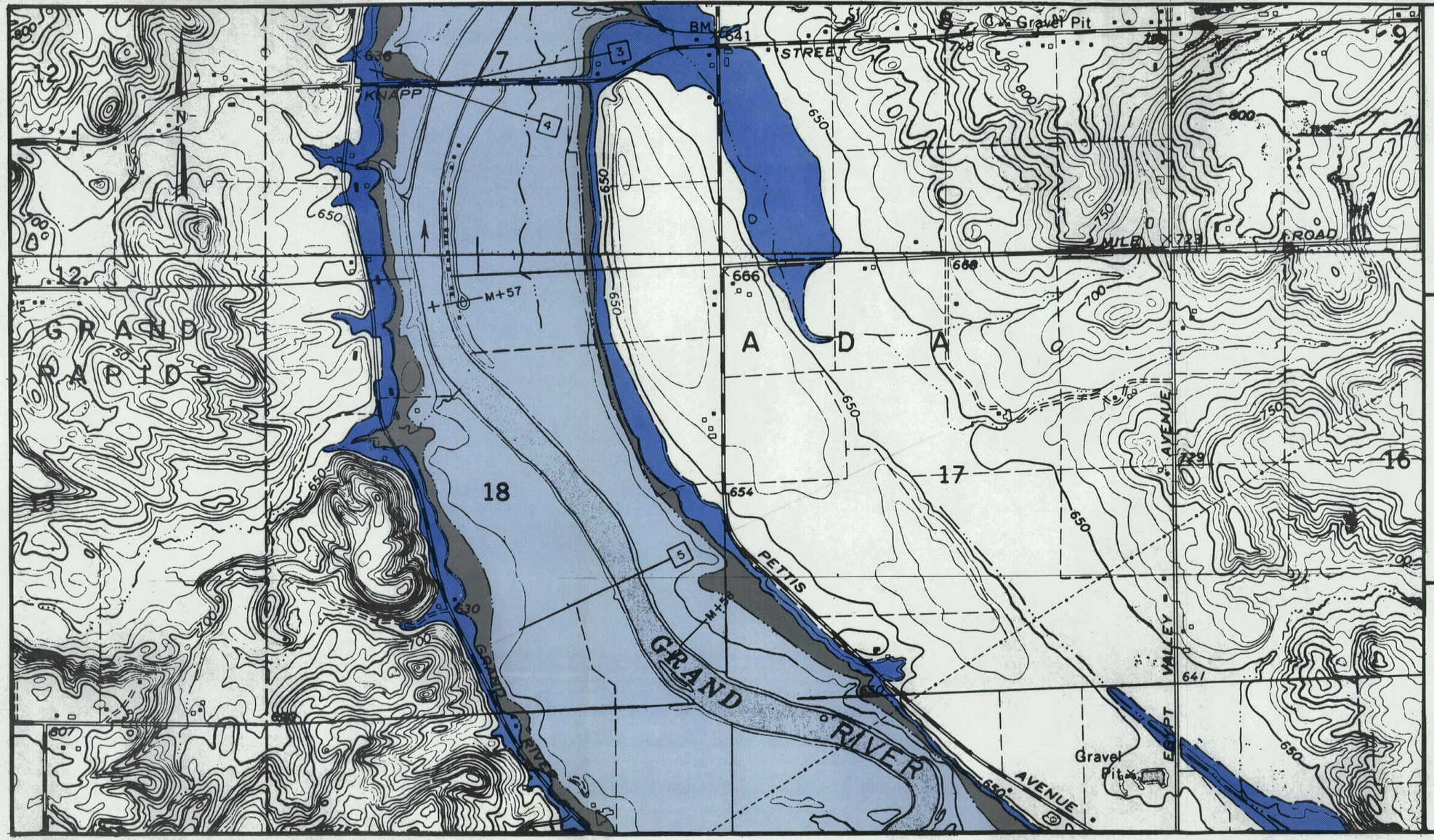
0 1000 2000

DEPARTMENT OF THE ARMY
DETROIT DISTRICT, CORPS OF ENGINEERS
DETROIT, MICHIGAN

FLOOD PLAIN INFORMATION
GRAND RIVER
ADA TOWNSHIP, MICHIGAN
FLOODED AREAS

1974

PLATE 3



LEGEND

OVERFLOW LIMITS

- STANDARD PROJECT FLOOD
- INTERMEDIATE REGIONAL FLOOD
- MARCH 1948 FLOOD
- M+58 MILES ABOVE MOUTH
- 5 CROSS SECTION
- 700 GROUND ELEVATION IN FEET (U.S.G.S.) SEA LEVEL DATUM

NOTES

1. BASE TOPOGRAPHIC MAP IS AN ENLARGED U.S.G.S. 7.5 MIN. QUADRANGLE SHEET: ROCKFORD, MICHIGAN AND GRAND RAPIDS EAST, MICHIGAN, 1967.
2. LIMITS OF OVERFLOW INDICATED MAY VARY FROM ACTUAL LOCATION ON GROUND AS THE CONTOUR INTERVAL AND MAP DO NOT PERMIT PRECISE PLOTTING.
3. AREAS OUTSIDE THE OVERFLOW LIMITS MAY BE SUBJECT TO FLOODING FROM LOCAL RUNOFF.
4. CONTOUR INTERVAL IS 10 FEET.

SCALE IN FEET

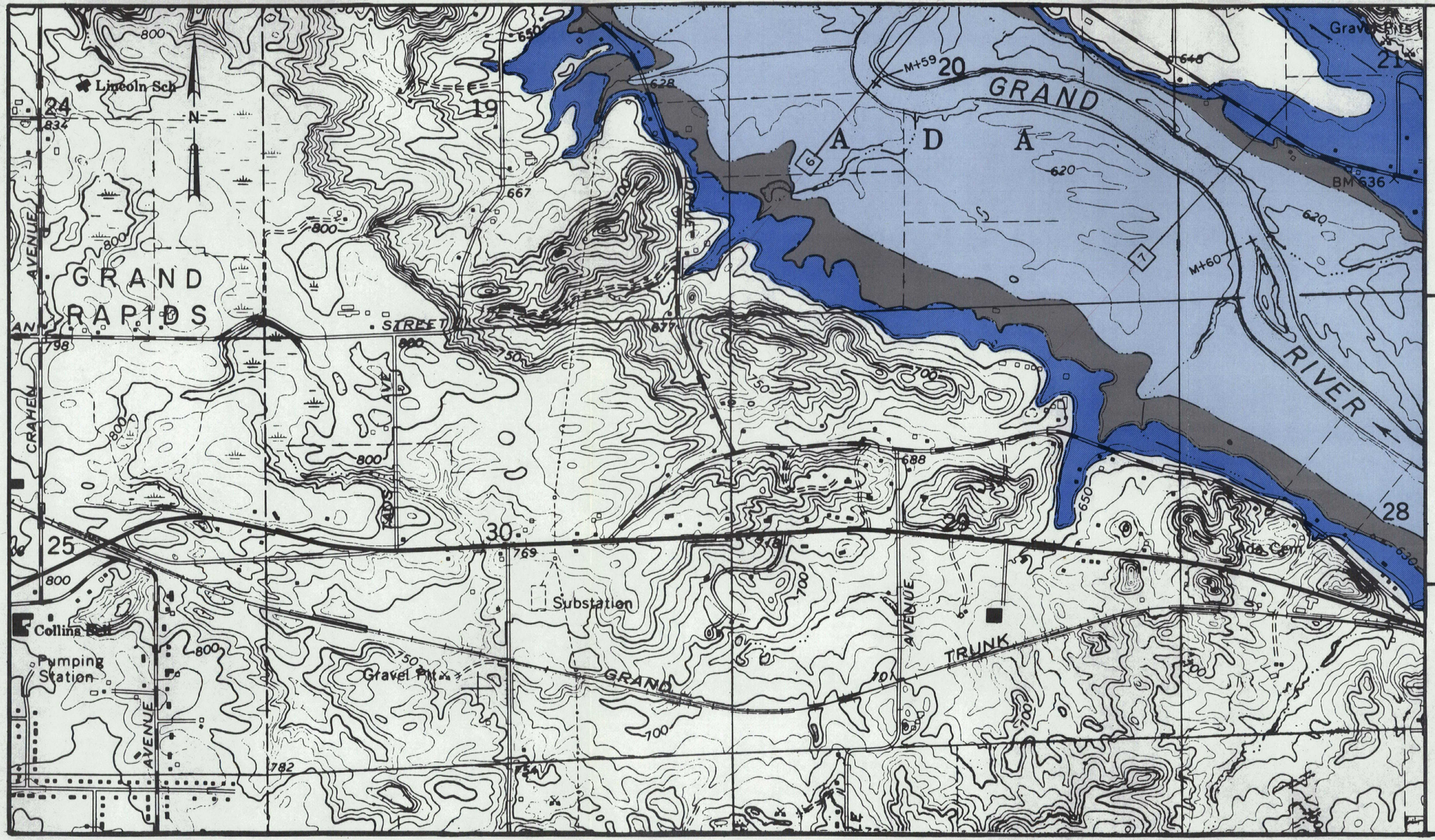
0 1000 2000

DEPARTMENT OF THE ARMY
DETROIT DISTRICT, CORPS OF ENGINEERS
DETROIT, MICHIGAN

FLOOD PLAIN INFORMATION
GRAND RIVER
ADA TOWNSHIP, MICHIGAN
FLOODED AREAS

1974

PLATE 4



LEGEND

OVERFLOW LIMITS

- STANDARD PROJECT FLOOD
- INTERMEDIATE REGIONAL FLOOD
- MARCH 1948 FLOOD
- M+60 MILES ABOVE MOUTH
- 7 CROSS SECTION
- 700 GROUND ELEVATION IN FEET (U.S.G.S.) SEA LEVEL DATUM

NOTES

1. BASE TOPOGRAPHIC MAP IS AN ENLARGED U.S.G.S. 7.5 MIN. QUADRANGLE SHEET: GRAND RAPIDS EAST, MICHIGAN, 1967.
2. LIMITS OF OVERFLOW INDICATED MAY VARY FROM ACTUAL LOCATION ON GROUND AS THE CONTOUR INTERVAL AND MAP DO NOT PERMIT PRECISE PLOTTING.
3. AREAS OUTSIDE THE OVERFLOW LIMITS MAY BE SUBJECT TO FLOODING FROM LOCAL RUNOFF.
4. CONTOUR INTERVAL IS 10 FEET.

SCALE IN FEET

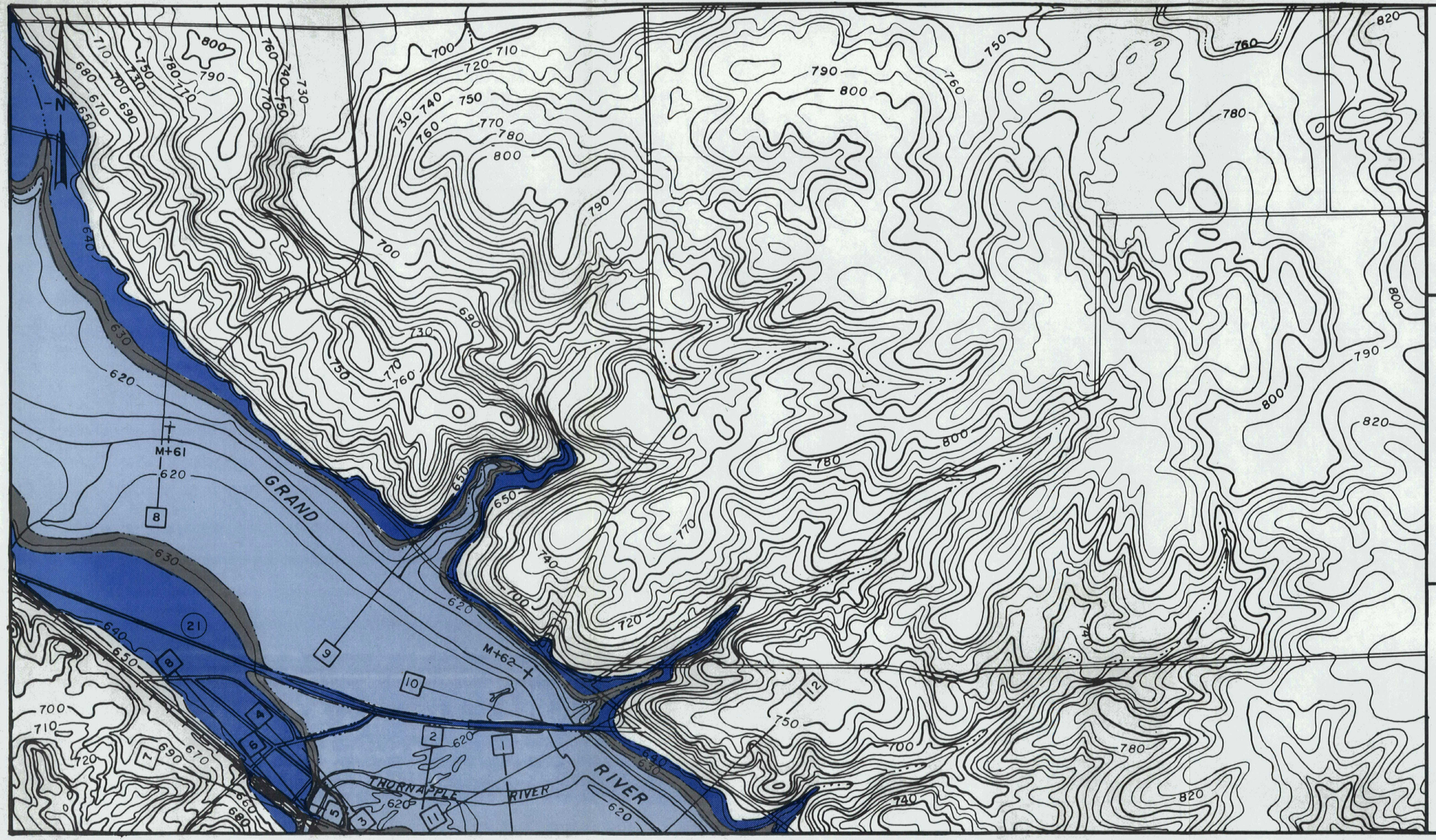
0 1000 2000

DEPARTMENT OF THE ARMY
DETROIT DISTRICT, CORPS OF ENGINEERS
DETROIT, MICHIGAN

FLOOD PLAIN INFORMATION
GRAND RIVER
ADA TOWNSHIP, MICHIGAN
FLOODED AREAS

1974

PLATE 5



LEGEND

OVERFLOW LIMITS

- STANDARD PROJECT FLOOD
- INTERMEDIATE REGIONAL FLOOD
- MARCH 1948 FLOOD
- M+62 MILES ABOVE MOUTH
- 8 CROSS SECTION
- 700 GROUND ELEVATION IN FEET (U.S.G.S.) SEA LEVEL DATUM

NOTES

1. BASE TOPOGRAPHIC MAP WAS REDRAWN FROM AN ENLARGED U.S.G.S. 15.0 MIN. QUADRANGLE SHEET: LOWELL, MICHIGAN, 1918 AND TOPOGRAPHIC MAP OF PARTS OF SEC. 33, 34 AND 35, T7N, R10W, ADA TOWNSHIP, KENT COUNTY, MICHIGAN.
2. LIMITS OF OVERFLOW INDICATED MAY VARY FROM ACTUAL LOCATION ON GROUND AS THE CONTOUR INTERVAL AND MAP DO NOT PERMIT PRECISE PLOTTING.
3. AREAS OUTSIDE THE OVERFLOW LIMITS MAY BE SUBJECT TO FLOODING FROM LOCAL RUNOFF.
4. CONTOUR INTERVAL IS 10 FEET.

SCALE IN FEET

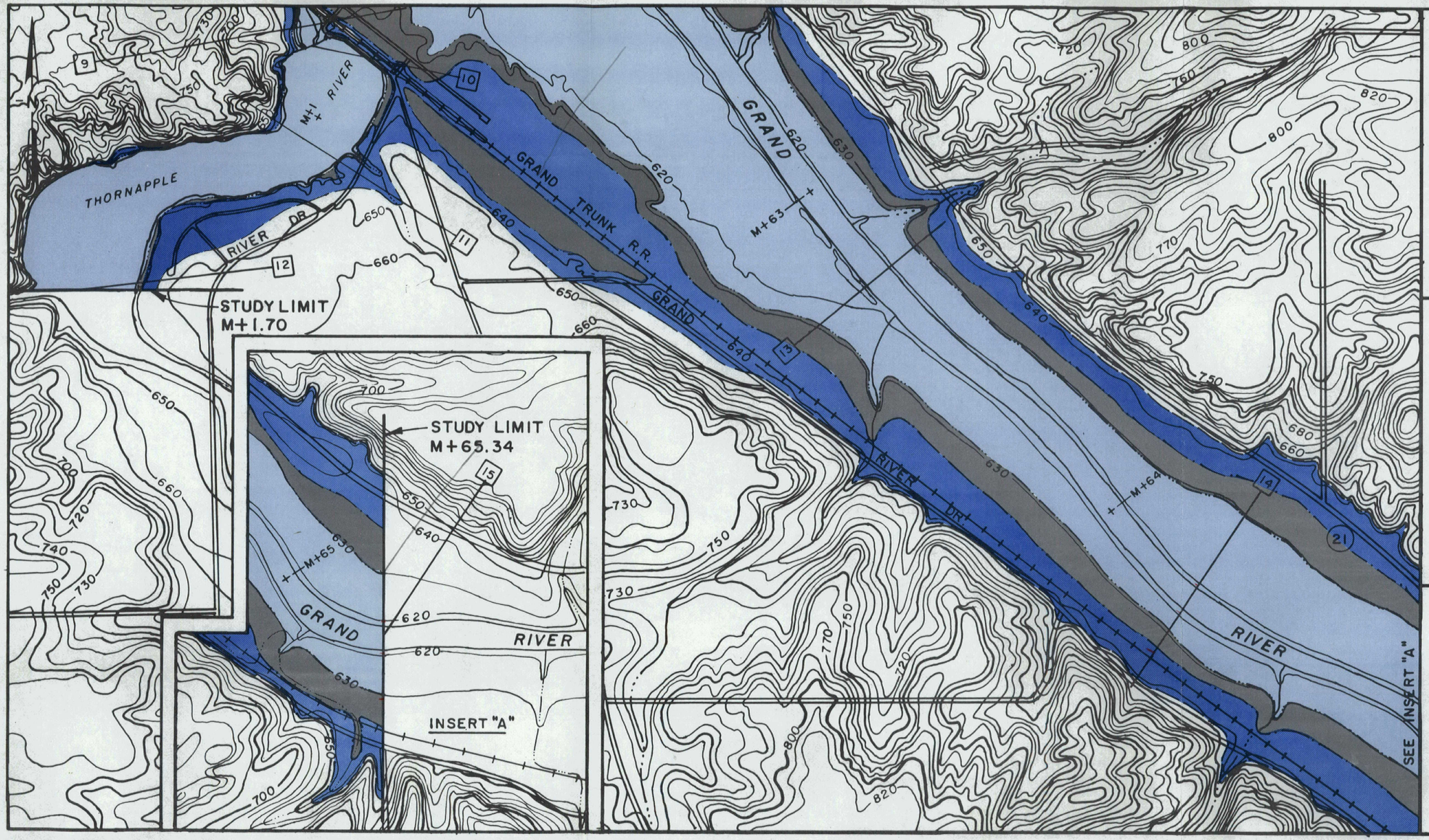
0 1000 2000

DEPARTMENT OF THE ARMY
DETROIT DISTRICT, CORPS OF ENGINEERS
DETROIT, MICHIGAN

FLOOD PLAIN INFORMATION
GRAND AND THORNAPPLE RIVERS
ADA TOWNSHIP, MICHIGAN
FLOODED AREAS

1974

PLATE 6



LEGEND

OVERFLOW LIMITS

- STANDARD PROJECT FLOOD
- INTERMEDIATE REGIONAL FLOOD
- MARCH 1948 FLOOD
- M+63 MILES ABOVE MOUTH
- 12 CROSS SECTION
- 700 GROUND ELEVATION IN FEET (U.S.G.S.) SEA LEVEL DATUM

NOTES

1. BASE TOPOGRAPHIC MAP WAS REDRAWN FROM AN ENLARGED U.S.G.S. 15.0 MIN. QUADRANGLE SHEET: LOWELL, MICHIGAN, 1918 AND TOPOGRAPHIC MAP OF PARTS OF SEC. 33,34 AND 35, T7N, R10W, ADA TOWNSHIP, KENT COUNTY, MICHIGAN.
2. LIMITS OF OVERFLOW INDICATED MAY VARY FROM ACTUAL LOCATION ON GROUND AS THE CONTOUR INTERVAL AND MAP DO NOT PERMIT PRECISE PLOTTING.
3. AREAS OUTSIDE THE OVERFLOW LIMITS MAY BE SUBJECT TO FLOODING FROM LOCAL RUNOFF.
4. CONTOUR INTERVAL IS 10 FEET.

SCALE IN FEET

0 1000 2000

DEPARTMENT OF THE ARMY
DETROIT DISTRICT, CORPS OF ENGINEERS
DETROIT, MICHIGAN

FLOOD PLAIN INFORMATION
GRAND AND THORNAPPLE RIVERS
ADA TOWNSHIP, MICHIGAN
FLOODED AREAS

1974

PLATE 7

ELEVATION IN FEET (ABOVE MEAN SEA LEVEL, DATUM OF 1929) U.S.G.S.

650.00
645.00
640.00
635.00
630.00
625.00
620.00
615.00
610.00
605.00
600.00
595.00
590.00
585.00
580.00

ADA TOWNSHIP

NOTES:
1. PROFILES REPRESENT 1972 STATE OF URBANIZATION AND CHANNEL CONDITIONS.
2. FLOODWAY ENCROACHMENT CAN RAISE PROFILES.

STANDARD PROJECT FLOOD
INTERMEDIATE REGIONAL FLOOD
MARCH 1948 FLOOD (UNDER 1972 CONDITIONS)
50 YEAR FREQUENCY FLOOD.
TOP OF LOW BANK
STREAM BED

1 — CANNON-ADA TOWNSHIP LINE
2
3 — KNAPP ROAD BRIDGE
4
5
6
7
8
9
10 — STATE ROUTE 21
11 — THORNAPPLE RIVER CONFL.
12
13
14
15 — ADA-CASCADE-LOWELL TWP. LINE

1969
1918

53.50 54.00 54.50 55.00 55.50 56.00 56.50 57.00 57.50 58.00 58.50 59.00 59.50 60.00 60.50 61.00 61.50 62.00 62.50 63.00 63.50 64.00 64.50 65.00 65.50

MILES ABOVE MOUTH

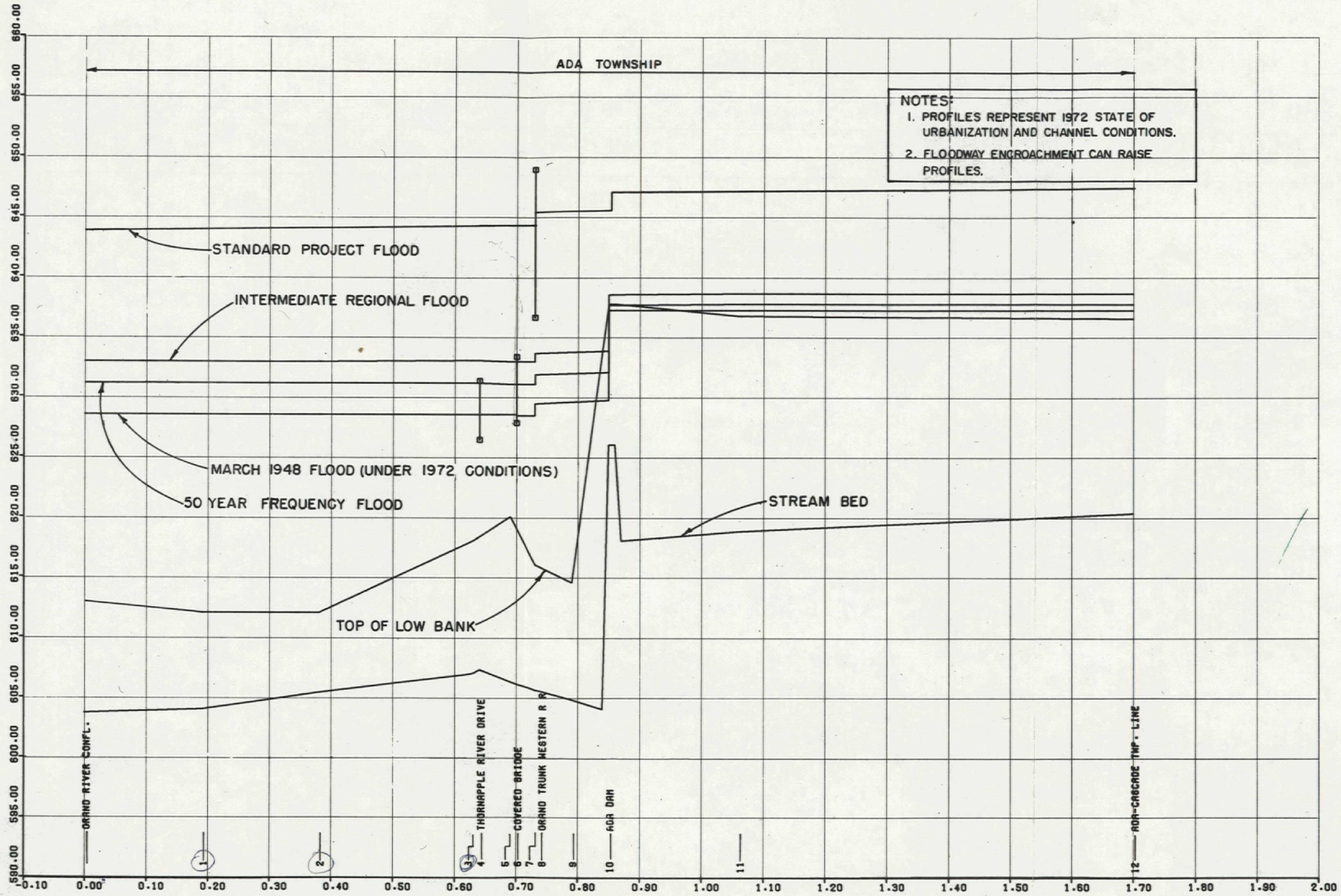
FLOOR OR RAIL
UNDERCLEARANCE

CULVERT OR BRIDGE

DEPARTMENT OF THE ARMY
DETROIT DISTRICT CORPS OF ENGINEERS
DETROIT, MICHIGAN
FLOOD PLAIN INFORMATION
GRAND RIVER
ADA TOWNSHIP MICHIGAN
HIGH WATER PROFILES
1974

PLATE 8

ELEVATION IN FEET (ABOVE MEAN SEA LEVEL, DATUM OF 1929) U.S.G.S.



FLOOR OR RAIL

UNDERCLEARANCE

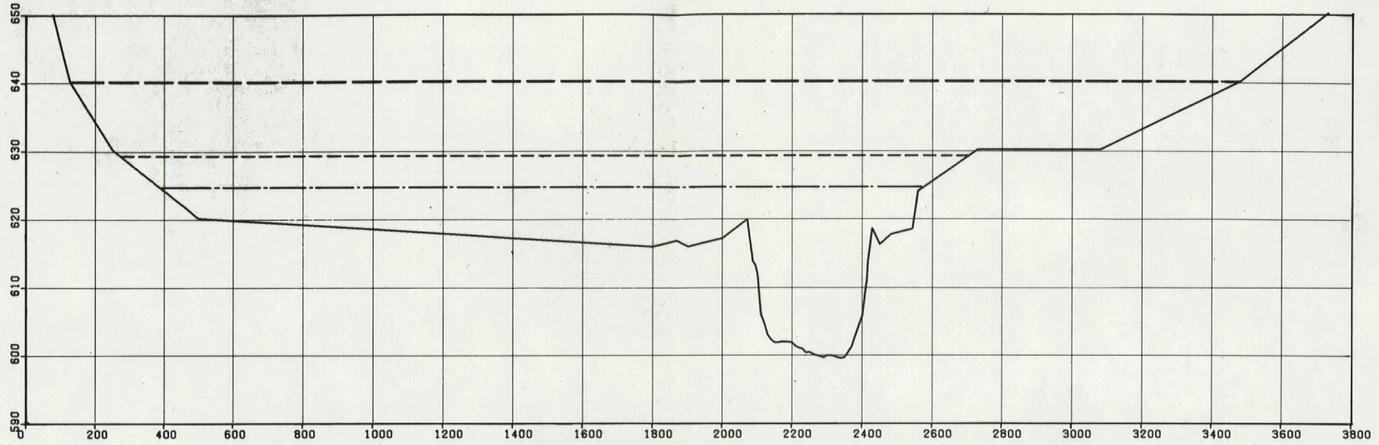
CULVERT OR BRIDGE

MILES ABOVE MOUTH

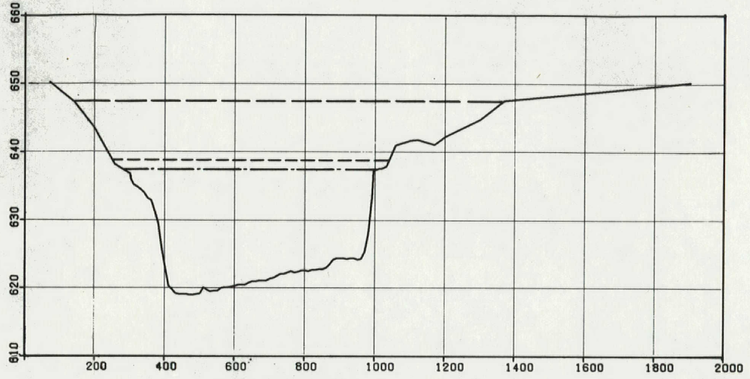
DEPARTMENT OF THE ARMY
DETROIT DISTRICT CORPS OF ENGINEERS
DETROIT, MICHIGAN
FLOOD PLAIN INFORMATION
THORNAPPLE RIVER
ADA TOWNSHIP MICHIGAN
HIGH WATER PROFILES
1974

PLATE 9

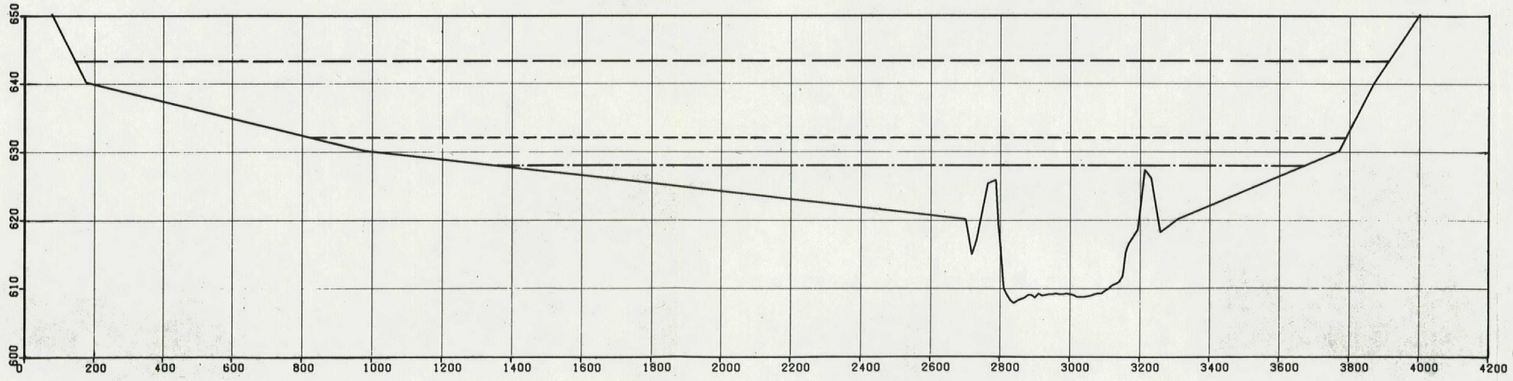
ELEVATION IN FEET (ABOVE MEAN SEA LEVEL, DATUM OF 1929) U.S.G.S.



GRAND RIVER-CROSS SECTION NO. 2
MILE 55.8



THORNAPPLE RIVER-CROSS SECTION NO. 11
MILE 1.1



GRAND RIVER-CROSS SECTION NO. 9
MILE 61.6

HORIZONTAL DISTANCE IN HUNDREDS OF FEET

LEGEND

——— STANDARD PROJECT FLOOD
– – – – INTERMEDIATE REGIONAL FLOOD
—·—·— MARCH 1948 FLOOD

SECTIONS ARE BASED ON ACTUAL FIELD SURVEYS AND U.S. GEOLOGICAL MAPS.

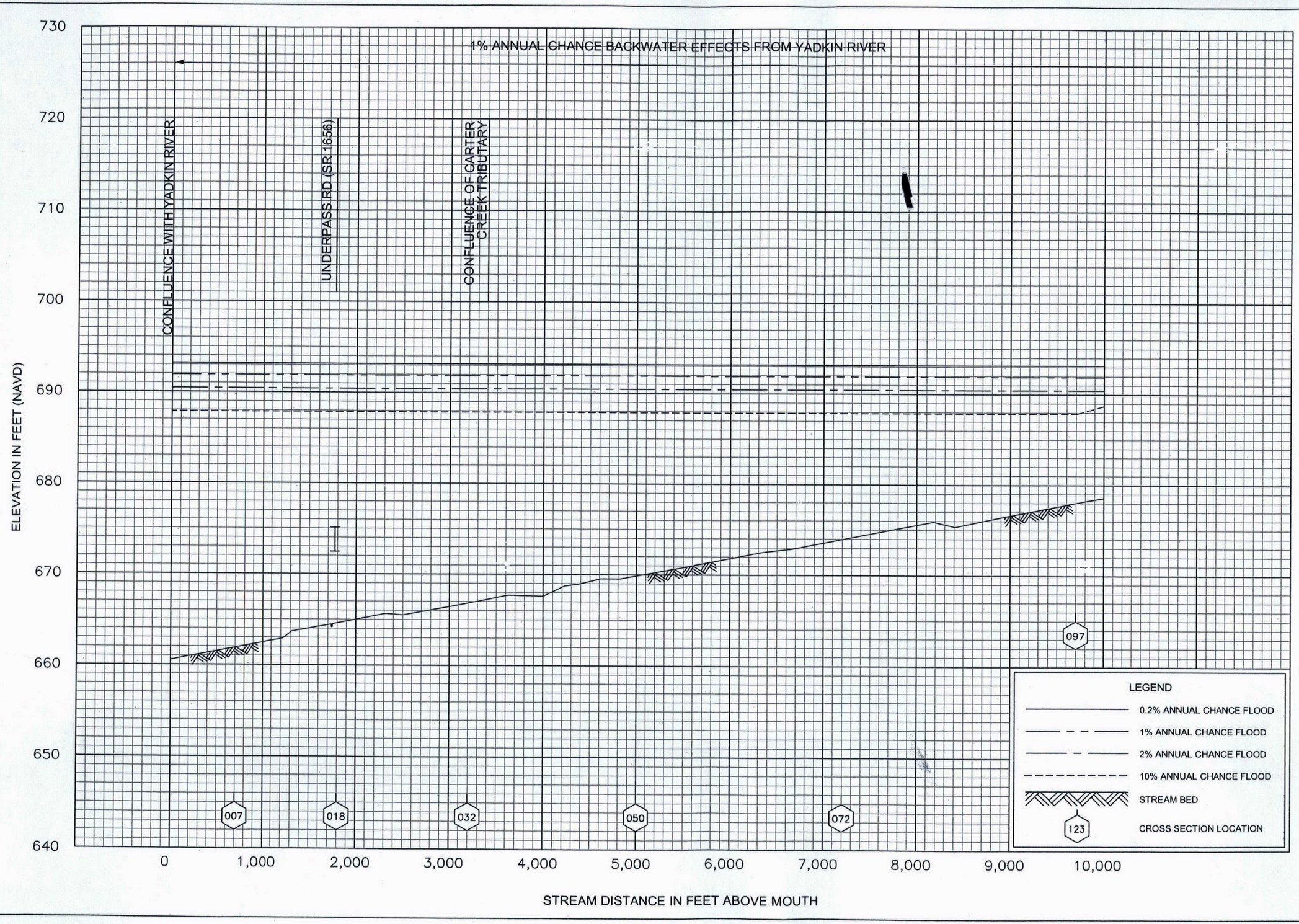
SECTIONS TAKEN LOOKING DOWNSTREAM
24 CROSS SECTIONS NOT SHOWN.

DEPARTMENT OF THE ARMY
DETROIT DISTRICT, CORPS OF ENGINEERS
DETROIT, MICHIGAN
FLOOD PLAIN INFORMATION

GRAND RIVER AND THORNAPPLE RIVER

ADA TOWNSHIP, MICHIGAN
CROSS SECTIONS
1974

PLATE 10



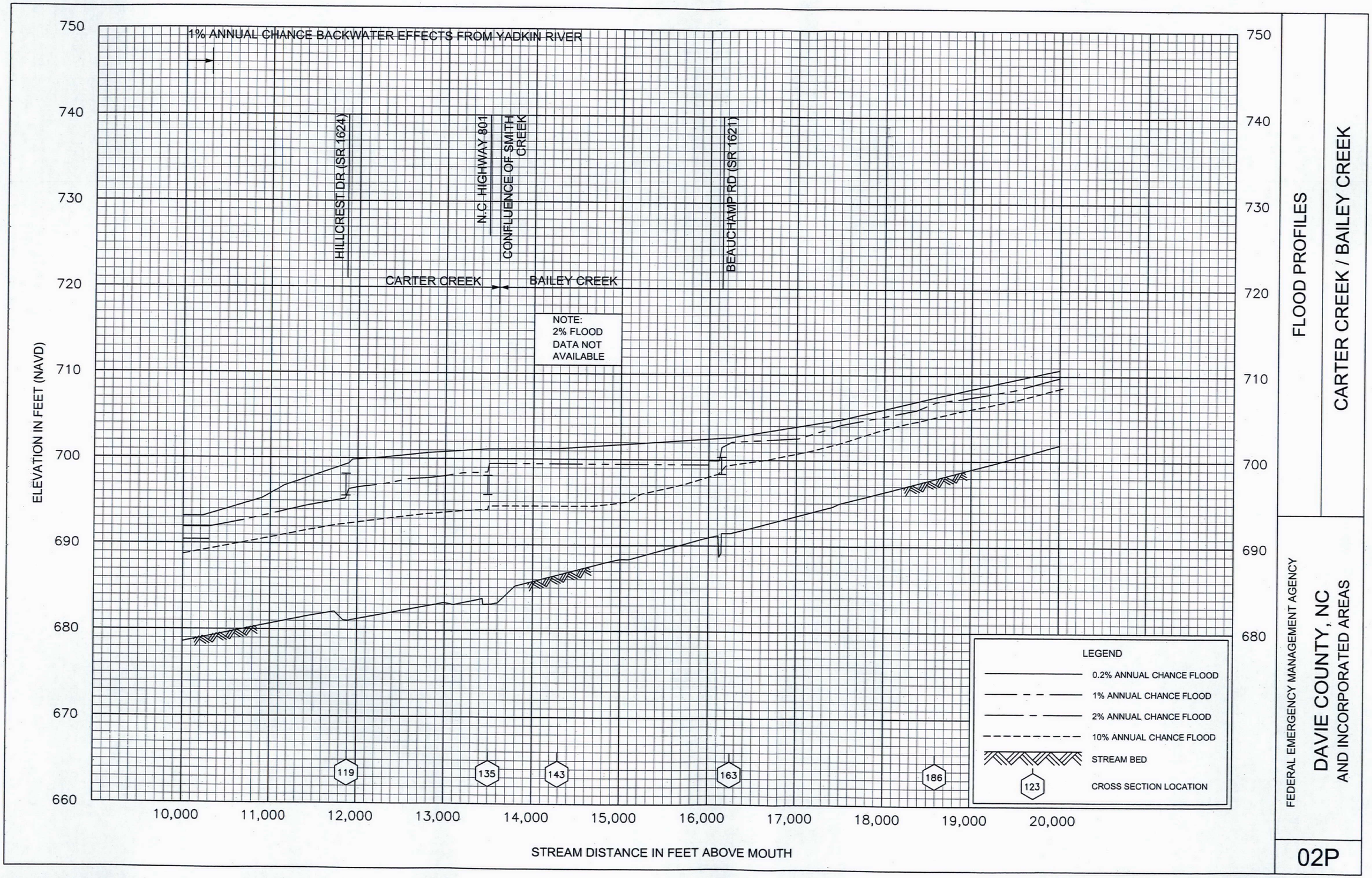
FLOOD PROFILES

CARTER CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

DAVIE COUNTY, NC
AND INCORPORATED AREAS

01P



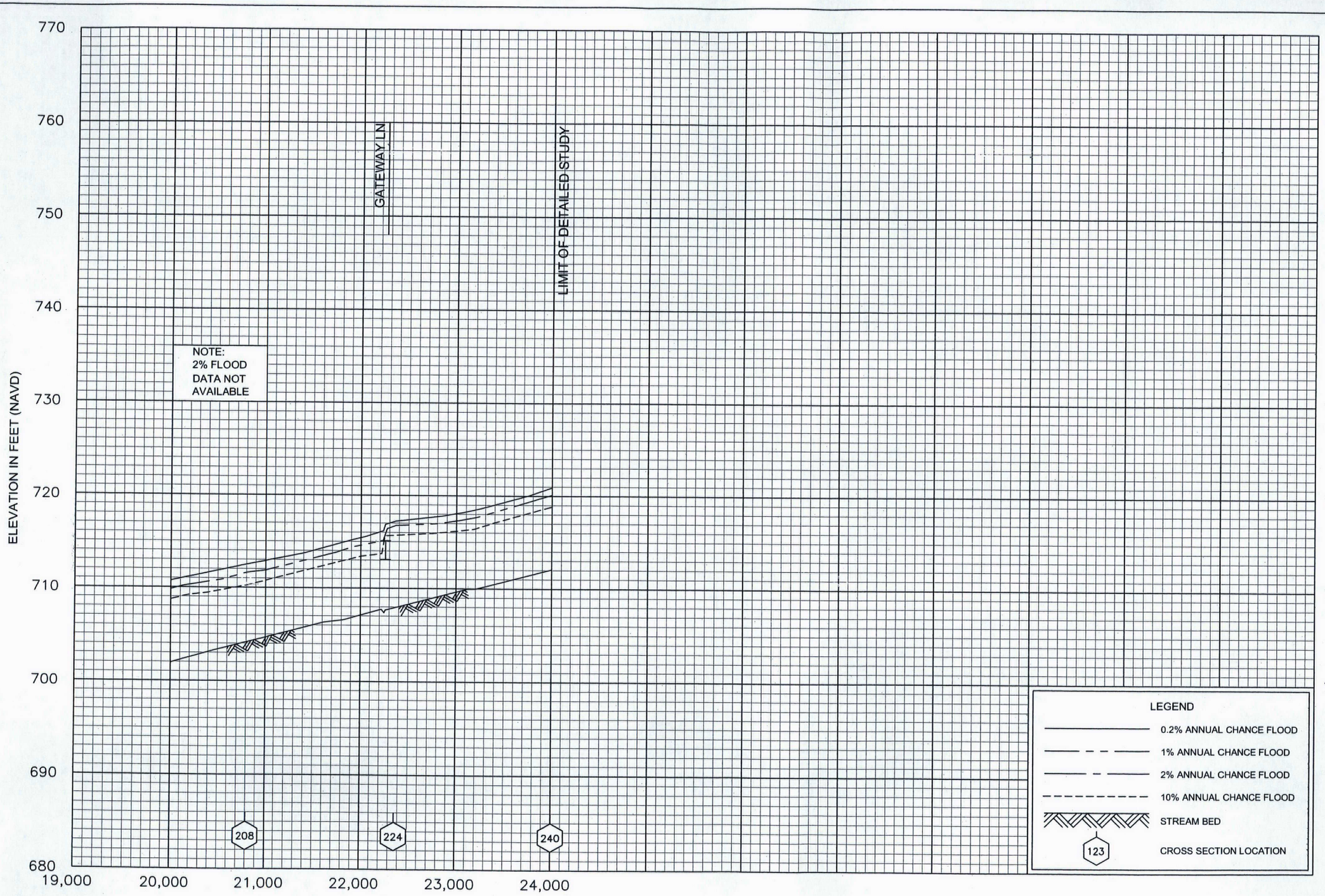
FLOOD PROFILES

CARTER CREEK / BAILEY CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

DAVIE COUNTY, NC
AND INCORPORATED AREAS

02P



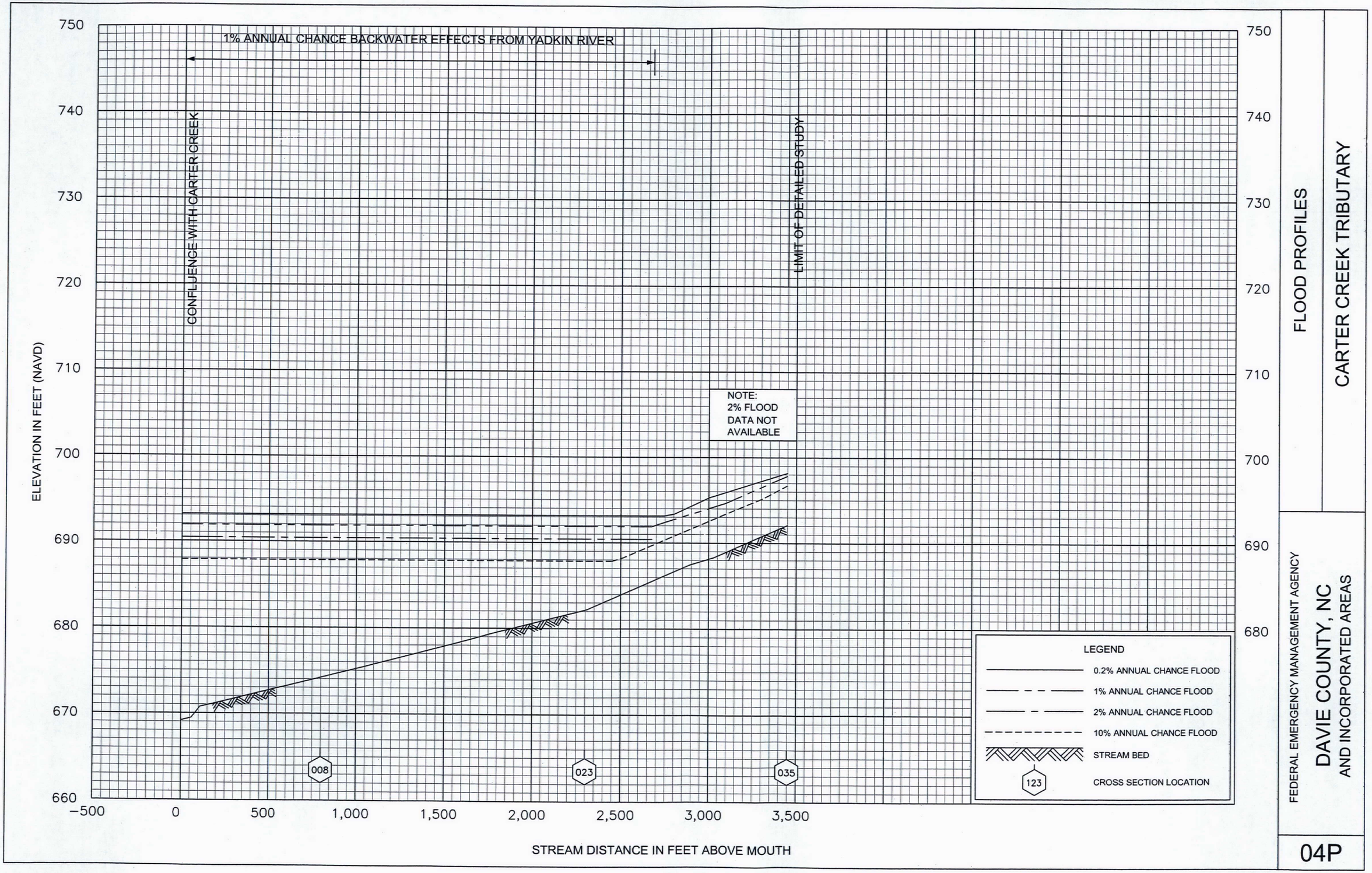
FLOOD PROFILES

BAILEY CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

DAVIE COUNTY, NC
AND INCORPORATED AREAS

03P



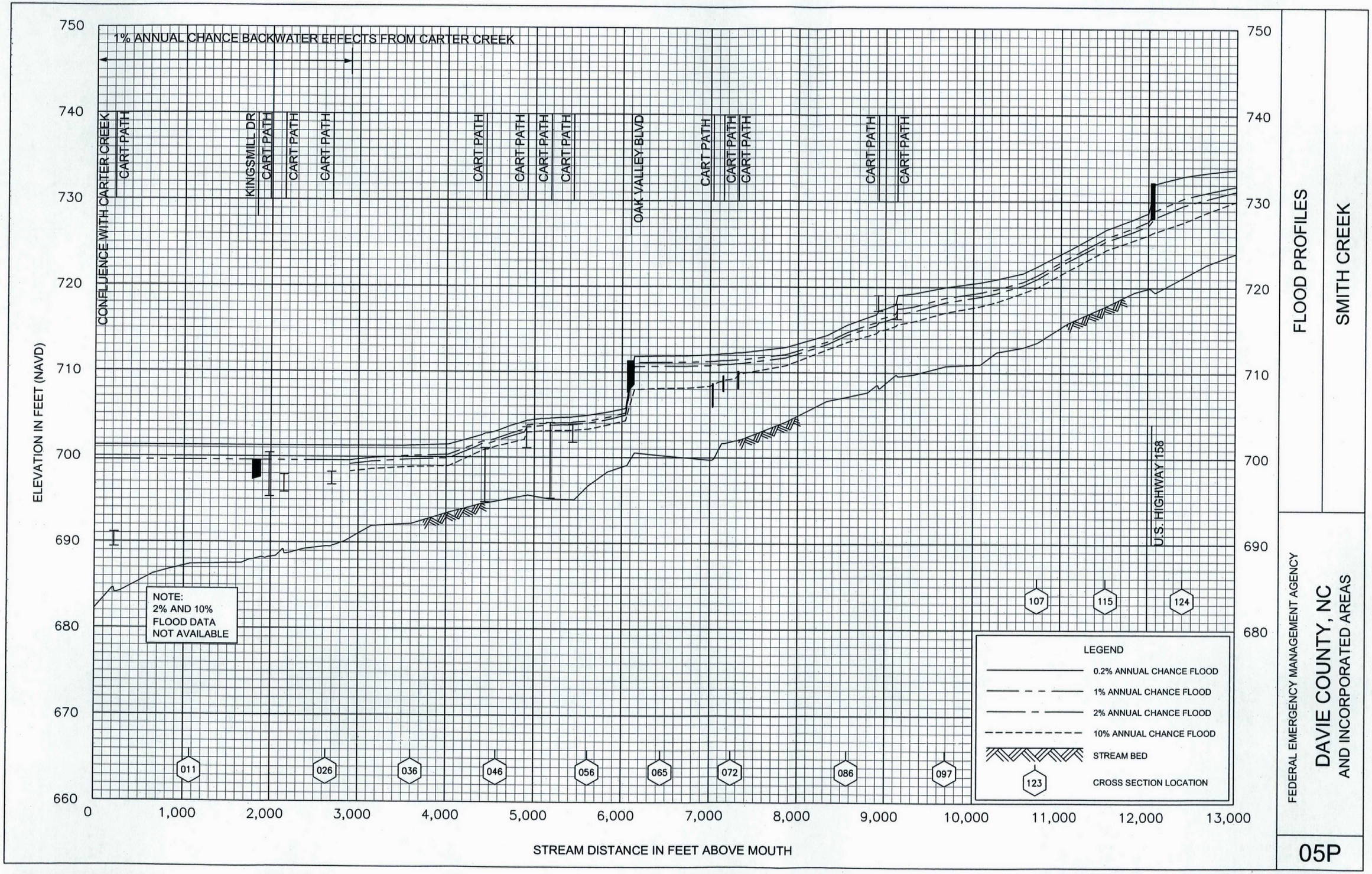
FLOOD PROFILES

CARTER CREEK TRIBUTARY

FEDERAL EMERGENCY MANAGEMENT AGENCY

DAVIE COUNTY, NC
AND INCORPORATED AREAS

04P



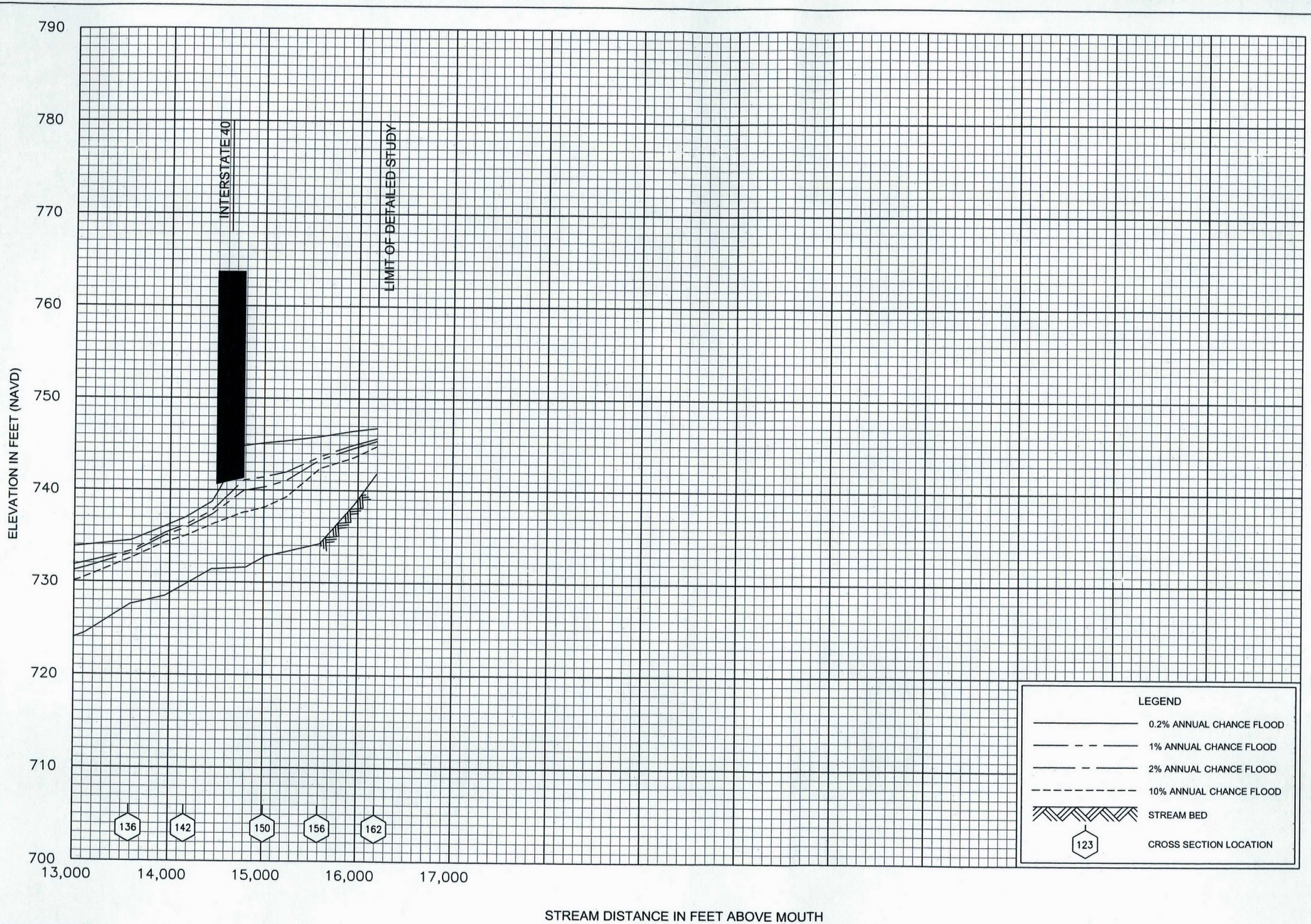
FLOOD PROFILES

SMITH CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

DAVIE COUNTY, NC
AND INCORPORATED AREAS

05P



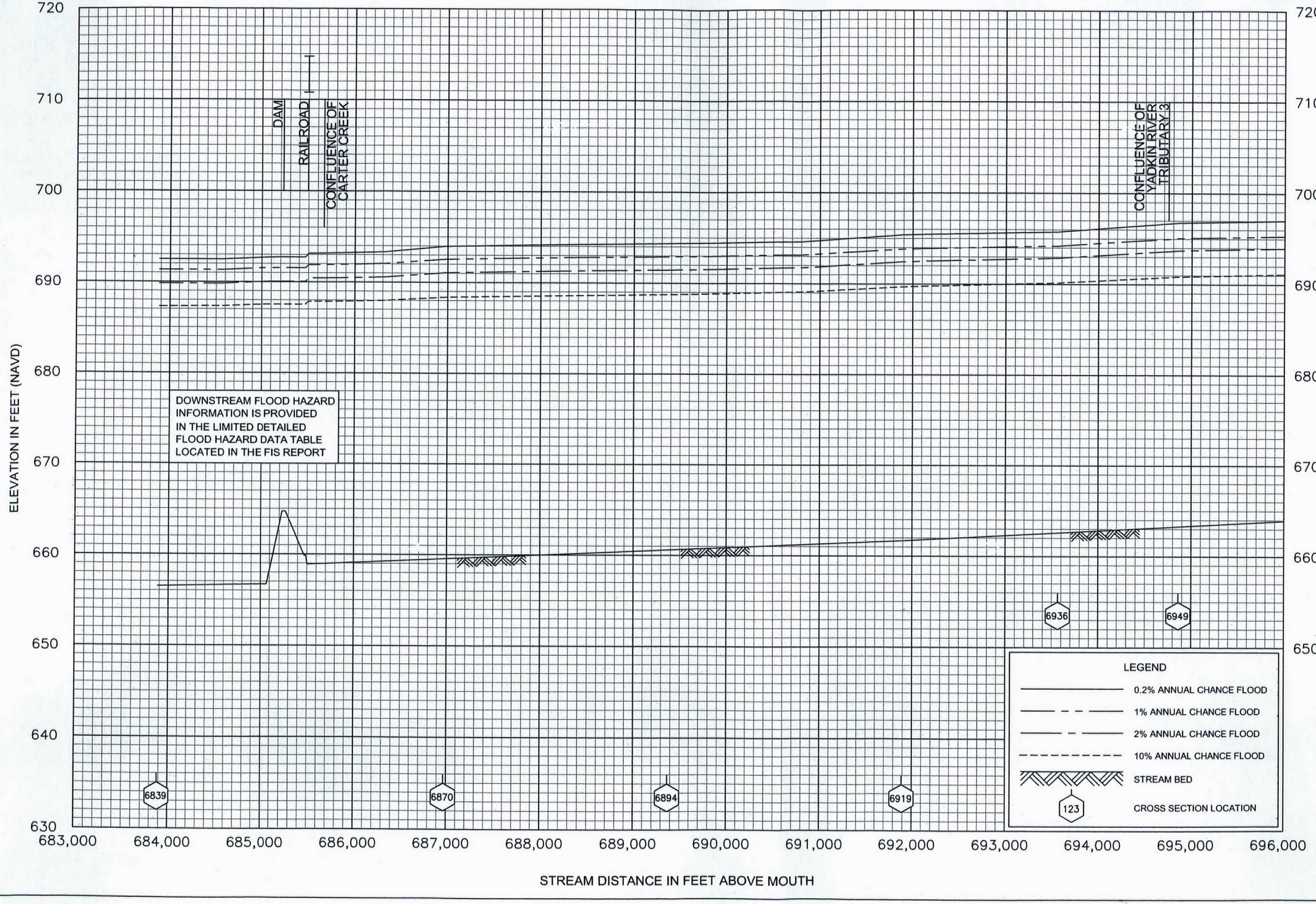
FLOOD PROFILES

SMITH CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

DAVIE COUNTY, NC
AND INCORPORATED AREAS

06P



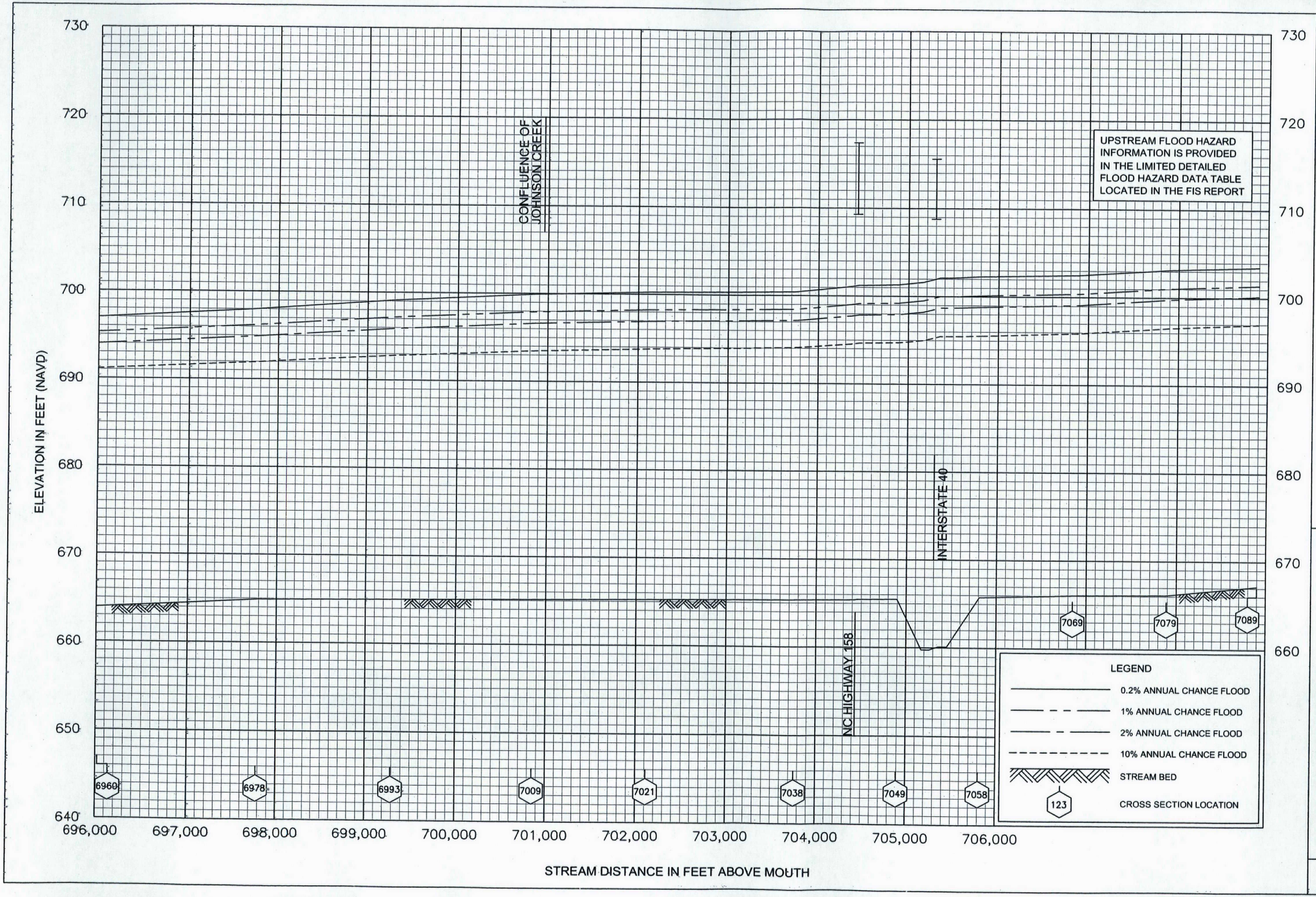
FLOOD PROFILES

YADKIN RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

DAVIE COUNTY, NC
AND INCORPORATED AREAS

07P



FLOOD PROFILES

YADKIN RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

DAVIE COUNTY, NC
AND INCORPORATED AREAS

08P



UNITED STATES
ARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

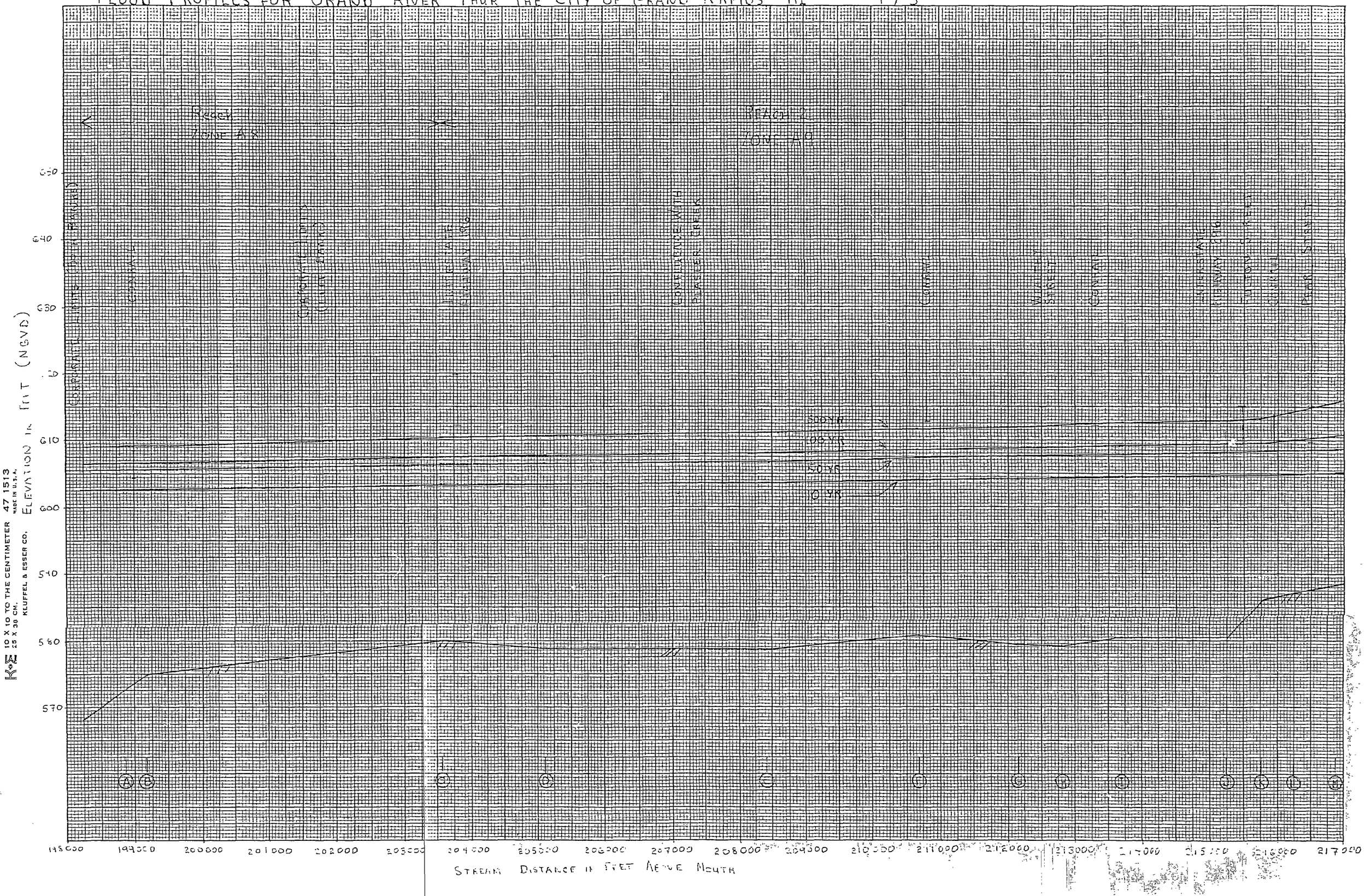
STATE OF MICHIGAN

GRANI

7.5 M

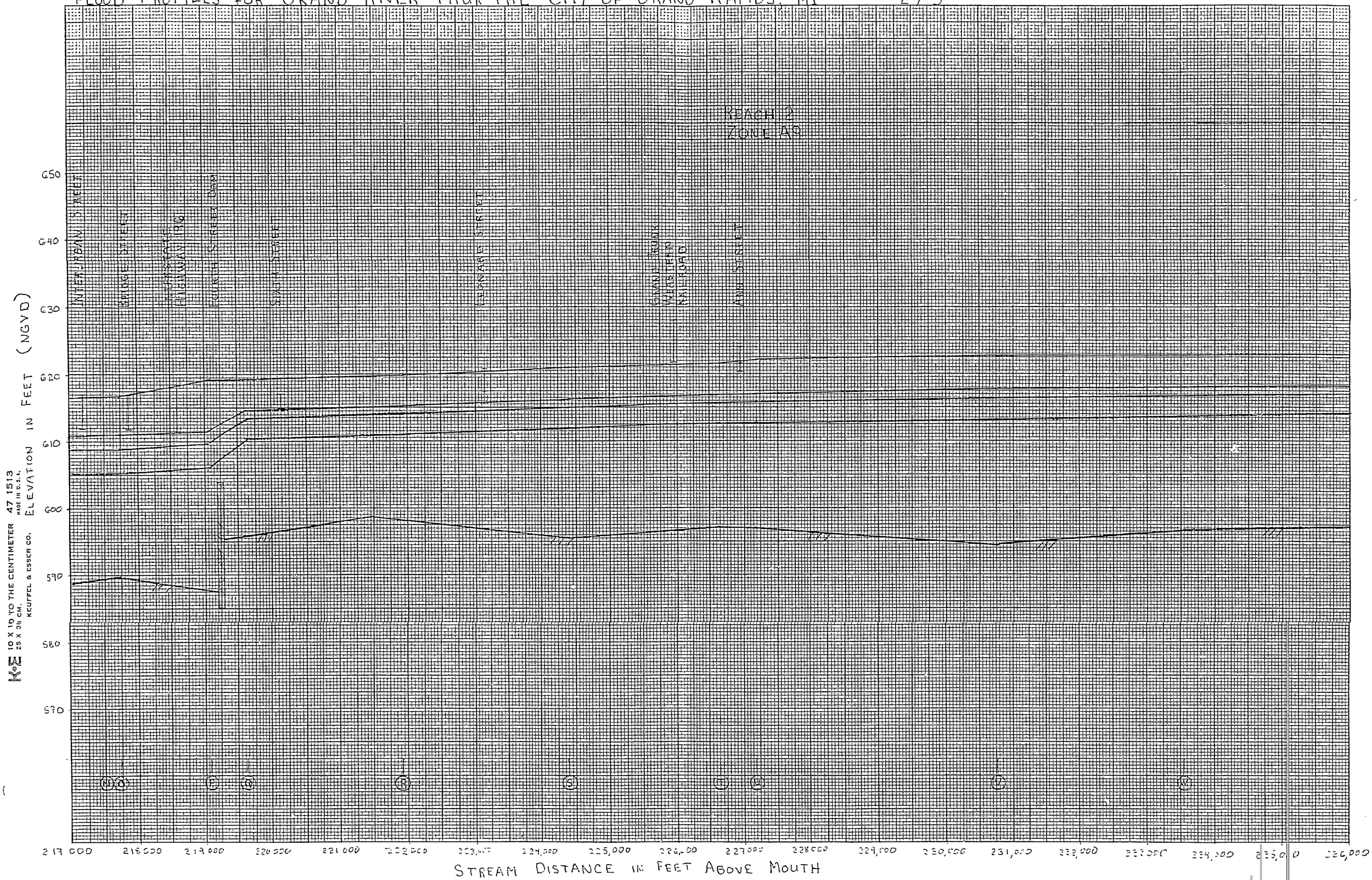

1.5 MI. TO INTERSTATE 96
42'30"
3870 II SW
(CEDAR SPRINGS SW)
ROCKFORD 12 MI.
1.3 MI. TO INTERSTATE 96
R. 12 W.
R. 11 W.
WALKER
GRAND RAPIDS
GRAND RIVER
Indian Creek
Bloomfield Creek
Comstock Riverside Park
Briggs Park
Radio Tower (WJEF)
Croston High Sch
Kent Country Club
Waterworks
St Alphonsus Sch
East Leonard Sch
Kendall Sch
Coldbrook Sch
Belknap Park
Reservoir
Highland Park
Colt Sch
Turner Sch
Stocking Sch
Adalberta Sch
Union High Sch
Valley Field
Harrison Park Jr High Sch
West Leonard Sch
Mt Calvary Cem
Villa Maria Sch
YMCA
West Side School No 1
West Side School No 2
Oakleigh Jr High Sch
Oakleigh Sch
Gravel Pit
Water Tank
Holy Cross Cemetery
West High Sch
Washington Park Cemetery
Achinn Cem
Greenwood Cemetery
Cowell Sch
Elks Country Club
Frost Sch
St Anthonys Sch
Shawmut Hills Sch
Mt Mercy Academy
Holy Spirit Sch
Gravel Pits
Sibley Sch
Lincoln Park
Sacred Heart Sch
Scraight Sch
Lexington Sch
John Ball Park
Auditorium
Gaging Stations
Library
Radio Station (WGRD)
Butterworth Hospital
Junior College
Fountain Sch
Central High Sch
Fulton Street Cem
Sanitarium
Museum
St Marys Hospital
St Andrews Sch
East High Sch
Henry Sch
Morris Sch
Maplewood Sch
St Joseph Sch
Grand Rapids High Sch
Franklin Sch
Campau Park Sch
Madison Park Sch
St Andrews Cemetery
Sheldon Sch
Our Lady of Sorrows Sch
Hall Sch
South High Sch
Jefferson Sch
Dickinson Sch
St Francis Xavier Sch
Buchanan Sch
Burton Sch
Garfield Park
St Joseph Seminary
Trailer Park
Tank
Gravel Pit
Bridgeside Sch
Radio Tower (WFUR)
Radio Tower (WMAX)
Radio Tower (WLAV)
Substation
Mine
Sewage Disposal
Kensington Sch
Colt Park
Marquette Park
Kimball Stadium
Southwest Sch
Athletic Field
Lee High Sch
Godfrey Sch
Holy Name Sch
Hopewell Indian Mounds Park
Johnson Park
Gravel Pits
Parking Area
Water Tank
Parkview Sch
Wyoming Park High Sch
Wyoming Sch
Taft Sch
Grace Bible College
Pinery Park Sch
Shopping Center
Drive-in
Rogers Clyde Park Sch
South Field
Athletic Field
Trailer Park
Gravel Pit
Broadside Sch
Plaster Creek
ZONE A9
ZONE A8
BFE 607
A
B
A8
A9
A
A
A

FLOOD PROFILES FOR GRAND RIVER THUR THE CITY OF GRAND RAPIDS MI 1/3

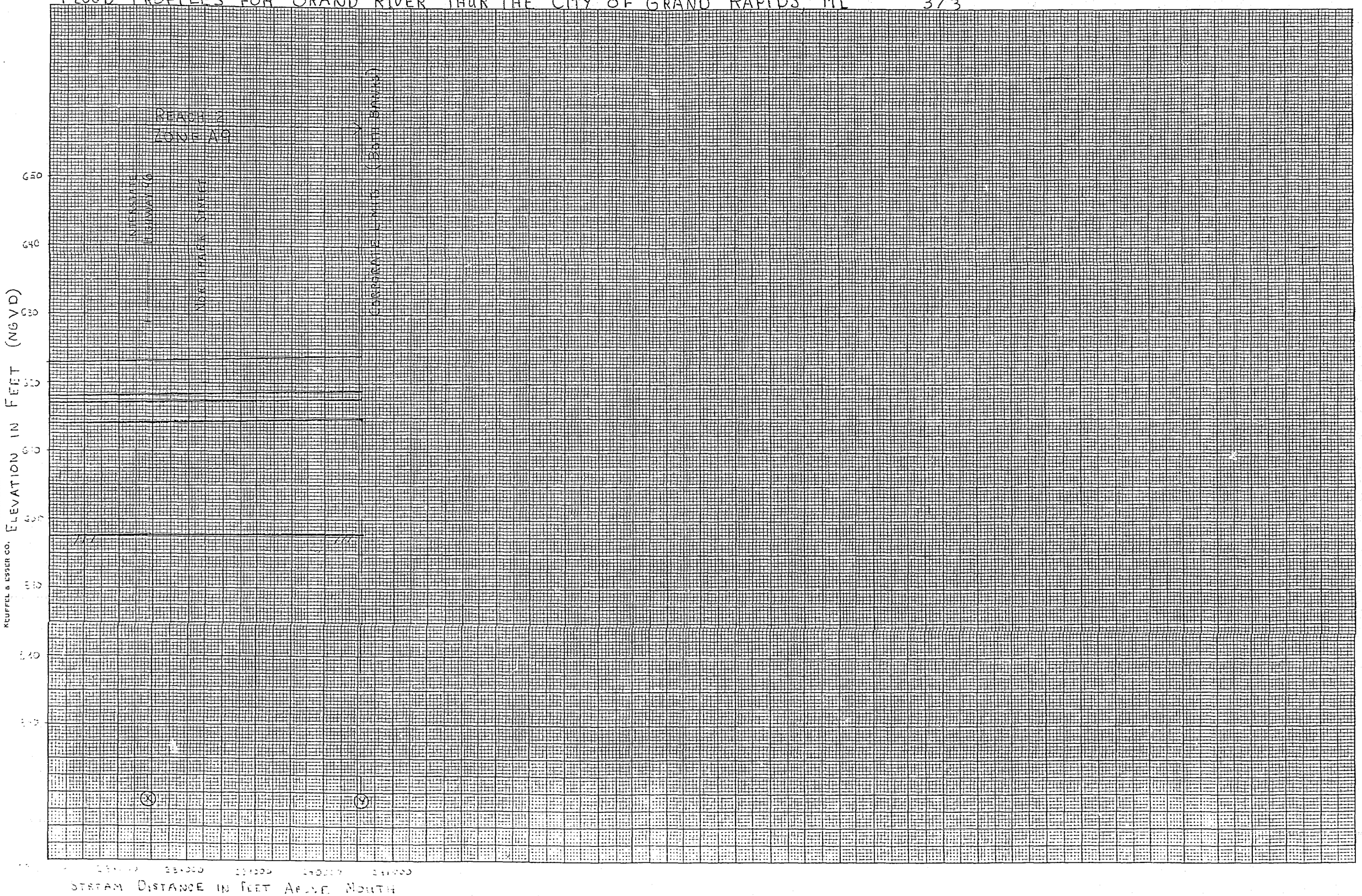


K+E 10 X 10 TO THE CENTIMETER 47 1513
25 X 38 CM. MADE IN U.S.A.
KEUFFEL & ESSER CO.

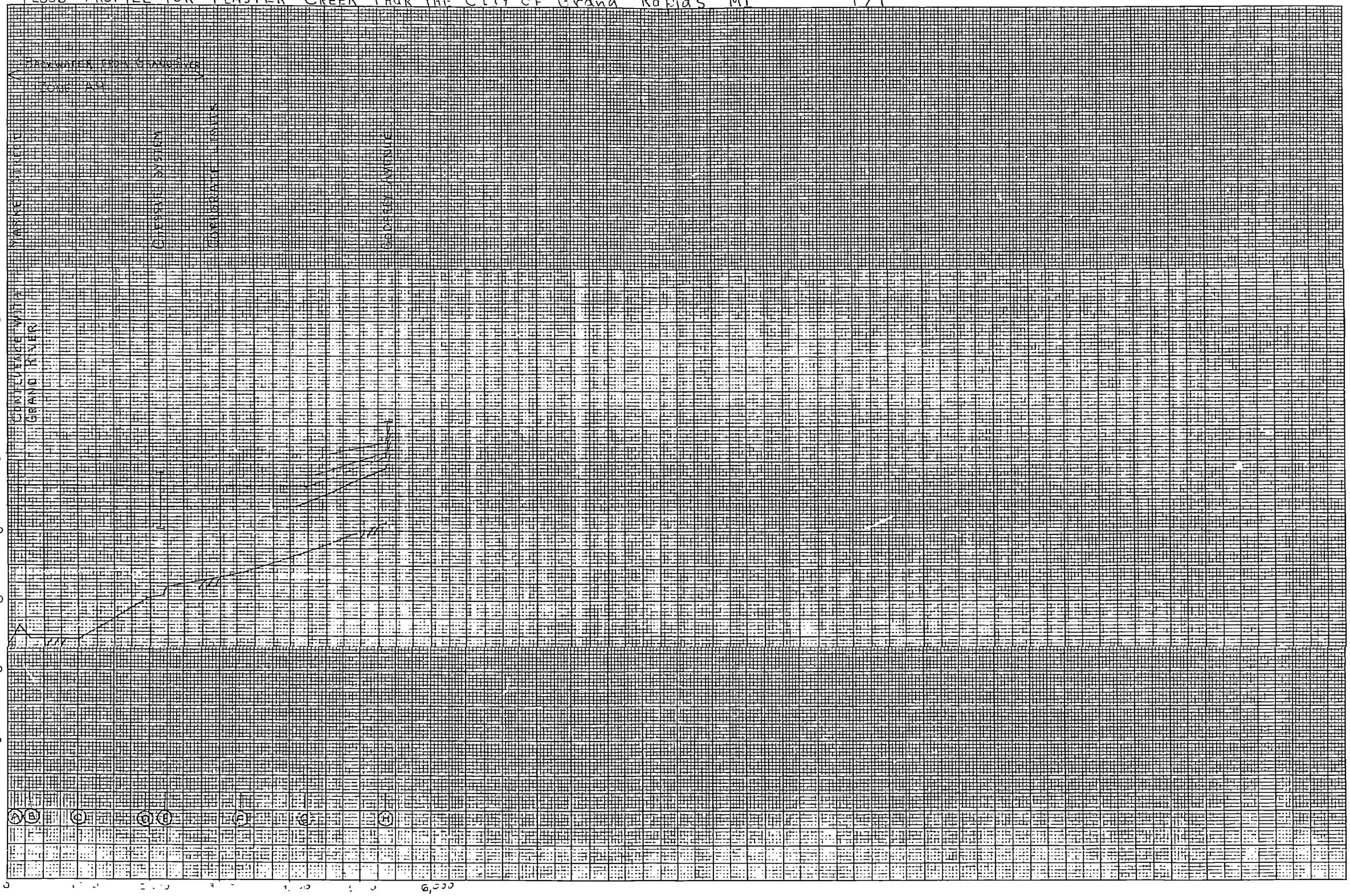
FLOOD PROFILES FOR GRAND RIVER THUR THE CITY OF GRAND RAPIDS, MI 2/3



FLOOD PROFILES FOR GRAND RIVER THUR THE CITY OF GRAND RAPIDS, MI 3/3



FLOOD PROFILE FOR PLASTER CREEK THUR THE CITY OF Grand Rapids MT



K&E 10 X 10 TO THE CENTIMETER 47 1513
25 X 25 CM MADE IN U.S.A.
KEUFFEL & ESSER CO.

1) COUNTY: KENT

2) STUDY NAME: GRANDVILLE, CITY OF

3) WATERCOURSE: BRANCH No. 3

4) DOCUMENT TYPE: 100-YEAR NATURAL

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**************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED APRI 1980
  ERROR CORR -  01,02,03,04
  MODIFICATION -  50,51,52,53,54
**************************************************
```

C
T1 FIS GRANDVILLE, KENT CO., MICHIGAN
T2 100-YEAR FLOOD
T3 BRANCH NO. 3

1/5/81

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
	0.	4.	0.	0.	0.000000	0.00	0.0	0.	621.890	0.000
J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	1.000	0.000	-1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
J3	VARIABLE CODES FOR SUMMARY PRINTOUT									
	38.000	1.000	53.000	21.000	22.000	54.000	4.000	39.000	150.000	200.000
NC	.070	.070	.040	.100	.300	0.000	0.000	0.000	0.000	0.000
QT	5.000	68.000	82.000	87.000	99.000	87.000	0.000	0.000	0.000	0.000

HUIZENGA DRAIN BRANCH NO. 3 MOUTH

X1	4.600	6.000	2010.000	2057.000	0.000	0.000	0.000	0.000	0.000	0.000
GR	625.400	2000.000	624.900	2010.000	616.500	2032.000	616.500	2044.000	621.600	2057.000
GR	623.200	2122.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

A

X1	6.700	10.000	2029.000	2043.000	558.000	558.000	558.000	0.000	0.000	0.000
GR	628.600	2000.000	623.700	2019.000	618.300	2029.000	616.800	2029.000	616.600	2036.000
GR	617.100	2043.000	619.000	2043.000	621.800	2051.000	625.200	2061.000	628.200	2081.000
NC	0.000	0.000	0.000	.300	.500	0.000	0.000	0.000	0.000	0.000

X1	6.800	9.000	2000.000	2004.000	50.000	50.000	50.000	0.000	0.000	0.000
GR	629.500	1606.000	629.700	1920.000	628.200	2000.000	616.300	2000.000	615.300	2001.500
GR	615.300	2002.500	616.300	2004.000	628.200	2004.000	626.900	2306.000	0.000	0.000
SB	0.000	3.530	3.000	0.000	3.140	0.000	12.830	0.000	617.500	616.700

WILSON AVENUE U/S

X1	7.000	9.000	2000.000	2004.000	107.000	107.000	107.000	0.000	0.000	0.000
X2	0.000	0.000	1.000	620.600	626.900	0.000	0.000	0.000	0.000	0.000
BT	9.000	1606.000	629.500	629.500	1920.000	629.700	629.700	2000.000	628.200	628.200
BT	2000.000	628.200	619.100	2001.500	628.200	620.600	2002.500	628.200	620.600	2004.000
BT	628.200	619.100	2004.000	628.200	628.200	2306.000	626.900	626.900	0.000	0.000
GR	629.500	1606.000	629.700	1920.000	628.200	2000.000	617.600	2000.000	616.600	2001.500
GR	616.600	2002.500	617.600	2004.000	628.200	2004.000	626.900	2306.000	0.000	0.000
QT	5.000	80.000	125.000	145.000	225.000	145.000	0.000	0.000	0.000	0.000

B

X1	7.200	10.000	2009.000	2049.000	30.000	30.000	30.000	0.000	0.000	0.000
GR	626.900	2000.000	626.000	2009.000	623.400	2016.000	617.500	2023.000	617.500	2025.000
GR	617.500	2029.000	617.500	2031.000	620.700	2038.000	627.900	2049.000	628.900	2052.000
NC	0.000	0.000	0.000	.100	.300	0.000	0.000	0.000	0.000	0.000
ET	0.000	0.000	0.000	0.000	0.000	1.400	0.000	0.000	0.000	0.000

C

X1	7.500	11.000	2162.000	2196.000	1720.000	1720.000	1720.000	0.000	0.000	0.000
GR	638.400	2000.000	633.700	2005.000	627.100	2092.000	628.200	2150.000	622.000	2162.000
GR	620.000	2181.000	619.700	2185.000	620.100	2189.000	622.200	2196.000	623.600	2350.000
GR	631.900	2558.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

D

X1	7.700	0.000	0.000	0.000	780.000	780.000	780.000	0.000	1.400	0.000
EJ	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
G	QLOB	GCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*PROF 1

CCHV= .100 CEHV= .300

*SECNO 4.600
HUIZENGA DRAIN BRANCH NO. 3 MOUTH

4.60	5.39	621.89	0.00	621.89	621.90	.01	0.00	0.00	624.90
87.	0.	87.	0.	0.	140.	2.	0.	0.	621.60
0.00	0.00	.62	.04	.070	.040	.070	0.000	616.50	2017.88
.000055	0.	0.	0.	0	0	0	0.00	50.90	2068.78

*SECNO 6.700
A

6.70	5.33	621.93	0.00	0.00	621.94	.02	.05	.00	618.30
87.	4.	79.	4.	12.	72.	12.	2.	1.	619.00
.15	.33	1.10	.31	.070	.040	.070	.040	616.60	2022.30
.000132	558.	558.	558.	0	0	0	0.00	29.06	2051.35

CCHV= .300 CEHV= .500

*SECNO 6.800

6.80	6.56	621.86	0.00	0.00	622.05	.19	.02	.09	628.20
87.	0.	87.	0.	0.	25.	0.	2.	1.	628.20
.15	0.00	3.52	0.00	.070	.040	.070	.040	615.30	2000.00
.004898	50.	50.	50.	2	0	0	0.00	4.00	2004.00

SPECIAL BRIDGE

SB	XK	XKOR	COFQ	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
	0.00	3.53	3.00	0.00	3.14	0.00	12.83	0.00	617.50	616.70

*SECNO 7.000
PRESSURE FLOW

EGPRS	EGLWC	H3	GWEIR	QPR	BAREA	TRAPEZOID AREA	ELLC	ELTRD
624.38	624.21	0.00	0.	87.	13.	10.	620.60	626.90

SECNO / G / TIME / SLOPE	DEPTH / QLOB / VLOB / XLOBL	CWSEL / QCH / VCH / XLCH	CRIWS / QROB / VROB / XLOBR	WSELK / ALOB / XNL / ITRIAL	EG / ACH / XNCH / IDC	HV / AROB / XNR / ICONT	HL / VOL / WTN / CORAR	OLOSS / TWA / ELMIN / TOPWID	BANK ELEV LEFT/RIGHT / SSTA / ENDST
WILSON AVENUE U/S									
7.00	7.64	624.24	0.00	0.00	624.38	.14	2.33	0.00	628.20
87.	0.	87.	0.	0.	29.	0.	2.	1.	628.20
.16	0.00	2.99	0.00	.070	.040	.070	.040	616.60	2000.00
.003399	107.	107.	107.	2	0	0	0.00	4.00	2004.00
*SECNO 7.200									
B									
7.20	6.91	624.41	0.00	0.00	624.42	.02	.01	.04	626.00
145.	0.	145.	0.	0.	132.	0.	2.	1.	627.90
.17	0.00	1.10	0.00	.070	.040	.070	.040	617.50	2013.29
.000146	30.	30.	30.	2	0	0	0.00	30.37	2043.66
CCHV= .100 CEHV= .300									
*SECNO 7.500									
C									
7.50	4.87	624.57	0.00	0.00	624.57	.00	.14	.00	622.00
145.	1.	86.	58.	6.	129.	269.	12.	5.	622.20
1.17	.17	.66	.22	.070	.040	.070	.040	619.70	2157.03
.000055	1720.	1720.	1720.	3	0	0	0.00	217.29	2374.32
*SECNO 7.700									
D									
7.70	3.54	624.64	0.00	0.00	624.68	.03	.10	.01	623.40
145.	0.	126.	18.	2.	84.	60.	17.	9.	623.60
1.33	.32	1.50	.31	.070	.040	.070	.040	621.10	2159.59
.000492	780.	780.	780.	0	0	0	0.00	151.41	2311.00

00BREAK00

1) COUNTY: KENT

2) STUDY NAME: GRANDVILLE, ~~WISCREST~~ CITY OF

3) WATERCOURSE: BRANCH No 3

4) DOCUMENT TYPE: 100-YEAR ENCROACHED

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  HEC2 RELEASE DATED NOV 76 UPDATED APRI 1980
  ERROR CORR -  01,02,03,04
  MODIFICATION -  50,51,52,53,54
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T1      FIS GRANDVILLE, KENT CO., MICHIGAN
T2      100-YEAR FLOOD    FLOODWAY
T3      BRANCH NO. 3

J1  ICHECK     INQ        NINV       IDIR       STRT       METRIC     HVINS      Q          WSEL       FQ
     -10.       6.         0.         0.  0.000000       0.00       0.0        0.   621.890    0.000
J2  NPROF      IPLOT      PRFVS      XSECV      XSECH      FN         ALLDC      IBW        CHNIM      ITRACE
     15.000     0.000     -1.000      0.000      0.000      0.000      0.000      0.000      0.000      0.000
```

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*PROF 2

CCHV= .100 CEHV= .300

*SECNO 4.600

HUIZENGA DRAIN BRANCH NO. 3 MOUTH

4.60	5.39	621.89	0.00	621.89	621.90	.01	0.00	0.00	624.90
87.	0.	87.	0.	0.	140.	2.	0.	0.	621.60
0.00	0.00	.62	.04	.070	.040	.070	0.000	616.50	2017.88
.000055	0.	0.	0.	0	0	0	0.00	50.90	2068.78

*SECNO 6.700

6.70	5.33	621.93	0.00	0.00	621.94	.02	.05	.00	618.30
87.	4.	79.	4.	12.	72.	12.	2.	1.	619.00
.15	.33	1.10	.31	.070	.040	.070	.040	616.60	2022.30
.000132	558.	558.	558.	0	0	0	0.00	29.06	2051.35

CCHV= .300 CEHV= .500

*SECNO 6.800

6.80	6.56	621.86	0.00	0.00	622.05	.19	.02	.09	628.20
87.	0.	87.	0.	0.	25.	0.	2.	1.	628.20
.15	0.00	3.52	0.00	.070	.040	.070	.040	615.30	2000.00
.004858	50.	50.	50.	2	0	0	0.00	4.00	2004.00

SPECIAL BRIDGE

SB	XK	XKOR	COFQ	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
	0.00	3.53	3.00	0.00	3.14	0.00	12.83	0.00	617.50	616.70

*SECNO 7.000

PRESSURE FLOW

EGPRS	EGLWC	H3	QWEIR	QPP	BAREA	TRAPEZOID AREA	ELLC	ELTRD
624.38	624.21	0.00	0.	87.	13.	10.	620.60	626.90

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
G	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

WILSON AVENUE U/S

7.00	7.64	624.24	0.00	0.00	624.38	.14	2.33	0.00	628.20
87.	0.	87.	0.	0.	29.	0.	2.	1.	628.20
.16	0.00	2.99	0.00	.070	.040	.070	.040	616.60	2000.00
.003399	107.	107.	107.	2	0	0	0.00	4.00	2004.00

*SECNO 7.200
B

7.20	6.91	624.41	0.00	0.00	624.42	.02	.01	.04	626.00
145.	0.	145.	0.	0.	132.	0.	2.	1.	627.90
.17	0.00	1.10	0.00	.070	.040	.070	.040	617.50	2013.29
.000146	30.	30.	30.	2	0	0	0.00	30.37	2043.66

CCHV= .100 CEHV= .300
*SECNO 7.500
2800 NAT Q1= 196.00 WSEL= 624.57 ENC Q1= 196.00 WSEL= 624.67 RATIO= 0.0000
NAT Q1= 209. RATIOS LOB,CH,ROB= .0078 .5789 .4133 WSEL= 624.67
3470 ENCROACHMENT STATIONS= 2162.0 2315.2 TYPE= 4 TARGET= .063
C

7.50	4.88	624.58	0.00	624.57	624.59	.00	.16	.00	622.00
145.	0.	89.	56.	0.	129.	218.	11.	4.	622.20
1.08	0.00	.69	.25	.070	.040	.070	.040	619.70	2162.00
.000065	1720.	1720.	1720.	0	0	0	0.00	153.16	2315.16

*SECNO 7.700
2800 NAT Q1= 65.37 WSEL= 624.64 ENC Q1= 65.37 WSEL= 624.74 RATIO= -.0000
NAT Q1= 72. RATIOS LOB,CH,ROB= .0037 .8489 .1475 WSEL= 624.74
3470 ENCROACHMENT STATIONS= 2162.0 2217.5 TYPE= 4 TARGET= .086
D

7.70	3.57	624.67	0.00	624.64	624.71	.04	.11	.01	623.40
145.	0.	135.	10.	0.	85.	21.	15.	6.	623.60
1.23	0.00	1.58	.48	.070	.040	.070	.040	621.10	2162.00
.000568	780.	780.	780.	2	0	0	0.00	55.48	2217.48

1) COUNTY: KENT

2) STUDY NAME: GRAND VILLE, CITY OF

3) WATERCOURSE: BRANCH #3

4) DOCUMENT TYPE: SUMMARIES

BRANCH NO. 3

SUMMARY PRINTOUT TABLE 150

SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10K*S	VCH	AREA	.01K
4.600	0.0	0.0	0.0	616.50	68.00	620.57	0.0	620.58	1.09	0.74	91.65	65.24
4.600	0.0	0.0	0.0	616.50	82.00	621.51	0.0	621.52	0.68	0.66	124.98	99.63
4.600	0.0	0.0	0.0	616.50	87.00	621.89	0.0	621.90	0.55	0.62	141.35	117.39
4.600	0.0	0.0	0.0	616.50	99.00	623.23	0.0	623.23	0.24	0.48	248.36	202.18
6.700	558.00	0.0	0.0	616.60	68.00	620.65	0.0	620.67	2.33	1.21	62.99	44.55
6.700	558.00	0.0	0.0	616.60	82.00	621.56	0.0	621.57	1.56	1.14	85.85	65.68
6.700	558.00	0.0	0.0	616.60	87.00	621.93	0.0	621.94	1.32	1.10	96.36	75.74
6.700	558.00	0.0	0.0	616.60	99.00	623.25	0.0	623.26	0.69	0.93	138.99	118.84
6.800	50.00	0.0	0.0	615.30	68.00	620.60	0.0	620.78	50.74	3.45	19.68	9.55
6.800	50.00	0.0	0.0	615.30	82.00	621.49	0.0	621.68	50.08	3.52	23.26	11.59
6.800	50.00	0.0	0.0	615.30	87.00	621.86	0.0	622.05	48.99	3.52	24.73	12.43
6.800	50.00	0.0	0.0	615.30	99.00	623.18	0.0	623.35	40.96	3.30	30.01	15.47
7.000	107.00	626.90	620.60	616.60	68.00	621.95	0.0	622.14	49.35	3.41	19.92	9.68
7.000	107.00	626.90	620.60	616.60	82.00	623.58	0.0	623.73	37.45	3.10	26.42	13.40
7.000	107.00	626.90	620.60	616.60	87.00	624.24	0.0	624.38	34.00	2.99	29.06	14.92
7.000	107.00	626.90	620.60	616.60	99.00	626.33	0.0	626.44	25.07	2.65	37.43	19.77
7.200	30.00	0.0	0.0	617.50	80.00	622.18	0.0	622.20	2.09	1.09	73.69	55.31
7.200	30.00	0.0	0.0	617.50	125.00	623.76	0.0	623.78	1.60	1.10	113.22	98.74
7.200	30.00	0.0	0.0	617.50	145.00	624.41	0.0	624.42	1.46	1.10	131.91	119.83
7.200	30.00	0.0	0.0	617.50	225.00	626.45	0.0	626.47	1.12	1.11	203.71	212.35
7.500	1720.00	0.0	0.0	619.70	80.00	622.68	0.0	622.70	4.39	1.19	78.53	38.17
7.500	1720.00	0.0	0.0	619.70	125.00	623.99	0.0	623.99	0.98	0.79	282.41	126.31
7.500	1720.00	0.0	0.0	619.70	145.00	624.57	0.0	624.57	0.55	0.66	404.58	195.88
7.500	1720.00	0.0	0.0	619.70	225.00	626.53	0.0	626.53	0.17	0.49	883.13	549.10
7.700	780.00	0.0	0.0	621.10	80.00	623.32	0.0	623.38	23.20	2.03	39.47	16.61
7.700	780.00	0.0	0.0	621.10	125.00	624.13	0.0	624.18	9.72	1.80	83.01	40.09
7.700	780.00	0.0	0.0	621.10	145.00	624.64	0.0	624.67	4.93	1.50	145.78	65.32
7.700	780.00	0.0	0.0	621.10	225.00	626.55	0.0	626.56	0.64	0.79	535.91	281.74

MOORE BUSINESS FORMS INC 23

00BREAK00

1) COUNTY: KENT

2) STUDY NAME: GRANDVIEW, CITY OF

3) WATERCOURSE: BOX CREEK

4) DOCUMENT TYPE: 10, 50, 100, 500 YR SUMMARIES

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**********************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED APRI 1980
  ERROR CORR -  01,02,03,04
  MODIFICATION -  50,51,52,53,54
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RECEIVED
DEC 22 1980
WATER MANAGEMENT

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C
T1     GRANDVILLE CITY FLOOD INSURANCE STUDY
T2        10-YEAR FLOOD
T3        BLCK CREEK
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J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
	0.	2.	0.	0.	0.000000	0.00	0.0	0.	590.000	0.000

J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	1.000	0.000	-1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

J3 VARIABLE CODES FOR SUMMARY PRINTOUT

	150.000	202.000	31.000	205.000	0.000	0.000	0.000	0.000	0.000	0.000

J5 PRNT NUMSEC ********REQUESTED SECTION NUMBERS********

	-10.000	-10.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
QT	5.000	2050.000	3070.000	3500.000	4710.000	3500.000	0.000	0.000	0.000	0.000
NC	0.000	0.000	0.000	.100	.300	0.000	0.000	0.000	0.000	0.000
NC	.110	.110	.065	0.000	0.000	0.000	0.000	0.000	0.000	0.000

(A)

X1	9.500	25.000	2673.000	2710.000	0.000	0.000	0.000	0.000	0.000	0.000
X3	0.000	0.000	0.000	2558.000	0.000	2825.000	0.000	0.000	0.000	0.000
GR	602.400	2100.000	602.400	2100.000	598.800	2180.000	599.200	2313.000	598.300	2418.000
GR	597.600	2453.000	588.600	2493.000	589.900	2543.000	588.700	2568.000	588.900	2643.000
GR	588.800	2673.000	587.400	2676.000	585.500	2681.000	584.900	2693.000	585.400	2705.000
GR	587.400	2710.000	589.700	2715.000	588.900	2813.000	588.600	2918.000	591.100	3018.000
GR	592.200	3116.000	591.800	3218.000	589.000	3318.000	590.000	3700.000	605.000	3900.000

X1	9.600	0.000	0.000	0.000	269.000	311.000	299.000	0.000	0.000	0.000
X3	0.000	0.000	0.000	2647.000	0.000	2736.000	0.000	0.000	0.000	0.000
NC	0.000	0.000	0.000	.300	.500	0.000	0.000	0.000	0.000	0.000

X1	9.890	28.000	2163.700	2256.800	50.000	50.000	50.000	0.000	0.000	0.000
X3	10.000	0.000	0.000	0.000	0.000	0.000	0.000	607.000	607.000	0.000
GR	-12.500	1900.000	610.500	2010.000	609.400	2110.000	609.200	2120.000	609.000	2130.000
GR	609.000	2140.000	608.900	2163.700	602.300	2163.700	589.300	2192.200	589.300	2192.300
GR	585.200	2195.900	585.200	2196.000	585.200	2200.000	585.200	2205.000	585.500	2210.000

GR	585.500	2215.000	585.500	2220.000	585.500	2224.300	585.500	2224.400	589.500	2227.900
GR	589.500	2428.000	601.400	2256.800	608.100	2256.800	608.000	2300.000	607.600	2410.000
GR	607.900	2410.000	607.900	2610.000	607.900	2810.000	0.000	0.000	0.000	0.000
NC	0.000	0.000	.030	0.000	0.000	0.000	0.000	0.000	0.000	0.000
X1	9.460	0.000	0.000	0.000	1.000	1.000	1.000	0.000	0.000	0.000
BT	12.000	2163.700	608.900	0.000	2163.700	608.900	604.800	2192.200	608.400	604.300
BT	2192.300	604.400	589.300	2195.900	608.400	585.200	2196.000	608.400	604.300	2224.300
BT	608.100	604.000	2224.400	608.100	585.500	2227.900	608.100	589.500	2228.000	608.100
BT	604.000	256.800	608.100	604.000	2256.800	608.100	0.000	0.000	0.000	0.000

U/S FACE SOUTHBOUND I-196

X1	9.910	0.000	0.000	0.000	50.000	50.000	50.000	0.000	0.000	0.000
X2	0.000	0.000	0.000	0.000	0.000	0.000	1.000	0.000	0.000	0.000
NC	0.000	0.000	.060	0.000	0.000	0.000	0.000	0.000	0.000	0.000
X1	9.920	0.000	0.000	0.000	1.000	1.000	1.000	0.000	.100	0.000
X3	10.000	0.000	0.000	0.000	0.000	0.000	0.000	607.600	607.600	0.000
NC	.110	.110	.060	.000	0.000	0.000	0.000	0.000	0.000	0.000
X1	9.950	0.000	2600.000	2700.000	50.000	50.000	50.000	0.000	0.000	0.000
X3	0.000	0.000	.000	2568.000	0.000	2732.000	0.000	0.000	0.000	0.000
GR	604.000	2000.000	593.800	2200.000	593.700	2300.000	592.500	2400.000	592.000	2550.000
GR	592.000	2600.000	592.000	2635.000	586.100	2637.000	586.000	2646.000	588.500	2655.000
GR	586.100	2670.000	591.600	2690.000	592.000	2690.000	592.500	2700.000	592.800	2750.000
GR	592.500	2900.000	592.600	3000.000	596.600	3100.000	598.000	3200.000	599.100	3300.000
GR	600.000	3400.000	600.600	3700.000	604.000	3800.000	0.000	0.000	0.000	0.000
X1	9.960	0.000	2001.000	2117.000	200.000	200.000	200.000	0.000	0.000	0.000
X3	10.000	0.000	0.000	0.000	0.000	0.000	0.000	612.000	607.500	0.000
GR	616.500	1950.000	616.000	1970.000	615.500	1990.000	615.200	2003.000	606.500	2003.000
GR	591.700	2038.600	591.700	2038.700	590.600	2042.300	590.600	2042.400	587.000	2049.000
GR	587.000	2070.000	587.000	2055.000	585.800	2055.100	586.000	2065.000	587.000	2070.000
GR	588.000	2081.800	588.700	2077.400	588.700	2077.500	588.700	2081.700	590.000	2081.800
GR	606.400	2117.000	612.800	2117.000	614.000	2130.000	612.000	2150.000	611.500	2160.000
GR	609.500	2460.000	609.600	2210.000	607.500	2460.000	0.000	0.000	0.000	0.000
NC	0.000	0.000	.000	.000	0.000	0.000	0.000	0.000	0.000	0.000
X1	10.000	0.000	2.000	.000	1.000	1.000	1.000	0.000	0.000	0.000
BT	1.000	2003.000	2.000	.000	2003.000	615.200	609.600	2038.600	615.000	609.600
BT	2038.700	615.000	591.700	2042.300	614.800	590.600	2042.400	614.800	609.600	2049.000
BT	614.500	609.600	2050.000	614.500	587.000	2055.000	614.500	609.600	2055.100	614.500
BT	585.800	2077.400	614.000	609.600	2077.500	614.000	588.700	2081.700	614.000	588.700
BT	2081.800	614.000	609.600	2117.000	612.800	609.600	2117.000	612.800	0.000	0.000

U/S FACE OF NORTHBOUND [illegible]

X1	10.060	0.000	[illegible]	0.000	45.000	45.000	45.000	0.000	0.000	0.000
X2	0.000	0.000	[illegible]	0.000	0.000	0.000	1.000	0.000	0.000	0.000
NC	0.000	0.000	.060	0.000	0.000	0.000	0.000	0.000	0.000	0.000
X1	10.060	0.000	0.000	0.000	1.000	1.000	1.000	0.000	0.000	0.000
X3	10.000	[illegible]	0.000	0.000	0.000	0.000	0.000	607.500	607.500	0.000
NC	.110	.110	.060	0.000	0.000	0.000	0.000	0.000	0.000	0.000
X1	[illegible]	23.000	[illegible]	[illegible]	82.000	82.000	82.000	0.000	0.000	0.000
X3	[illegible]	0.000	0.000	[illegible]	0.000	2777.000	0.000	0.000	0.000	0.000
GR	598.900	[illegible]	[illegible]	2200.000	593.700	2300.000	592.500	2400.000	592.000	2500.000
GR	592.800	[illegible]	592.000	2635.000	586.100	2637.000	586.000	2646.000	588.500	2655.000
GR	589.100	[illegible]	591.600	2680.000	592.000	2690.000	592.500	2700.000	592.800	2800.000
GR	[illegible]	[illegible]	592.600	3000.000	596.600	3100.000	598.000	3200.000	599.100	3300.000
GR	600.200	3400.000	600.600	3700.000	603.000	4200.000	0.000	0.000	0.000	0.000
NC	.110	.110	.060	0.000	0.000	0.000	0.000	0.000	0.000	0.000
X1	10.980	25.000	[illegible]	2074.000	115.000	225.000	325.000	0.000	0.000	0.000
X3	10.000	0.000	[illegible]	0.000	0.000	0.000	0.000	602.000	602.000	0.000
GR	603.600	1440.000	603.500	1640.000	603.500	1840.000	603.500	1940.000	603.500	1950.000
GR	603.600	2000.000	603.600	2006.000	592.800	2006.000	587.800	2015.500	587.300	2026.000
GR	587.000	2026.100	587.000	2029.000	587.200	2029.100	587.000	2040.000	588.000	2050.000
GR	588.200	2050.100	588.200	2053.000	588.500	2053.100	599.700	2074.000	602.200	2074.000
GR	603.700	2074.000	603.700	2090.000	603.700	2140.000	603.700	2240.000	603.700	2440.000
NC	0.000	0.000	.030	0.000	0.000	0.000	0.000	0.000	0.000	0.000
X1	11.000	0.000	0.000	0.000	1.000	1.000	1.000	0.000	0.000	0.000
BT	16.000	2006.000	603.600	0.000	2006.000	603.600	599.800	2026.000	603.700	599.800
BT	2026.100	603.700	587.000	2029.000	603.700	587.000	2029.100	603.700	599.800	2050.000
BT	603.700	599.800	2050.100	603.700	588.200	2053.000	603.700	588.200	2053.100	603.700
BT	599.800	2053.100	603.700	599.800	2053.100	603.700	599.800	2053.100	603.700	599.800
BT	2074.000	603.700	599.700	2074.000	603.700	0.000	2140.000	603.700	0.000	0.000

U/S FACE OF C & O RAILROAD

X1	11.060	0.000	0.000	[illegible]	60.000	60.000	60.000	0.000	0.000	0.000
X2	0.000	0.000	0.000	[illegible]	0.000	0.000	1.000	0.000	0.000	0.000
NC	.110	.110	.060	[illegible]	0.000	0.000	0.000	0.000	0.000	0.000
X1	11.100	0.000	0.000	[illegible]	1.000	1.000	1.000	0.000	0.000	0.000
X3	10.000	0.000	[illegible]	0.000	0.000	0.000	0.000	603.600	603.600	0.000

X1	11.200	[illegible]	0.000	0.000	[illegible]	50.000	50.000	0.000	0.000	0.000
NC	.110	.110	.060	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NC	0.000	0.000	0.000	.100	.300	0.000	0.000	0.000	0.000	0.000
X1	11.900	24.000	2565.000	2640.000	380.000	400.000	630.000	0.000	0.000	0.000
X3	0.000	0.000	0.000	2565.000	0.000	2640.000	0.000	0.000	0.000	0.000
GR	605.000	1700.000	[illegible]1.200	2100.000	[illegible]1.200	[illegible]200.000	[illegible]00.800	[illegible]300.000	601.600	2400.000
GR	599.200	2500.000	[illegible]95.200	2565.000	591.700	[illegible]580.000	590.500	[illegible]600.000	591.500	2621.000
GR	595.200	[illegible]36.000	[illegible]96.300	2640.000	595.100	2670.000	601.700	2690.000	600.700	2725.000
GR	595.200	2750.000	595.500	2780.000	601.500	2800.000	601.300	2900.000	601.700	3000.000
GR	602.400	3100.000	602.700	3200.000	602.700	3200.000	605.000	3400.000	0.000	0.000
NC	0.000	0.000	0.000	.300	.500	0.000	0.000	0.000	0.000	0.000
X1	11.980	18.000	3779.500	[illegible]820.800	50.000	50.000	50.000	0.000	0.000	0.000
GR	618.000	3400.000	[illegible]02.300	[illegible]40.000	602.700	3600.000	603.300	3700.000	603.300	3779.500
GR	592.300	3779.500	591.300	3800.000	591.300	3800.000	591.300	3800.000	591.300	3800.000
GR	593.700	3820.800	603.300	3820.800	602.600	3900.000	602.200	4000.000	601.700	4200.000
GR	602.900	4400.000	604.300	4600.000	618.000	4600.000	0.000	0.000	0.000	0.000
NC	0.000	0.000	.030	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SB	0.000	1.760	3.000	0.000	41.300	0.000	348.500	0.000	0.000	0.000

U/S FACE OF CHICAGO DRIVE.

X1	12.060	0.000	0.000	0.000	54.000	54.000	54.000	0.000	0.000	0.000
X2	0.000	0.000	1.000	600.500	603.000	0.000	0.000	0.000	0.000	0.000
X3	0.000	0.000	0.000	3779.500	0.000	3820.800	0.000	0.000	0.000	0.000
BT	4.000	3779.500	603.300	0.000	3779.500	603.300	600.500	3820.800	603.000	600.200
BT	3820.800	603.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NC	.100	.100	.065	0.000	0.000	0.000	0.000	0.000	0.000	0.000
X1	12.200	22.000	726.000	772.000	51.000	51.000	51.000	0.000	0.000	0.000
X3	0.000	0.000	0.000	678.000	0.000	819.000	0.000	0.000	0.000	0.000
GR	604.600	704.000	604.600	704.000	604.600	704.000	604.600	704.000	597.500	720.000
GR	597.500	720.000	595.100	726.000	594.700	728.000	594.200	749.000	594.600	770.000
GR	595.100	772.000	596.400	792.000	597.500	[illegible]06.000	597.900	905.000	596.900	1005.000
GR	595.400	1014.000	594.700	1020.000	595.400	1026.000	598.500	1038.000	602.300	1097.000
GR	606.000	1132.000	605.000	1300.000	0.000	0.000	0.000	0.000	0.000	0.000
NC	0.000	0.000	0.000	.100	.300	0.000	0.000	0.000	0.000	0.000
BT	0.000	0.000	0.000	0.000	0.000	1.410	0.000	0.000	0.000	0.000

(E)

X1	12.500	0.000	0.000	0.000	[illegible]00.000	[illegible]06.000	610.000	0.000	0.000	0.000
NC	.085	.085	.065	0.000	0.000	0.000	0.000	0.000	0.000	0.000
BT	0.000	9.100	9.100	9.100	9.100	9.100	0.000	0.000	211.000	767.000

X1	12.900	20.000	300.000	350.000	650.000	300.000	450.000	0.000	0.000	0.000
GR	608.200	0.000	608.200	0.000	607.400	24.000	606.500	124.000	604.600	224.000
GR	602.600	249.000	602.600	284.000	596.400	300.000	592.700	324.000	596.300	350.000
GR	598.200	359.000	602.600	375.000	603.800	379.000	604.200	399.000	604.700	424.000
GR	604.000	524.000	604.500	624.000	604.200	724.000	604.200	824.000	608.000	1214.000
NC	0.000	0.000	0.000	.300	.500	0.000	0.000	0.000	0.000	0.000

X1	12.980	10.000	300.000	350.000	49.000	49.000	49.000	0.000	0.000	0.000
X3	0.000	0.000	0.000	268.000	0.000	0.000	0.000	0.000	0.000	0.000
BT	4.000	300.000	604.200	0.000	300.000	604.200	601.700	350.000	604.200	601.700
BT	350.000	604.200	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
GR	607.700	0.000	606.400	100.000	604.500	200.000	604.200	300.000	604.200	350.000
GR	603.300	400.000	603.100	500.000	603.300	600.000	603.700	700.000	604.200	800.000

U/S FACE OF CANAL AVE. BRIDGE.

X1	13.060	0.000	0.000	0.000	50.000	50.000	50.000	0.000	0.000	0.000
X2	0.000	0.000	0.000	0.000	0.000	0.000	1.000	0.000	0.000	0.000
X3	0.000	0.000	0.000	280.000	0.000	0.000	0.000	0.000	0.000	0.000
NC	.100	.075	.065	0.000	0.000	0.000	0.000	0.000	0.000	0.000

X1	13.100	0.000	0.000	0.000	1.000	1.000	1.000	0.000	0.000	0.000
X3	10.000	0.000	0.000	280.000	0.000	0.000	0.000	603.800	603.500	0.000

(C)

X1	13.200	18.000	164.000	243.000	100.000	100.000	100.000	0.000	0.000	0.000
GR	608.600	0.000	602.500	100.000	603.300	125.000	601.900	164.000	601.900	164.000
GR	601.300	175.000	595.700	185.000	592.700	200.000	595.700	216.000	596.300	225.000
GR	601.900	243.000	602.600	245.000	601.900	275.000	602.000	300.000	602.800	400.000
GR	602.600	500.000	603.300	600.000	605.800	700.000	0.000	0.000	0.000	0.000
NC	.085	.085	.065	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NC	0.000	0.000	0.000	.100	.300	0.000	0.000	0.000	0.000	0.000
ET	0.000	0.000	0.000	0.000	0.000	1.410	0.000	0.000	0.000	0.000

X1	13.300	20.000	922.000	972.000	580.000	700.000	800.000	0.000	0.000	0.000
GR	608.600	833.000	608.600	833.000	605.500	837.000	601.900	847.000	601.700	881.000
GR	600.800	922.000	598.500	937.000	597.500	940.000	596.300	950.000	597.000	960.000
GR	598.500	963.000	602.100	972.000	601.300	991.000	601.300	1039.000	603.700	1121.000
GR	605.200	1154.000	607.100	1247.000	609.300	1329.000	613.100	1425.000	615.300	1435.000
NC	.085	.085	.065	0.000	0.000	0.000	0.000	0.000	0.000	0.000

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X1	13.700	23.000	785.000	818.000	1150.000	1000.000	1175.000	0.000	0.000	0.000
GR	610.000	0.000	609.200	100.000	609.200	185.000	609.100	281.000	609.000	388.300
GR	609.300	482.000	606.800	582.000	607.700	682.000	607.700	685.000	606.800	715.000
GR	604.900	750.000	603.500	785.000	602.400	790.000	600.300	793.000	599.700	802.000
GR	600.000	811.000	602.400	814.000	604.000	818.000	603.600	856.000	605.400	898.000
GR	609.400	936.000	612.000	976.000	613.000	988.000	0.000	0.000	0.000	0.000
X1	13.800	20.000	760.000	820.000	450.000	375.000	450.000	0.000	0.000	0.000
GR	612.500	0.000	610.700	100.000	610.700	200.000	610.200	300.000	609.800	400.000
GR	609.800	500.000	609.400	600.000	609.000	700.000	608.800	720.000	608.200	740.000
GR	607.600	760.000	604.000	780.000	601.000	800.000	605.300	820.000	608.100	840.000
GR	608.700	850.000	608.700	860.000	609.400	900.000	611.000	940.000	612.300	988.000
DC	.085	.085	.065	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FT	0.000	0.000	0.000	0.000	0.000	5.100	0.000	0.000	243.000	843.000
X1	13.900	21.000	760.000	830.000	500.000	350.000	550.000	0.000	0.000	0.000
GR	614.100	100.000	614.100	100.000	613.200	200.000	612.200	300.000	611.500	400.000
GR	611.400	500.000	611.100	600.000	611.200	700.000	610.500	760.000	604.600	780.000
GR	604.000	783.000	602.000	800.000	604.300	817.000	610.500	829.000	611.100	830.000
GR	613.600	850.000	613.000	900.000	613.000	1000.000	613.800	1100.000	614.000	1200.000
GR	616.100	1300.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
DC	0.000	0.000	0.000	.300	.500	0.000	0.000	0.000	0.000	0.000

X1	13.980	20.000	474.500	526.500	48.000	48.000	48.000	0.000	0.000	0.000
X3	10.000	0.000	0.000	0.000	0.000	0.000	0.000	611.000	611.000	0.000
GR	613.700	0.000	611.000	100.000	610.500	200.000	611.100	300.000	611.900	400.000
GR	612.000	450.000	610.500	474.500	605.000	474.600	604.500	480.000	603.500	490.000
GR	602.300	500.000	602.300	500.100	602.300	500.500	602.300	500.600	603.000	526.500
GR	612.500	540.000	612.500	540.000	612.500	600.000	613.100	700.000	615.000	900.000
DC	0.000	0.000	.030	0.000	0.000	0.000	0.000	0.000	0.000	0.000
X1	13.990	0.000	0.000	0.000	1.000	1.000	1.000	0.000	0.000	0.000
X3	10.000	0.000	0.000	0.000	0.000	0.000	0.000	611.000	611.000	0.000
FT	15.000	0.000	613.700	0.000	100.000	611.000	0.000	200.000	610.500	0.000
FT	300.000	611.100	0.000	400.000	611.900	0.000	450.000	612.000	0.000	474.500
FT	612.200	0.000	474.500	612.200	610.500	500.000	612.200	610.500	500.100	612.200
FT	602.300	500.500	612.200	602.300	500.600	612.200	610.500	526.500	612.200	610.500
BT	526.500	612.200	0.000	540.000	612.500	0.000	600.000	612.500	0.000	700.000
BT	613.100	0.000	900.000	615.000	0.000	0.000	0.000	0.000	0.000	0.000

U/S FACE OF WILSON AVENUE. (F)

X1	14.060	0.000	0.000	0.000	45.000	45.000	45.000	0.000	0.000	0.000
X2	0.000	0.000	0.000	0.000	0.000	0.000	1.000	0.000	0.000	0.000
X3	10.000	0.000	0.000	0.000	0.000	0.000	0.000	612.500	612.500	0.000
NC	0.000	0.000	.065	0.000	0.000	0.000	0.000	0.000	0.000	0.000
X1	14.070	0.000	0.000	0.000	1.000	1.000	1.000	0.000	0.000	0.000
X3	10.000	0.000	0.000	0.000	0.000	0.000	0.000	612.500	612.500	0.000
NC	.065	.065	.065	0.000	0.000	0.000	0.000	0.000	0.000	0.000
X1	14.200	0.000	0.000	0.000	49.000	49.000	49.000	0.000	0.000	0.000
NC	.085	.085	.065	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NC	0.000	0.000	0.000	.100	.300	0.000	0.000	0.000	0.000	0.000
FT	0.000	0.000	0.000	0.000	0.000	1.410	0.000	0.000	0.000	0.000
X1	14.300	23.000	418.000	468.000	1300.000	1250.000	1610.000	0.000	0.000	0.000
GR	616.800	100.000	616.800	100.000	616.400	246.000	614.800	276.000	611.600	318.000
GR	610.700	418.000	608.500	425.000	606.500	430.000	604.300	438.000	604.100	444.000
GR	604.300	454.000	606.500	460.000	608.500	468.000	609.700	510.000	609.300	636.000
GR	609.900	736.000	609.800	786.000	609.900	965.000	611.500	1084.000	609.800	1248.000
GR	610.700	1348.000	614.200	1398.000	617.900	1480.000	0.000	0.000	0.000	0.000
NC	.080	.080	.060	0.000	0.000	0.000	0.000	0.000	0.000	0.000
X1	14.500	27.000	764.000	804.000	1880.000	1880.000	1880.000	0.000	0.000	0.000
GR	629.300	100.000	629.300	100.000	625.400	230.000	621.700	340.000	621.600	438.000
GR	619.300	522.000	618.100	622.000	613.600	714.000	611.800	764.000	610.300	768.000
GR	607.800	771.000	605.800	780.000	608.000	789.000	610.300	792.000	611.400	798.000
GR	612.200	804.000	611.000	904.000	612.300	1005.000	612.700	1105.000	613.300	1163.000
GR	614.000	1260.000	615.000	1355.000	616.600	1417.000	617.500	1520.000	619.700	1625.000
GR	620.000	1730.000	620.300	1805.000	0.000	0.000	0.000	0.000	0.000	0.000
X1	14.550	20.000	760.000	800.000	450.000	550.000	275.000	0.000	0.000	0.000
GR	625.000	0.000	623.000	100.000	620.000	200.000	618.600	300.000	616.800	400.000
GR	615.300	500.000	614.800	600.000	614.600	680.000	614.400	700.000	614.300	740.000
GR	614.000	760.000	611.800	763.000	607.700	780.000	613.900	800.000	614.200	850.000
GR	614.000	900.000	614.800	1000.000	615.800	1100.000	617.000	1200.000	618.200	1300.000
X1	14.580	19.000	1003.000	1036.700	150.000	275.000	350.000	0.000	0.000	0.000
GR	623.000	0.000	616.500	720.000	616.000	920.000	616.000	970.000	616.000	1000.000
GR	616.000	1003.000	610.200	1003.000	609.900	1010.000	609.800	1015.000	609.600	1020.000
GR	610.000	1025.000	610.200	1030.000	610.700	1036.700	616.300	1036.700	616.500	1070.000
GR	616.000	1120.000	617.000	1140.000	619.000	1220.000	623.000	1300.000	0.000	0.000
NC	0.000	0.000	0.000	.300	.500	0.000	0.000	0.000	0.000	0.000

X1	14.600	0.000	0.000	0.000	50.000	50.000	50.000	0.000	0.000	0.000
X3	10.000	0.000	0.000	0.000	0.000	0.000	0.000	615.500	615.500	0.000
MC	0.000	0.000	.030	0.000	0.000	0.000	0.000	0.000	0.000	0.000
X1	14.610	0.000	0.000	0.000	1.000	1.000	1.000	0.000	0.000	0.000
PT	4.000	1003.000	616.000	0.000	1003.000	616.000	615.000	1036.700	616.300	615.300
PT	1036.700	616.300	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

U/S FACE OF CEMETERY BRIDGE. (F)

X1	14.620	0.000	0.000	0.000	34.000	34.000	34.000	0.000	.100	0.000
X2	0.000	0.000	0.000	0.000	0.000	0.000	1.000	0.000	0.000	0.000
MC	0.000	0.000	.060	0.000	0.000	0.000	0.000	0.000	0.000	0.000
X1	14.630	0.000	0.000	0.000	1.000	1.000	1.000	0.000	0.000	0.000
X3	10.000	0.000	0.000	0.000	0.000	0.000	0.000	616.000	616.000	0.000
X1	14.650	0.000	0.000	0.000	100.000	100.000	100.000	0.000	0.000	0.000
MC	0.000	0.000	0.000	.100	.300	0.000	0.000	0.000	0.000	0.000
MC	.075	.075	.055	0.000	0.000	0.000	0.000	0.000	0.000	0.000

X1	14.700	15.000	106.000	140.000	1580.000	1580.000	1580.000	0.000	0.000	0.000
GR	623.200	100.000	623.200	100.000	617.800	106.000	615.800	108.000	613.300	119.000
GR	613.500	124.000	614.300	129.000	615.800	139.000	616.200	140.000	617.900	154.000
GR	618.200	204.000	617.900	298.000	616.900	498.000	617.700	600.000	616.800	702.000
GR	616.600	762.000	618.000	826.000	619.300	928.000	633.000	928.000	0.000	0.000
PT	0.000	0.000	0.000	0.000	0.000	9.100	0.000	0.000	1999.000	2480.000
X1	14.800	15.000	2001.000	2038.500	580.000	420.000	620.000	0.000	0.000	0.000
GR	627.000	1850.000	624.000	1950.000	623.000	1970.000	621.300	2000.000	621.200	2001.000
GR	614.200	2001.000	614.000	2014.000	614.000	2020.000	613.900	2030.000	613.600	2038.500
GR	621.200	2038.500	621.200	2040.000	620.000	2090.000	620.000	2100.000	619.200	2200.000
GR	619.000	2300.000	619.000	2480.000	633.000	2480.000	0.000	0.000	0.000	0.000
X1	14.810	0.000	0.000	0.000	1.000	1.000	1.000	0.000	0.000	0.000
X3	10.000	0.000	0.000	0.000	0.000	0.000	0.000	620.000	619.000	0.000
PT	13.000	1850.000	627.000	0.000	1950.000	624.000	0.000	1970.000	623.000	0.000
PT	2001.000	621.200	0.000	2001.000	621.200	620.000	2038.500	621.200	620.000	2038.500
PT	621.200	0.000	2090.000	620.000	0.000	2100.000	620.000	0.000	2200.000	619.200
PT	0.000	2300.000	619.000	0.000	2480.000	619.000	0.000	2480.000	633.000	0.000

U/S FACE OF PRIVATE DRIVE.

X1	14.815	0.000	0.000	0.000	38.000	38.000	38.000	0.000	0.000	0.000
X2	0.000	0.000	0.000	0.000	0.000	0.000	1.000	0.000	0.000	0.000
X3	10.000	0.000	0.000	0.000	0.000	0.000	0.000	621.200	619.000	0.000
X1	14.820	0.000	0.000	0.000	50.000	50.000	50.000	0.000	0.000	0.000
MC	.075	.075	.055	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ET	0.000	0.000	0.000	0.000	0.000	1.400	0.000	0.000	0.000	0.000
X1	14.900	23.000	575.000	617.000	260.000	270.000	260.000	0.000	0.000	0.000
GR	628.400	100.000	628.400	100.000	626.500	200.000	622.600	400.000	622.000	500.000
GR	622.400	550.000	621.900	575.000	618.500	581.000	616.200	585.000	614.200	600.000
GR	615.800	615.000	618.500	617.000	619.300	675.000	619.400	700.000	618.700	800.000
GR	620.500	900.000	622.200	1000.000	621.300	1100.000	621.600	1200.000	622.600	1300.000
GR	624.400	1400.000	625.400	1500.000	627.000	1600.000	0.000	0.000	0.000	0.000
X1	14.960	0.000	0.000	0.000	225.000	225.000	225.000	0.000	0.000	0.000
X3	0.000	0.000	0.000	370.000	0.000	820.000	0.000	0.000	0.000	0.000
TC	0.000	0.000	.065	.300	.500	0.000	0.000	0.000	0.000	0.000
X1	14.980	22.000	673.000	726.000	50.000	50.000	50.000	0.000	0.000	0.000
X3	10.000	0.000	0.000	299.000	0.000	1098.000	0.000	621.800	621.800	0.000
GR	627.000	0.000	623.000	300.000	624.500	500.000	624.700	600.000	624.800	620.000
GR	624.900	640.000	625.000	670.000	625.000	673.000	615.800	673.000	615.200	680.000
GR	615.000	690.000	614.500	700.000	614.300	710.000	614.500	720.000	615.000	726.000
GR	625.000	725.000	624.000	770.000	623.500	800.000	622.000	900.000	621.800	1000.000
GR	624.000	1180.000	636.000	1180.000	0.000	0.000	0.000	0.000	0.000	0.000
SF	0.000	1.720	2.000	0.000	52.500	0.000	368.000	0.000	0.000	0.000

U/S FACE OF IVANREST AVE. (G)

X1	15.050	0.000	0.000	0.000	32.000	32.000	32.000	0.000	0.000	0.000
X2	0.000	0.000	1.000	622.000	622.100	0.000	0.000	0.000	0.000	0.000
X3	10.000	0.000	0.000	237.000	0.000	1166.000	0.000	623.000	621.800	0.000
ET	10.000	0.000	627.000	0.000	300.000	625.000	0.000	500.000	624.500	0.000
ET	600.000	624.700	0.000	620.000	624.800	0.000	640.000	624.900	0.000	673.000
ET	625.000	0.000	673.000	625.000	622.000	726.000	625.000	622.000	726.000	625.000
ET	0.000	770.000	624.000	0.000	800.000	623.500	0.000	900.000	622.500	0.000
ET	1000.000	622.500	0.000	1180.000	624.000	0.000	1180.000	636.000	0.000	0.000
TC	.075	.075	.055	0.000	0.000	0.000	0.000	0.000	0.000	0.000

X1	15.100	21.000	775.000	818.000	100.000	100.000	100.000	0.000	0.000	0.000
X3	0.000	0.000	0.000	435.000	0.000	1160.000	0.000	0.000	0.000	0.000
GR	629.500	100.000	625.700	200.000	623.700	300.000	623.200	400.000	622.400	500.000
GR	619.600	600.000	619.500	700.000	619.300	775.000	616.400	785.000	612.900	800.000
GR	615.700	815.000	619.300	818.000	619.500	825.000	620.300	875.000	622.800	900.000
GR	621.700	1000.000	623.000	1100.000	623.000	1200.000	624.700	1300.000	625.500	1400.000
GR	626.500	1500.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
MC	0.000	0.000	0.000	.100	.300	0.000	0.000	0.000	0.000	0.000
MC	.085	.085	.055	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ET	0.000	0.000	0.000	0.000	0.000	1.410	0.000	0.000	0.000	0.000

(H)

X1	15.300	23.000	1092.000	1120.000	1875.000	1725.000	2575.000	0.000	0.000	0.000
GR	626.500	0.000	624.500	205.000	624.300	302.000	623.300	428.000	623.700	540.000
GR	623.600	635.000	623.500	734.000	623.700	836.000	622.700	1000.000	622.900	1050.000
GR	621.700	1074.000	620.900	1092.000	617.900	1095.000	616.900	1106.000	618.000	1116.000
GR	620.800	1120.000	624.900	1124.000	626.200	1152.000	629.000	1222.000	633.500	1362.000
GR	633.700	1622.000	635.700	1682.000	636.000	1770.000	0.000	0.000	0.000	0.000
MC	.085	.085	.055	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ET	0.000	0.000	0.000	0.000	0.000	9.100	0.000	0.000	193.000	823.000

(I)

X1	15.500	20.000	719.000	780.000	2575.000	2575.000	2575.000	0.000	0.000	0.000
GR	631.600	100.000	629.600	200.000	628.000	240.000	629.400	320.000	630.400	418.000
GR	629.500	468.000	626.900	579.000	625.900	619.000	625.700	669.000	625.700	719.000
GR	623.100	728.000	621.300	733.000	620.800	750.000	621.200	768.000	623.100	772.000
GR	624.600	775.000	625.700	780.000	626.200	805.000	630.600	828.200	634.400	928.000
MC	.085	.085	.055	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ET	0.000	0.000	0.000	0.000	0.000	1.400	0.000	0.000	0.000	0.000

X1	15.800	23.000	1127.000	1176.000	1175.000	1175.000	1175.000	0.000	0.000	0.000
GR	633.600	100.000	632.800	253.000	633.300	374.000	632.800	518.000	632.000	643.800
GR	632.500	760.000	633.300	896.000	630.900	1020.000	630.400	1044.000	625.600	1074.000
GR	625.400	1092.000	626.100	1127.000	623.900	1131.000	623.000	1134.000	620.500	1153.000
GR	622.000	1172.000	623.900	1175.000	625.200	1176.000	626.100	1199.000	629.300	1285.000
GR	631.300	1415.000	633.500	1531.000	635.000	1545.000	0.000	0.000	0.000	0.000
ET	0.000	0.000	0.000	0.000	0.000	9.100	0.000	0.000	52.000	362.000

X1	15.840	16.000	231.000	273.000	500.000	500.000	500.000	0.000	0.000	0.000
GR	635.000	30.000	630.000	65.000	626.300	80.000	625.500	130.000	626.500	180.000
GR	627.200	231.000	625.100	233.000	621.200	250.000	624.800	266.000	626.600	272.000
GR	626.000	273.000	628.000	285.000	625.700	320.000	625.600	335.000	626.000	345.000
GR	634.500	370.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
MC	0.000	0.000	0.000	.300	.500	0.000	0.000	0.000	0.000	0.000

(J)

XL	15.850	10.000	307.000	333.000	80.000	80.000	80.000	0.000	0.000	0.000
GR	640.000	70.000	627.000	80.000	627.000	300.000	624.000	307.000	621.400	320.000
GR	621.400	328.000	623.200	333.000	627.000	340.000	627.000	460.000	640.000	470.000
SB	0.000	1.700	3.050	0.000	29.500	0.000	177.200	0.000	623.200	623.200

PRIVATE DRIVE

XL	15.860	0.000	0.000	0.000	25.000	25.000	25.000	0.000	0.000	0.000
X2	0.000	0.000	1.000	629.200	630.000	0.000	0.000	0.000	0.000	0.000
ST	11.000	80.000	634.300	0.000	210.000	630.800	0.000	300.000	630.800	0.000
ST	307.000	630.800	624.000	307.000	630.800	628.200	333.000	630.800	628.200	333.000
ST	630.800	623.200	340.000	630.800	0.000	365.000	630.000	0.000	410.000	630.000
ST	0.000	470.000	640.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

XL	15.870	21.000	283.000	314.000	30.000	30.000	30.000	0.000	0.000	0.000
GR	640.000	10.000	627.500	75.000	628.200	125.000	627.400	200.000	626.900	250.000
GR	626.100	270.000	625.000	283.000	623.300	287.000	621.600	300.000	623.800	312.000
GR	626.500	314.000	627.000	323.000	628.200	338.000	630.300	342.000	633.000	350.000
GR	633.200	375.000	633.800	380.000	633.900	403.000	633.800	453.000	633.500	503.000
GR	640.000	505.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
EJ	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

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  HEC2 RELEASE DATED NOV 76 UPDATED APRI 1980
  ERROR CORR -  01.02.03.04
  MODIFICATION -  50.51.52.53.54
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NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

BUCK CREEK

SUMMARY PRINTOUT TABLE 150

	SECNO	XLCH	ELTRD	ELLC	FLMIN	Q	CWSEL	CRIWS	EG	10K*S	VCH	AREA	.01K
*	9.500	0.00	0.00	0.00	584.90	2050.00	590.21	590.21	591.07	206.83	8.75	438.87	142.54
*	9.500	0.00	0.00	0.00	584.90	3070.00	590.75	590.75	591.78	238.48	10.13	582.78	198.80
*	9.500	0.00	0.00	0.00	584.90	3500.00	590.94	590.94	592.05	250.71	10.65	633.62	221.04
*	9.500	0.00	0.00	0.00	584.90	4710.00	591.48	591.48	592.71	264.03	11.67	776.79	289.86
	9.600	299.00	0.00	0.00	584.90	2050.00	593.20	0.00	593.63	45.89	5.80	487.79	302.62
	9.600	299.00	0.00	0.00	584.90	3070.00	594.32	0.00	594.98	60.36	7.30	587.29	395.14
	9.600	299.00	0.00	0.00	584.90	3500.00	594.73	0.00	595.48	65.96	7.87	623.32	430.95
	9.600	299.00	0.00	0.00	584.90	4710.00	595.66	0.00	596.73	82.55	9.41	706.86	518.40
	9.890	50.00	0.00	0.00	585.20	2050.00	593.39	0.00	594.08	94.07	6.64	308.63	211.36
	9.890	50.00	0.00	0.00	585.20	3070.00	594.55	0.00	595.59	125.37	8.20	374.51	274.18
	9.890	50.00	0.00	0.00	585.20	3500.00	594.97	0.00	596.16	136.51	8.75	400.02	299.57
	9.890	50.00	0.00	0.00	585.20	4710.00	595.96	0.00	597.57	166.35	10.16	463.59	365.18
	9.900	1.00	608.10	604.80	585.20	2050.00	593.25	0.00	594.23	45.98	7.92	258.96	302.31
	9.900	1.00	608.10	604.80	585.20	3070.00	594.32	0.00	595.83	66.19	9.87	311.17	377.34
	9.900	1.00	608.10	604.80	585.20	3500.00	594.71	0.00	596.44	73.91	10.57	331.17	407.12
	9.900	1.00	608.10	604.80	585.20	4710.00	595.58	0.00	597.97	95.70	12.41	379.62	481.48
	9.910	50.00	608.10	604.80	585.20	2050.00	593.61	0.00	594.47	39.66	7.44	275.43	325.54
	9.910	50.00	608.10	604.80	585.20	3070.00	594.99	0.00	596.21	50.87	8.86	346.57	430.42
	9.910	50.00	608.10	604.80	585.20	3500.00	595.53	0.00	596.87	53.82	9.29	376.80	477.07
	9.910	50.00	608.10	604.80	585.20	4710.00	596.96	0.00	598.57	58.93	10.21	461.48	613.58
	9.920	1.00	0.00	0.00	585.30	2050.00	593.99	0.00	594.56	63.66	6.10	336.22	256.93
	9.920	1.00	0.00	0.00	585.30	3070.00	595.55	0.00	596.34	73.65	7.14	430.11	357.73
	9.920	1.00	0.00	0.00	585.30	3500.00	596.16	0.00	597.02	75.70	7.46	469.39	402.26
	9.920	1.00	0.00	0.00	585.30	4710.00	597.74	0.00	598.76	77.72	8.12	579.98	534.26
	9.950	50.00	0.00	0.00	586.00	2050.00	594.66	0.00	594.93	50.16	4.41	552.97	289.44
	9.950	50.00	0.00	0.00	586.00	3070.00	596.46	0.00	596.73	30.98	4.41	848.88	551.53
	9.950	50.00	0.00	0.00	586.00	3500.00	597.14	0.00	597.41	27.57	4.46	959.99	666.61
	9.950	50.00	0.00	0.00	586.00	4710.00	598.87	0.00	599.17	22.28	4.68	1243.93	997.84

SECNO	XLCH	ELTRO	ELLC	ELMIN	Q	CWSEL	CRIWS	FG	10K*S	VCH	AREA	.01K
9.960	200.00	0.00	0.00	585.80	2050.00	595.53	0.00	595.96	44.95	5.23	391.63	305.77
9.960	200.00	0.00	0.00	585.80	3070.00	597.09	0.00	597.68	52.23	6.17	497.53	424.79
9.960	200.00	0.00	0.00	585.80	3500.00	597.70	0.00	598.35	53.73	6.46	541.93	477.49
9.960	200.00	0.00	0.00	585.80	4710.00	599.30	0.00	600.08	55.38	7.07	666.31	632.91
10.000	1.00	612.80	609.60	585.80	2050.00	595.35	0.00	596.15	68.79	7.21	284.35	247.17
10.000	1.00	612.80	609.60	585.80	3070.00	596.81	0.00	597.98	91.71	8.71	352.65	320.58
10.000	1.00	612.80	609.60	585.80	3500.00	597.38	0.00	598.69	98.47	9.18	381.39	352.72
10.000	1.00	612.80	609.60	585.80	4710.00	598.89	0.00	600.50	111.08	10.18	462.45	446.89
10.060	45.00	612.80	609.60	585.80	2050.00	595.76	0.00	596.47	59.11	6.77	302.86	266.64
10.060	45.00	612.80	609.60	585.80	3070.00	597.41	0.00	598.41	74.91	8.01	383.16	354.71
10.060	45.00	612.80	609.60	585.80	3500.00	598.05	0.00	599.15	79.31	8.40	416.61	393.01
10.060	45.00	612.80	609.60	585.80	4710.00	599.70	0.00	601.03	87.50	9.25	509.27	503.51
10.080	1.00	0.00	0.00	585.80	2050.00	596.25	0.00	596.59	32.82	4.67	439.03	357.83
10.080	1.00	0.00	0.00	585.80	3070.00	598.14	0.00	598.58	35.09	5.34	575.41	518.23
10.080	1.00	0.00	0.00	585.80	3500.00	598.86	0.00	599.34	35.51	5.55	630.73	587.35
10.080	1.00	0.00	0.00	585.80	4710.00	600.71	0.00	601.26	35.46	6.00	785.08	790.96
10.100	82.00	0.00	0.00	586.00	2050.00	596.71	0.00	596.80	10.17	3.05	1195.98	642.84
10.100	82.00	0.00	0.00	586.00	3070.00	598.72	0.00	598.81	8.58	3.23	1676.37	1048.21
10.100	82.00	0.00	0.00	586.00	3500.00	599.48	0.00	599.58	8.20	3.31	1858.12	1222.03
10.100	82.00	0.00	0.00	586.00	4710.00	601.41	0.00	601.52	7.60	3.54	2319.56	1708.99
10.980	325.00	0.00	0.00	587.00	2050.00	597.03	0.00	597.30	21.34	4.15	493.60	443.75
10.980	325.00	0.00	0.00	587.00	3070.00	598.96	0.00	599.35	25.10	4.96	618.76	612.74
10.980	325.00	0.00	0.00	587.00	3500.00	599.70	0.00	600.12	26.26	5.24	668.13	683.00
10.980	325.00	0.00	0.00	587.00	4710.00	601.56	0.00	602.11	28.33	5.93	794.90	884.96
11.000	1.00	603.60	599.80	587.00	2050.00	597.00	0.00	597.34	13.96	4.71	435.34	548.73
11.000	1.00	603.60	599.80	587.00	3070.00	598.91	0.00	599.40	17.45	5.61	547.65	734.96
11.000	1.00	603.60	599.80	587.00	3500.00	599.64	0.00	600.18	18.62	5.91	592.10	811.22
11.000	1.00	603.60	599.80	587.00	4710.00	601.36	0.00	602.32	54.57	7.84	600.80	637.60
11.060	60.00	603.60	599.80	587.00	2050.00	597.09	0.00	597.43	13.50	4.65	441.05	557.94
11.060	60.00	603.60	599.80	587.00	3070.00	599.03	0.00	599.51	16.84	5.53	555.37	748.11
11.060	60.00	603.60	599.80	587.00	3500.00	599.78	0.00	600.31	21.03	5.84	599.80	763.14
11.060	60.00	603.60	599.80	587.00	4710.00	601.69	0.00	602.64	54.57	7.84	600.80	637.60
11.100	1.00	0.00	0.00	587.00	2050.00	597.19	0.00	597.45	20.13	4.07	503.76	456.94
11.100	1.00	0.00	0.00	587.00	3070.00	599.18	0.00	599.54	23.53	4.85	633.04	632.86
11.100	1.00	0.00	0.00	587.00	3500.00	599.94	0.00	600.35	24.41	5.11	684.64	708.46
11.100	1.00	0.00	0.00	587.00	4710.00	602.31	0.00	602.79	23.59	5.57	845.71	969.69
11.200	50.00	0.00	0.00	587.00	2050.00	597.30	0.00	597.55	19.37	4.02	510.58	465.85
11.200	50.00	0.00	0.00	587.00	3070.00	599.31	0.00	599.66	22.65	4.78	641.62	645.04
11.200	50.00	0.00	0.00	587.00	3500.00	600.07	0.00	600.47	23.54	5.05	692.96	721.41
11.200	50.00	0.00	0.00	587.00	4710.00	602.44	0.00	602.91	22.90	5.51	854.27	984.16

SECNO	XLCH	ELTRD	ELLC	FLMIN	Q	CWSEL	CRIWS	EG	10K*S	VCH	AREA	.01K
11.900	630.00	0.00	0.00	590.50	2050.00	598.72	0.00	598.99	27.11	4.22	485.63	393.75
11.900	630.00	0.00	0.00	590.50	3070.00	600.82	0.00	601.17	25.45	4.77	643.33	608.55
11.900	630.00	0.00	0.00	590.50	3500.00	601.62	0.00	602.00	25.21	4.98	703.08	697.07
11.900	630.00	0.00	0.00	590.50	4710.00	603.92	0.00	604.37	23.49	5.38	875.94	971.82
11.980	50.00	0.00	0.00	591.30	2050.00	598.64	0.00	599.55	109.09	7.65	268.08	196.27
11.980	50.00	0.00	0.00	591.30	3070.00	600.63	0.00	601.83	110.55	8.76	350.27	291.99
11.980	50.00	0.00	0.00	591.30	3500.00	601.39	0.00	602.70	111.86	9.17	381.61	330.93
11.980	50.00	0.00	0.00	591.30	4710.00	604.29	0.00	604.56	29.47	5.41	2360.91	867.65
12.060	54.00	603.00	600.50	591.30	2050.00	599.03	0.00	599.84	26.76	7.21	284.40	396.31
12.060	54.00	603.00	600.50	591.30	3070.00	601.84	0.00	602.75	18.76	7.67	400.05	708.80
12.060	54.00	603.00	600.50	591.30	3500.00	603.07	0.00	604.00	17.25	7.76	451.12	842.62
12.060	54.00	603.00	600.50	591.30	4710.00	606.31	0.00	607.32	15.00	8.05	585.13	1215.92
12.200	51.00	0.00	0.00	594.20	2050.00	599.62	0.00	600.15	92.04	6.54	404.31	213.68
12.200	51.00	0.00	0.00	594.20	3070.00	602.68	0.00	603.05	35.45	5.54	733.32	515.63
12.200	51.00	0.00	0.00	594.20	3500.00	603.96	0.00	604.29	27.07	5.33	876.19	672.64
12.200	51.00	0.00	0.00	594.20	4710.00	607.33	0.00	607.61	16.08	5.03	1263.14	1174.60
12.500	610.00	0.00	0.00	594.20	2050.00	601.28	0.00	601.33	8.46	2.39	1509.41	704.97
12.500	610.00	0.00	0.00	594.20	3070.00	603.62	0.00	603.65	4.82	2.19	2411.70	1398.55
12.500	610.00	0.00	0.00	594.20	3500.00	604.73	0.00	604.76	3.73	2.08	2868.83	1811.59
12.500	610.00	0.00	0.00	594.20	4710.00	607.86	0.00	607.88	1.99	1.82	4597.57	3340.66
12.900	450.00	0.00	0.00	592.70	2050.00	601.68	0.00	602.05	36.87	5.12	456.19	337.62
12.900	450.00	0.00	0.00	592.70	3070.00	603.75	0.00	604.16	30.55	5.52	692.61	555.45
12.900	450.00	0.00	0.00	592.70	3500.00	604.83	0.00	605.15	22.81	5.14	1068.83	732.85
12.900	450.00	0.00	0.00	592.70	4710.00	607.94	0.00	608.03	6.36	3.23	2792.60	1867.75
12.980	49.00	604.20	601.70	603.10	2050.00	604.38	604.38	604.78	888.39	2.13	409.25	68.78
12.980	49.00	604.20	601.70	603.10	3070.00	604.62	604.62	605.14	869.24	3.80	541.62	104.13
12.980	49.00	604.20	601.70	603.10	3500.00	605.15	0.00	605.44	304.48	3.85	821.12	200.58
12.980	49.00	604.20	601.70	603.10	4710.00	608.02	0.00	608.08	17.50	2.34	2347.53	1125.78
13.060	50.00	604.20	601.70	603.10	2050.00	605.51	0.00	605.58	54.36	2.01	996.24	278.05
13.060	50.00	604.20	601.70	603.10	3070.00	605.94	0.00	606.04	62.48	2.61	1221.51	388.38
13.060	50.00	604.20	601.70	603.10	3500.00	606.02	0.00	606.14	72.47	2.90	1264.53	411.14
13.060	50.00	604.20	601.70	603.10	4710.00	608.10	0.00	608.17	16.98	2.34	2347.47	1142.90
13.100	1.00	0.00	0.00	603.10	2050.00	605.51	0.00	605.58	42.76	1.79	1000.52	313.49
13.100	1.00	0.00	0.00	603.10	3070.00	605.95	0.00	606.04	49.65	2.33	1224.37	435.70
13.100	1.00	0.00	0.00	603.10	3500.00	606.03	0.00	606.15	57.03	2.59	1271.43	463.45
13.100	1.00	0.00	0.00	603.10	4710.00	608.11	0.00	608.17	13.69	2.10	2348.37	1272.91
13.200	100.00	0.00	0.00	592.70	2050.00	605.64	0.00	605.67	3.00	1.62	2142.35	1183.46
13.200	100.00	0.00	0.00	592.70	3070.00	606.13	0.00	606.17	4.71	2.10	2462.01	1414.49
13.200	100.00	0.00	0.00	592.70	3500.00	606.25	0.00	606.30	5.63	2.32	2540.93	1474.77
13.200	100.00	0.00	0.00	592.70	4710.00	608.20	0.00	608.24	3.18	1.98	3863.86	2640.75

SECNO	XLCH	ELTRD	ELLC	FLMIN	Q	CWSEL	CRIWS	EG	10K*S	VCH	AREA	.01K
13.300	800.00	0.00	0.00	596.30	2050.00	605.95	0.00	606.00	7.26	2.32	1383.40	761.06
13.300	800.00	0.00	0.00	596.30	3070.00	606.60	0.00	606.68	10.66	2.97	1622.78	940.40
13.300	800.00	0.00	0.00	596.30	3500.00	606.80	0.00	606.89	12.18	3.23	1704.09	1002.69
13.300	800.00	0.00	0.00	596.30	4710.00	608.52	0.00	608.60	8.44	3.05	2450.38	1620.98
13.700	1175.00	0.00	0.00	599.70	2050.00	607.43	0.00	607.65	40.80	4.84	665.82	320.94
13.700	1175.00	0.00	0.00	599.70	3070.00	608.51	0.00	608.75	38.68	5.24	955.69	493.60
13.700	1175.00	0.00	0.00	599.70	3500.00	608.89	0.00	609.13	38.06	5.37	1083.50	567.30
13.700	1175.00	0.00	0.00	599.70	4710.00	609.99	0.00	610.16	27.26	4.96	1933.42	902.15
13.800	450.00	0.00	0.00	601.00	2050.00	609.39	0.00	609.78	57.03	5.37	495.02	271.45
13.800	450.00	0.00	0.00	601.00	3070.00	610.33	0.00	610.70	50.66	5.61	950.04	431.31
13.800	450.00	0.00	0.00	601.00	3500.00	610.65	0.00	610.98	46.73	5.56	1165.44	511.97
13.800	450.00	0.00	0.00	601.00	4710.00	611.33	0.00	611.60	39.73	5.47	1748.69	747.20
13.900	550.00	0.00	0.00	602.00	2050.00	611.72	0.00	611.99	30.48	4.26	639.38	371.34
13.900	550.00	0.00	0.00	602.00	3070.00	612.54	0.00	612.82	32.45	4.76	1069.81	538.93
13.900	550.00	0.00	0.00	602.00	3500.00	612.77	0.00	613.06	34.08	4.98	1204.92	599.54
13.900	550.00	0.00	0.00	602.00	4710.00	613.30	0.00	613.63	37.72	5.49	1583.04	766.93
13.980	46.00	0.00	0.00	602.30	2050.00	611.93	0.00	612.12	17.52	3.80	820.54	489.77
13.980	48.00	0.00	0.00	602.30	3070.00	612.74	0.00	612.96	21.33	4.44	1230.89	664.78
13.980	48.00	0.00	0.00	602.30	3500.00	612.97	0.00	613.21	23.19	4.71	1371.80	726.84
13.980	48.00	0.00	0.00	602.30	4710.00	613.52	0.00	613.79	26.86	5.26	1760.44	908.76
13.990	1.00	610.50	610.50	602.30	2050.00	611.86	0.00	612.19	23.92	4.86	644.12	419.11
13.990	1.00	610.50	610.50	602.30	3070.00	612.69	0.00	613.01	41.26	5.35	1027.79	477.96
13.990	1.00	610.50	610.50	602.30	3500.00	612.93	0.00	613.26	42.36	5.53	1176.57	537.77
13.990	1.00	610.50	610.50	602.30	4710.00	613.49	0.00	613.82	44.34	5.92	1566.40	707.34
14.060	45.00	610.50	610.50	602.30	2050.00	611.92	0.00	612.38	30.02	5.45	376.46	374.16
14.060	45.00	610.50	610.50	602.30	3070.00	612.95	0.00	613.20	31.83	4.80	1192.09	544.14
14.060	45.00	610.50	610.50	602.30	3500.00	613.20	0.00	613.45	32.45	4.95	1358.75	614.39
14.060	45.00	610.50	610.50	602.30	4710.00	613.77	0.00	614.02	34.05	5.30	1776.66	807.19
14.070	1.00	0.00	0.00	602.30	2050.00	612.13	0.00	612.43	22.91	4.41	465.14	428.28
14.070	1.00	0.00	0.00	602.30	3070.00	613.05	0.00	613.22	16.66	4.01	1428.30	752.13
14.070	1.00	0.00	0.00	602.30	3500.00	613.28	0.00	613.47	17.92	4.23	1590.34	826.87
14.070	1.00	0.00	0.00	602.30	4710.00	613.83	0.00	614.04	21.03	4.74	1993.92	1027.05
14.200	49.00	0.00	0.00	602.30	2050.00	612.43	0.00	612.56	12.09	3.27	1058.12	589.54
14.200	49.00	0.00	0.00	602.30	3070.00	613.14	0.00	613.30	15.43	3.89	1493.34	781.67
14.200	49.00	0.00	0.00	602.30	3500.00	613.39	0.00	613.56	16.34	4.07	1672.36	865.95
14.200	49.00	0.00	0.00	602.30	4710.00	613.95	0.00	614.14	18.91	4.53	2099.51	1083.16
14.300	1610.00	0.00	0.00	604.10	2050.00	613.17	0.00	613.18	2.14	1.20	3370.00	1402.16
14.300	1610.00	0.00	0.00	604.10	3070.00	613.99	0.00	614.00	2.35	1.35	4267.77	2004.43
14.300	1610.00	0.00	0.00	604.10	3500.00	614.27	0.00	614.29	2.45	1.42	4581.90	2234.93
14.300	1610.00	0.00	0.00	604.10	4710.00	614.95	0.00	614.96	2.77	1.59	5340.94	2831.38

STCNO	XLCH	ELTFD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10K*S	VCH	AREA	.01K
14.500	1880.00	0.00	0.00	605.80	2050.00	614.09	0.00	614.19	28.03	3.75	1038.93	387.19
14.500	1880.00	0.00	0.00	605.80	3070.00	614.94	0.00	615.03	22.37	3.71	1561.88	649.06
14.500	1880.00	0.00	0.00	605.80	3500.00	615.24	0.00	615.33	21.08	3.72	1765.27	762.37
14.500	1880.00	0.00	0.00	605.80	4710.00	615.98	0.00	616.07	18.94	3.79	2283.58	1082.18
14.550	275.00	0.00	0.00	607.70	2050.00	615.62	0.00	615.93	64.80	5.71	748.15	254.66
14.550	275.00	0.00	0.00	607.70	3070.00	616.28	0.00	616.51	52.83	5.59	1176.14	422.36
14.550	275.00	0.00	0.00	607.70	3500.00	616.52	0.00	616.74	48.73	5.52	1355.37	501.39
14.550	275.00	0.00	0.00	607.70	4710.00	617.14	0.00	617.32	40.51	5.37	1845.44	740.06
14.580	350.00	0.00	0.00	609.60	2050.00	617.33	0.00	617.68	53.78	5.63	716.12	279.54
14.580	350.00	0.00	0.00	609.60	3070.00	617.79	0.00	618.18	66.75	6.53	971.89	375.76
14.580	350.00	0.00	0.00	609.60	3500.00	617.95	0.00	618.36	71.08	6.83	1068.91	415.13
14.580	350.00	0.00	0.00	609.60	4710.00	618.37	0.00	618.80	78.09	7.41	1342.26	532.99
14.600	50.00	0.00	0.00	609.60	2050.00	617.74	0.00	617.93	31.75	4.49	941.77	363.84
14.600	50.00	0.00	0.00	609.60	3070.00	618.28	0.00	618.48	36.57	5.04	1285.31	507.65
14.600	50.00	0.00	0.00	609.60	3500.00	618.47	0.00	618.68	38.33	5.24	1413.67	565.30
14.600	50.00	0.00	0.00	609.60	4710.00	618.92	0.00	619.14	42.53	5.71	1744.80	722.24
14.610	1.00	616.00	615.30	609.60	2050.00	617.74	0.00	617.93	38.92	4.72	909.39	328.60
14.610	1.00	616.00	615.30	609.60	3070.00	618.28	0.00	618.49	42.58	5.20	1250.99	470.47
14.610	1.00	616.00	615.30	609.60	3500.00	618.47	0.00	618.68	44.05	5.38	1378.50	527.34
14.610	1.00	616.00	615.30	609.60	4710.00	618.93	0.00	619.15	47.55	5.81	1708.95	683.04
14.620	34.00	616.00	615.40	609.70	2050.00	617.87	0.00	618.06	36.77	4.64	926.55	338.08
14.620	34.00	616.00	615.40	609.70	3070.00	618.44	0.00	618.63	39.74	5.08	1282.20	487.01
14.620	34.00	616.00	615.40	609.70	3500.00	618.63	0.00	618.83	40.26	5.21	1425.49	551.60
14.620	34.00	616.00	615.40	609.70	4710.00	619.10	0.00	619.31	43.06	5.61	1773.81	717.76
14.630	1.00	0.00	0.00	609.70	2050.00	617.89	0.00	618.07	29.97	4.38	968.68	374.49
14.630	1.00	0.00	0.00	609.70	3070.00	618.44	0.00	618.63	34.34	4.90	1321.97	523.92
14.630	1.00	0.00	0.00	609.70	3500.00	618.64	0.00	618.83	35.67	5.08	1458.76	585.99
14.630	1.00	0.00	0.00	609.70	4710.00	619.11	0.00	619.31	39.10	5.51	1807.62	753.26
14.650	100.00	0.00	0.00	609.70	2050.00	618.22	0.00	618.33	19.68	3.65	1180.70	462.15
14.650	100.00	0.00	0.00	609.70	3070.00	618.81	0.00	618.93	22.60	4.10	1586.35	645.74
14.650	100.00	0.00	0.00	609.70	3500.00	619.01	0.00	619.14	23.71	4.26	1737.71	718.76
14.650	100.00	0.00	0.00	609.70	4710.00	619.51	0.00	619.65	25.97	4.63	2136.88	924.30
14.700	1580.00	0.00	0.00	613.30	2050.00	619.94	0.00	619.96	6.28	2.01	2043.07	818.19
14.700	1580.00	0.00	0.00	613.30	3070.00	620.65	0.00	620.67	6.45	2.22	2627.43	1208.61
14.700	1580.00	0.00	0.00	613.30	3500.00	620.90	0.00	620.93	6.57	2.30	2839.10	1365.75
14.700	1580.00	0.00	0.00	613.30	4710.00	621.53	0.00	621.57	6.95	2.52	3359.99	1785.98
14.800	620.00	0.00	0.00	613.60	2050.00	620.43	0.00	620.71	47.32	5.29	724.48	298.02
14.800	620.00	0.00	0.00	613.60	3070.00	621.14	0.00	621.40	45.15	5.43	1054.03	456.89
14.800	620.00	0.00	0.00	613.60	3500.00	621.40	0.00	621.65	44.13	5.49	1178.43	526.87
14.800	620.00	0.00	0.00	613.60	4710.00	622.05	0.00	622.29	42.16	5.68	1492.01	725.38

SECNO	XLCH	ELTRD	ELLC	FLMIN	Q	CWSEL	CRIWS	EG	10K*S	VCH	AREA	.01K
14.810	1.00	619.00	620.00	613.60	2050.00	620.59	0.00	620.73	71.37	3.95	775.16	242.66
14.810	1.00	619.00	620.00	613.60	3070.00	621.29	0.00	621.41	73.91	3.28	1076.88	357.09
14.810	1.00	619.00	620.00	613.60	3500.00	621.53	0.00	621.67	69.65	3.27	1194.55	419.38
14.810	1.00	619.00	620.00	613.60	4710.00	622.15	0.00	622.31	61.91	3.28	1497.68	598.58
14.815	38.00	619.00	620.00	613.60	2050.00	620.86	0.00	620.96	50.21	3.31	888.53	289.31
14.815	38.00	619.00	620.00	613.60	3070.00	621.55	0.00	621.65	52.50	2.84	1202.43	423.70
14.815	38.00	619.00	620.00	613.60	3500.00	621.78	0.00	621.90	51.31	2.88	1316.99	488.64
14.815	38.00	619.00	620.00	613.60	4710.00	622.38	0.00	622.52	48.97	2.98	1612.70	673.10
14.820	50.00	0.00	0.00	613.60	2050.00	621.01	0.00	621.14	23.56	3.89	987.79	422.32
14.820	50.00	0.00	0.00	613.60	3070.00	621.70	0.00	621.84	25.13	4.25	1319.20	612.41
14.820	50.00	0.00	0.00	613.60	3500.00	621.93	0.00	622.08	25.92	4.41	1435.52	687.53
14.820	50.00	0.00	0.00	613.60	4710.00	622.54	0.00	622.71	27.49	4.77	1735.51	898.29
14.900	260.00	0.00	0.00	614.20	2050.00	621.63	0.00	621.75	22.26	3.82	968.56	434.54
14.900	260.00	0.00	0.00	614.20	3070.00	622.35	0.00	622.47	22.33	4.11	1441.98	649.65
14.900	260.00	0.00	0.00	614.20	3500.00	622.60	0.00	622.72	21.90	4.18	1658.13	747.96
14.900	260.00	0.00	0.00	614.20	4710.00	623.22	0.00	623.34	20.14	4.27	2238.29	1049.39
14.960	225.00	0.00	0.00	614.20	2050.00	622.09	0.00	622.21	19.11	3.70	873.44	468.95
14.960	225.00	0.00	0.00	614.20	3070.00	622.83	0.00	623.00	23.06	4.39	1154.94	639.35
14.960	225.00	0.00	0.00	614.20	3500.00	623.08	0.00	623.26	24.45	4.63	1263.62	707.77
14.960	225.00	0.00	0.00	614.20	4710.00	623.67	0.00	623.90	27.77	5.22	1532.56	893.71
14.980	50.00	0.00	0.00	614.30	2050.00	622.08	0.00	622.51	50.78	5.27	408.67	287.67
14.980	50.00	0.00	0.00	614.30	3070.00	622.77	0.00	623.44	76.71	6.79	568.28	350.51
14.980	50.00	0.00	0.00	614.30	3500.00	623.00	0.00	623.75	85.45	7.27	638.82	378.63
14.980	50.00	0.00	0.00	614.30	4710.00	623.60	0.00	624.44	98.86	8.10	868.27	473.71
15.090	32.00	622.10	622.00	614.30	2050.00	622.53	0.00	622.88	39.62	4.80	505.21	325.67
15.090	32.00	622.10	622.00	614.30	3070.00	623.49	0.00	623.89	45.91	5.49	841.64	453.11
15.090	32.00	622.10	622.00	614.30	3500.00	623.81	0.00	624.19	46.05	5.60	1014.27	515.75
15.090	32.00	622.10	622.00	614.30	4710.00	624.60	0.00	624.90	39.63	5.41	1561.63	748.20
15.100	100.00	0.00	0.00	612.90	2050.00	623.05	0.00	623.10	6.65	2.58	1550.90	794.66
15.100	100.00	0.00	0.00	612.90	3070.00	624.07	0.00	624.12	5.98	2.66	2292.47	1255.63
15.100	100.00	0.00	0.00	612.90	3500.00	624.37	0.00	624.43	6.09	2.75	2514.07	1418.42
15.160	100.00	0.00	0.00	612.90	4710.00	625.05	0.00	625.11	6.76	3.04	3000.49	1811.80
15.300	2575.00	0.00	0.00	616.90	2050.00	625.05	0.00	625.13	14.65	3.64	1598.25	535.51
15.300	2575.00	0.00	0.00	616.90	3070.00	625.78	0.00	625.84	12.49	3.59	2345.62	868.80
15.300	2575.00	0.00	0.00	616.90	3500.00	626.05	0.00	626.12	11.82	3.57	2644.42	1018.18
15.300	2575.00	0.00	0.00	616.90	4710.00	626.73	0.00	626.79	10.62	3.57	3419.23	1445.48
15.500	2575.00	0.00	0.00	620.80	2050.00	628.71	0.00	628.85	14.09	3.49	964.27	546.20
15.500	2575.00	0.00	0.00	620.80	3070.00	629.48	0.00	629.66	17.51	4.19	1291.00	733.76
15.500	2575.00	0.00	0.00	620.80	3500.00	629.73	0.00	629.93	18.63	4.42	1422.06	810.84
15.500	2575.00	0.00	0.00	620.80	4710.00	630.36	0.00	630.59	21.18	4.97	1792.87	1023.47

SECNO	XLCH	ELTMD	ELLC	FLMIN	Q	CWSEL	CRIWS	EG	10K*S	VCH	AREA	.01K
15.800	1175.00	0.00	0.00	620.50	2050.00	630.10	0.00	630.21	9.67	3.28	1020.25	659.23
15.800	1175.00	0.00	0.00	620.50	3070.00	631.15	0.00	631.30	11.35	3.86	1380.28	911.39
15.800	1175.00	0.00	0.00	620.50	3500.00	631.50	0.00	631.66	11.92	4.05	1530.00	1013.92
15.800	1175.00	0.00	0.00	620.50	4710.00	632.35	0.00	632.53	13.19	4.52	1960.41	1296.69
15.840	500.00	0.00	0.00	621.20	2050.00	630.60	0.00	630.65	7.97	2.65	1298.75	726.30
15.840	500.00	0.00	0.00	621.20	3070.00	631.73	0.00	631.80	8.85	3.09	1642.27	1032.00
15.840	500.00	0.00	0.00	621.20	3500.00	632.11	0.00	632.19	9.34	3.27	1760.15	1145.16
15.840	500.00	0.00	0.00	621.20	4710.00	633.02	0.00	633.13	10.71	3.76	2049.57	1439.18
15.850	80.00	0.00	0.00	621.40	2050.00	630.66	0.00	630.71	6.56	2.83	1551.67	800.13
15.850	80.00	0.00	0.00	621.40	3070.00	631.81	0.00	631.87	6.89	3.15	1993.40	1169.86
15.850	80.00	0.00	0.00	621.40	3500.00	632.20	0.00	632.26	7.17	3.30	2142.08	1307.29
15.850	80.00	0.00	0.00	621.40	4710.00	633.13	0.00	633.21	7.98	3.70	2503.84	1667.39
15.860	25.00	630.00	629.20	621.40	2050.00	631.76	0.00	631.78	3.17	2.13	1972.31	1150.89
15.860	25.00	630.00	629.20	621.40	3070.00	632.64	0.00	632.68	4.32	2.64	2316.77	1476.73
15.860	25.00	630.00	629.20	621.40	3500.00	632.94	0.00	632.99	4.82	2.84	2432.63	1593.71
15.860	25.00	630.00	629.20	621.40	4710.00	633.73	0.00	633.80	6.00	3.33	2741.48	1922.93
15.870	30.00	0.00	0.00	621.60	2050.00	631.75	0.00	631.81	6.56	2.83	1350.41	800.25
15.870	30.00	0.00	0.00	621.60	3070.00	632.64	0.00	632.73	8.85	3.50	1610.59	1032.21
15.870	30.00	0.00	0.00	621.60	3500.00	632.93	0.00	633.04	9.82	3.77	1700.12	1117.00
15.870	30.00	0.00	0.00	621.60	4710.00	633.72	0.00	633.86	11.99	4.38	1961.95	1360.32

1) COUNTY: KENT

2) STUDY NAME: GRANDVIEW, CITY OF

3) WATERCOURSE: BUCK CREEK

4) DOCUMENT TYPE: 100-YEAR ENCROACHED

00BREAK00

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**********************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED APRI 1980
  ERROR CORR -  01,02,03,04
  MODIFICATION -  50,51,52,53,54
**********************************************************
T1    GRANDVILLE CITY FLOOD INSURANCE STUDY
T2
T3       ROCK CREEK
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J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
	-10.	6.	0.	0.	0.000000	0.00	0.0	0.	590.940	0.000

J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	15.000	0.000	-1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*PROF 2

CCHV= .100 CEHV= .300

*SECNO 9.500

3470 ENCROACHMENT STATIONS= 2558.0 2825.0 TYPE= 1 TARGET= 267.000
(A)

9.50	6.04	590.94	0.00	590.94	592.05	1.11	0.00	0.00	588.80
3500.	852.	2049.	599.	243.	192.	197.	0.	0.	587.40
0.00	3.50	10.67	3.04	.110	.065	.110	0.000	584.90	2558.00
.025177	0.	0.	0.	0	0	0	0.00	267.00	2825.00

*SECNO 9.600

3470 ENCROACHMENT STATIONS= 2647.0 2736.0 TYPE= 1 TARGET= 89.000

9.60	9.83	594.73	0.00	0.00	595.48	.75	3.40	.04	588.80
3500.	478.	2613.	409.	153.	332.	138.	4.	1.	587.40
.01	3.12	7.87	2.95	.110	.065	.110	.066	584.90	2647.00
.006587	269.	299.	311.	4	0	0	0.00	89.00	2736.00

CCHV= .300 CEHV= .500

*SECNO 9.890

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE.ELLEA= 607.00 ELREA= 607.00

9.89	4.77	594.97	0.00	0.00	596.16	1.19	.46	.22	608.90
3500.	0.	3500.	0.	0.	400.	0.	5.	1.	608.10
.01	0.00	8.75	0.00	.110	.065	.110	.065	585.20	2179.76
.013634	50.	50.	50.	2	0	0	0.00	61.49	2241.25

*SECNO 9.900

3301 HV CHANGED MORE THAN HVINS

3370 NORMAL BRIDGE,NRD= 12 MIN ELTRD= 608.10 MAX ELLC= 604.80

9.90	9.51	594.71	0.00	0.00	596.44	1.73	.01	.27	608.90
3500.	0.	3500.	0.	0.	331.	0.	5.	1.	608.10
.01	0.00	10.56	0.00	.110	.030	.110	.065	585.20	2180.34
.007381	1.	1.	1.	2	0	0	-52.75	60.27	2240.61

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
O	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 9.910

3370 NORMAL BRIDGE,NRD= 12 MIN ELTRD= 608.10 MAX ELLC= 604.80

U/S FACE SOUTHBOUND I-196

9.91	10.33	595.53	0.00	0.00	596.87	1.34	.31	.12	608.90
3500.	0.	3500.	0.	0.	377.	0.	5.	1.	608.10
.02	0.00	9.29	0.00	.110	.030	.110	.061	585.20	2178.52
.005380	50.	50.	50.	2	0	0	-58.79	64.10	2242.62

*SECNO 9.920

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA= 607.60 ELREA= 607.60

9.92	10.86	596.16	0.00	0.00	597.02	.86	.01	.14	609.00
3500.	0.	3500.	0.	0.	469.	0.	5.	1.	608.20
.02	0.00	7.46	0.00	.110	.060	.110	.060	585.30	2177.39
.007568	1.	1.	1.	3	0	0	0.00	66.48	2243.87

*SECNO 9.950

3301 HV CHANGED MORE THAN HVINS

3470 ENCROACHMENT STATIONS= 2568.0 2732.0 TYPE= 1 TARGET= 164.000

9.95	11.14	597.14	0.00	0.00	597.41	.27	.21	.18	592.80
3500.	263.	2977.	260.	147.	667.	146.	6.	1.	592.50
.02	1.79	4.46	1.79	.110	.060	.110	.060	586.00	2568.00
.002756	50.	50.	50.	2	0	0	0.00	164.00	2732.00

*SECNO 9.960

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA= 612.00 ELREA= 607.50

9.96	11.90	597.70	0.00	0.00	598.35	.65	.75	.19	615.20
3500.	0.	3500.	0.	0.	542.	0.	10.	2.	612.80
.03	0.00	6.46	0.00	.110	.060	.110	.060	585.80	2024.16
.005372	200.	200.	200.	2	0	0	0.00	74.18	2098.33

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	QLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 10.000

3301 HV CHANGED MORE THAN HVINS

3370 NORMAL BRIDGE,NRD= 16 MIN ELTRD= 612.80 MAX ELLC= 609.60

10.00	11.58	597.38	0.00	0.00	598.69	1.31	.01	.33	615.20
3500.	0.	3500.	0.	0.	381.	0.	10.	2.	612.80
.03	0.00	9.18	0.00	.110	.030	.110	.060	585.80	2024.93
.009845	1.	1.	1.	2	0	0	-136.90	72.71	2097.64

*SECNO 10.060

3370 NORMAL BRIDGE,NRD= 16 MIN ELTRD= 612.80 MAX ELLC= 609.60

U/S FACE OF NORTHBOUND I-196.

10.06	12.25	598.05	0.00	0.00	599.15	1.10	.40	.06	615.20
3500.	0.	3500.	0.	0.	417.	0.	10.	2.	612.80
.03	0.00	8.40	0.00	.110	.030	.110	.058	585.80	2023.31
.007930	45.	45.	45.	2	0	0	-151.75	75.78	2099.09

*SECNO 10.080

3301 HV CHANGED MORE THAN HVINS

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA= 607.50 ELREA= 607.50

10.08	13.06	598.86	0.00	0.00	599.34	.48	.01	.19	615.20
3500.	0.	3500.	0.	0.	631.	0.	10.	2.	612.80
.03	0.00	5.55	0.00	.110	.060	.110	.058	585.80	2021.38
.003551	1.	1.	1.	3	0	0	0.00	79.44	2100.92

*SECNO 10.100

3470 ENCROACHMENT STATIONS= 2538.0 2777.0 TYPE= 1 TARGET= 239.000

10.10	13.48	599.48	0.00	0.00	599.58	.10	.12	.11	592.00
3500.	915.	1667.	918.	677.	503.	678.	12.	2.	591.60
.04	1.35	3.31	1.36	.110	.060	.110	.058	586.00	2538.00
.000820	82.	82.	82.	2	0	0	0.00	239.00	2777.00

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	QLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 10.980

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA= 602.00 ELREA= 602.00

10.98	12.70	599.70	0.00	0.00	600.12	.43	.38	.17	603.60
3500.	0.	3500.	0.	0.	668.	0.	19.	3.	603.70
.05	0.00	5.24	0.00	.110	.060	.110	.061	587.00	2006.00
.002626	115.	325.	225.	2	0	0	0.00	68.00	2074.00

*SECNO 11.000

3370 NORMAL BRIDGE,NRD= 16 MIN ELTRD= 603.60 MAX ELLC= 599.80

11.00	12.64	599.64	0.00	0.00	600.18	.54	.00	.06	603.60
3500.	0.	3500.	0.	0.	592.	0.	19.	3.	603.70
.05	0.00	5.91	0.00	.110	.030	.110	.061	587.00	2006.00
.001861	1.	1.	1.	2	0	0	-72.22	67.89	2073.89

*SECNO 11.060

3370 NORMAL BRIDGE,NRD= 16 MIN ELTRD= 603.60 MAX ELLC= 599.80

U/S FACE OF C & O RAILROAD

11.06	12.78	599.78	0.00	0.00	600.31	.53	.12	.00	603.60
3500.	0.	3500.	0.	0.	600.	0.	20.	3.	603.70
.06	0.00	5.84	0.00	.110	.030	.110	.059	587.00	2006.00
.002104	60.	60.	60.	0	0	0	-73.68	68.00	2074.00

*SECNO 11.100

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA= 603.60 ELREA= 603.60

11.10	12.94	599.94	0.00	0.00	600.35	.41	.00	.04	603.60
3500.	0.	3500.	0.	0.	685.	0.	20.	3.	603.70
.06	0.00	5.11	0.00	.110	.060	.110	.059	587.00	2006.00
.002440	1.	1.	1.	2	0	0	0.00	68.00	2074.00

SECNO	DEPTH	CWSEL	CRIWS	WSELR	EG	HV	HL	QLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IOC	ICONT	COPAR	TOPWID	ENDST

*SECNO 11.200

11.20	13.07	600.07	0.00	0.00	600.47	.40	.12	.00	603.60
3500.	0.	3500.	0.	0.	693.	0.	21.	3.	603.70
.06	0.00	5.05	0.00	.110	.060	.110	.059	587.00	2006.00
.002354	50.	50.	50.	1	0	0	0.00	68.00	2074.00

CCHV= .100 CEHV= .300
*SECNO 11.900

3470 ENCROACHMENT STATIONS= 2565.0 2640.0 TYPE= 1 TARGET= 75.000

11.90	11.12	601.62	0.00	0.00	602.00	.38	1.53	.00	595.20
3500.	0.	3500.	0.	0.	703.	0.	31.	4.	100000.00
.09	0.00	4.98	0.00	.110	.060	.110	.059	590.50	2565.00
.002521	380.	630.	400.	2	0	0	0.00	75.00	2640.00

CCHV= .300 CEHV= .500
*SECNO 11.980

3301 HV CHANGED MORE THAN HVINS

11.98	10.09	601.39	0.00	0.00	602.70	1.31	.23	.46	603.30
3500.	0.	3500.	0.	0.	382.	0.	32.	4.	603.30
.10	0.00	9.17	0.00	.110	.060	.110	.059	591.30	3779.50
.011185	50.	50.	50.	2	0	0	0.00	41.30	3820.80

SPECIAL BRIDGE

5070,VARIABLE ELCHU OR ELCHD ON CARD SB NOT SPECIFIED

SP	XK	XKOR	CUFQ	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
	0.00	1.76	3.00	0.00	41.30	0.00	348.50	0.00	591.30	591.30

*SECNO 12.060
PRESSURE AND WEIR FLOW

EGPRS	EGLWC	H3	QWEIR	QPR	BAREA	TRAPEZOID AREA	ELLC	ELTRD
604.15	602.70	0.00	97.	3406.	349.	380.	600.50	603.00

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	QLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3470 ENCROACHMENT STATIONS= 3779.5 3820.8 TYPE= 1 TARGET= 41.300
U/S FACE OF CHICAGO DRIVE.

12.06	11.77	603.07	0.00	0.00	604.00	.93	1.30	0.00	603.30
3500.	0.	3500.	0.	0.	451.	0.	32.	5.	100000.00
.10	0.00	7.76	0.00	.110	.030	.110	.058	591.30	3779.50
.001725	54.	54.	54.	2	0	2	0.00	41.30	3820.80

*SECNO 12.200

3301 HV CHANGED MORE THAN HVINS

3470 ENCROACHMENT STATIONS= 678.0 819.0 TYPE= 1 TARGET= 141.000

12.20	9.76	603.96	0.00	0.00	604.29	.33	.11	.18	595.10
3500.	206.	2328.	965.	93.	437.	346.	33.	5.	595.10
.10	2.22	5.33	2.79	.100	.065	.100	.059	594.20	705.43
.002707	51.	51.	51.	2	0	0	0.00	113.57	819.00

CCHV= .100 CEHV= .300

*SECNO 12.500

2800 NAT Q1= 1811.59 WSEL= 604.73 ENC Q1= 1811.59 WSEL= 604.83 RATIO= 0.0000

NAT Q1= 1852. RATIOS LOB,CH,ROB= .0274 .2794 .6931 WSEL= 604.83

3280 CROSS SECTION 12.50 EXTENDED .14 FEET

3470 ENCROACHMENT STATIONS= 719.9 1084.0 TYPE= 4 TARGET= .022
(F)

12.50	10.54	604.74	0.00	604.73	604.77	.03	.45	.03	595.10
3500.	58.	1004.	2438.	51.	473.	2226.	55.	8.	595.10
.21	1.14	2.12	1.10	.100	.065	.100	.061	594.20	719.89
.000387	600.	610.	500.	2	0	0	0.00	364.10	1083.99

*SECNO 12.900

3470 ENCROACHMENT STATIONS= 211.0 767.0 TYPE= 1 TARGET= 556.000

12.90	12.15	604.85	0.00	604.83	605.17	.32	.31	.08	596.40
3500.	352.	2642.	506.	198.	517.	365.	71.	11.	596.30
.24	1.78	5.11	1.39	.085	.065	.085	.063	592.70	211.00
.002253	650.	450.	300.	2	0	0	0.00	556.00	767.00

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	QLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

CCHV= .300 CEHV= .500
*SECNO 12.980
3280 CROSS SECTION 12.98 EXTENDED .97 FEET

3370 NORMAL BRIDGE,NRD= 4 MIN ELTRD= 604.20 MAX ELLC= 601.70

3470 ENCROACHMENT STATIONS= 268.0 800.0 TYPE= I TARGET= -268.000

12.98	2.07	605.17	0.00	605.15	605.45	.28	.27	.01	604.20
3500.	82.	185.	3233.	29.	48.	753.	72.	12.	604.20
.24	2.78	3.83	4.29	.085	.065	.085	.063	603.10	268.00
.029289	49.	49.	49.	3	0	0	0.00	532.00	800.00

*SECNO 13.060
3280 CROSS SECTION 13.06 EXTENDED 1.82 FEET

3370 NORMAL BRIDGE,NRD= 4 MIN ELTRD= 604.20 MAX ELLC= 601.70

3470 ENCROACHMENT STATIONS= 280.0 800.0 TYPE= 1 TARGET= -280.000
U/S FACE OF CANAL AVE. BRIDGE.

13.06	2.92	606.02	0.00	606.02	606.14	.12	.65	.05	604.20
3500.	74.	265.	3161.	36.	91.	1138.	73.	12.	604.20
.25	2.68	2.90	2.78	.085	.065	.085	.063	603.10	280.00
.007239	50.	50.	50.	2	0	0	0.00	520.00	800.00

*SECNO 13.100
3280 CROSS SECTION 13.10 EXTENDED 1.84 FEET

3470 ENCROACHMENT STATIONS= 280.0 800.0 TYPE= 1 TARGET= -280.000

13.10	2.93	606.03	0.00	606.03	606.15	.12	.01	.00	604.20
3500.	57.	238.	3206.	36.	92.	1144.	73.	12.	604.20
.25	1.57	2.59	2.80	.100	.065	.075	.063	603.10	280.00
.005699	1.	1.	1.	1	0	0	0.00	520.00	800.00

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 13.200
3280 CROSS SECTION 13.20 EXTENDED .45 FEET

(C)

13.20	13.55	606.25	0.00	606.25	606.30	.05	.13	.02	601.90
3500.	247.	1676.	1577.	342.	723.	1476.	78.	14.	601.90
.26	.72	2.32	1.07	.100	.065	.075	.063	592.70	38.49
.000563	100.	100.	100.	2	0	0	0.00	661.51	700.00

CCHV= .100 CEHV= .300
*SECNO 13.300
2800 NAT Q1= 1002.69 WSEL= 606.80 ENC Q1= 1002.69 WSEL= 606.90 RATIO= 0.0000
NAT Q1= 1034. RATIOS LOB,CH,ROB= .2226 .3839 .3933 WSEL= 606.90

3470 ENCROACHMENT STATIONS= 845.4 1147.4 TYPE= 4 TARGET= .030

13.30	10.51	606.81	0.00	606.80	606.91	.10	.59	.01	600.80
3500.	762.	1389.	1349.	405.	420.	781.	111.	21.	602.10
.35	1.88	3.31	1.73	.085	.065	.085	.065	596.30	845.44
.001272	580.	600.	700.	2	0	0	0.00	301.93	1147.37

*SECNO 13.700
2800 NAT Q1= 567.30 WSEL= 608.89 ENC Q1= 567.30 WSEL= 608.99 RATIO= 0.0000
NAT Q1= 589. RATIOS LOB,CH,ROB= .2534 .3918 .3548 WSEL= 608.99

3470 ENCROACHMENT STATIONS= 681.7 902.5 TYPE= 4 TARGET= .036

(D)

13.70	9.27	608.97	0.00	608.89	609.23	.26	2.27	.05	603.50
3500.	852.	1430.	1218.	331.	262.	399.	144.	28.	604.00
.43	2.57	5.46	3.06	.085	.065	.085	.066	599.70	681.75
.003886	1150.	1175.	1000.	2	0	0	0.00	220.73	902.48

*SECNO 13.800
2800 NAT Q1= 511.97 WSEL= 610.65 ENC Q1= 511.97 WSEL= 610.75 RATIO= 0.0000
NAT Q1= 541. RATIOS LOB,CH,ROB= .2412 .6319 .1269 WSEL= 610.75

3470 ENCROACHMENT STATIONS= 407.3 871.1 TYPE= 4 TARGET= .053

13.80	9.75	610.75	0.00	610.65	611.10	.35	1.84	.02	607.60
3500.	794.	2336.	369.	497.	416.	147.	154.	31.	605.30
.45	1.60	5.62	2.52	.085	.065	.085	.066	601.00	407.26
.004668	450.	450.	375.	2	0	0	0.00	463.81	871.07

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	QLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VCL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 13.900

3470 ENCROACHMENT STATIONS= 243.0 843.0 TYPE= 1 TARGET= 600.000

13.90	10.84	612.84	0.00	612.77	613.12	.28	2.01	.01	610.50
3500.	915.	2574.	11.	706.	531.	12.	167.	37.	611.10
.49	1.30	4.85	.93	.085	.065	.085	.066	602.00	243.00
.003185	500.	550.	350.	2	0	0	0.00	600.00	843.00

CCHV= .300 CEHV= .500

*SECNO 13.980

13.98	10.73	613.03	0.00	612.97	613.26	.23	.13	.01	610.50
3500.	963.	2357.	180.	777.	512.	126.	169.	38.	603.00
.50	1.24	4.60	1.42	.085	.065	.085	.066	602.30	24.86
.002198	48.	48.	48.	0	0	0	0.00	663.28	688.14

*SECNO 13.990

3370 NORMAL BRIDGE,NRD= 16 MIN ELTRD= 610.50 MAX ELLC= 610.50

13.99	10.69	612.99	0.00	612.93	613.30	.31	.00	.04	610.50
3500.	1210.	2254.	36.	739.	418.	58.	169.	38.	603.00
.50	1.64	5.40	.62	.085	.030	.085	.066	602.30	26.28
.003997	1.	1.	1.	2	0	0	-175.43	655.49	681.76

*SECNO 14.060

3370 NORMAL BRIDGE,NRD= 16 MIN ELTRD= 610.50 MAX ELLC= 610.50

U/S FACE OF WILSON AVENUE. (E)

14.06	10.94	613.64	0.00	613.20	613.48	.24	.16	.02	610.50
3500.	1330.	2099.	72.	853.	431.	102.	170.	39.	603.00
.50	1.56	4.87	.71	.085	.030	.085	.066	602.30	16.97
.003125	45.	45.	45.	2	0	0	-175.43	697.96	714.93

*SECNO 14.070

14.07	11.02	613.32	0.00	613.28	613.50	.18	.00	.02	610.50
3500.	1090.	2203.	207.	908.	527.	178.	170.	39.	603.00
.50	1.20	4.18	1.16	.085	.065	.085	.066	602.30	14.20
.001745	1.	1.	1.	2	0	0	0.00	708.60	722.80

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	QLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	wTN	ELMIN	SSTA
SLOPE	xLOBL	xLCH	xLOBR	ITRIAL	IDC	ICOUNT	CORAR	TOPwID	ENDST
*SECNO 14.200									
14.20	11.12	613.42	0.00	613.39	613.58	.16	.08	.00	610.50
3500.	1135.	2146.	219.	960.	533.	201.	172.	40.	603.00
.50	1.18	4.03	1.09	.085	.065	.085	.066	602.30	10.07
.001596	49.	49.	49.	1	0	0	0.00	724.46	734.53
CCHV= .100 CEHV= .300									
*SECNO 14.300									
2800 NAT Q1= 2234.93 WSEL= 614.27 ENC Q1= 2234.93 WSEL= 614.37 RATIO= 0.0000									
NAT Q1= 2317. RATIOS LOB,CH,ROB= .0578 .1618 .7804 WSEL= 614.37									
3470 ENCROACHMENT STATIONS= 344.5 1341.5 TYPE= 4 TARGET= .035									
14.30	10.22	614.32	0.00	614.27	614.33	.01	.73	.02	610.70
3500.	145.	592.	2762.	241.	408.	3730.	264.	65.	608.50
.96	.60	1.45	.74	.085	.065	.085	.067	604.10	344.54
.000256	1300.	1610.	1250.	2	0	0	0.00	996.93	1341.47
*SECNO 14.500									
2800 NAT Q1= 762.37 WSEL= 615.24 ENC Q1= 762.37 WSEL= 615.34 RATIO= 0.0000									
NAT Q1= 802. RATIOS LOB,CH,ROB= .0651 .2609 .6741 WSEL= 615.34									
3470 ENCROACHMENT STATIONS= 734.7 1241.3 TYPE= 4 TARGET= .050									
14.50	9.52	615.32	0.00	615.24	615.42	.10	1.07	.03	611.80
3500.	148.	965.	2386.	88.	255.	1295.	394.	97.	612.20
1.18	1.70	3.79	1.84	.080	.060	.080	.066	605.80	734.75
.002157	1880.	1880.	1880.	2	0	0	0.00	506.58	1241.33
*SECNO 14.550									
2800 NAT Q1= 501.39 WSEL= 616.52 ENC Q1= 501.39 WSEL= 616.62 RATIO= .0000									
NAT Q1= 536. RATIOS LOB,CH,ROB= .2805 .3641 .3554 WSEL= 616.62									
3470 ENCROACHMENT STATIONS= 528.0 1036.0 TYPE= 4 TARGET= .065									
14.55	8.91	616.61	0.00	616.52	616.85	.24	1.38	.04	614.00
3500.	926.	1367.	1207.	452.	244.	533.	410.	103.	613.90
1.21	2.05	5.60	2.26	.080	.060	.080	.065	607.70	527.96
.004925	450.	275.	550.	2	0	0	0.00	507.99	1035.95
*SECNO 14.580									

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   SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         QLOSS    BANK ELEV
   Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA   LEFT/RIGHT
   TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
   SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST

 2800 NAT Q1=     415.13  WSEL=     617.95  ENC Q1=     415.13  WSEL=     618.05  RATIO=  0.0000
 NAT Q1=     441.  RATIOS LOB,CH,ROB=    .3869    .5013    .1118  WSEL=     618.05

3470 ENCROACHMENT STATIONS=      695.8     1116.6  TYPE=      4  TARGET=          .059
     14.58       8.45     618.05       0.00     617.95     618.48        .43       1.58        .06     616.00
     3500.      1332.      1862.       306.       566.       271.       138.       415.       106.      616.30
      1.23       2.35       6.88       2.22       .080       .060       .080       .065     609.60     695.78
   .007074       150.       350.       275.          1          0          0       0.00     420.78    1116.56

CCHV=    .300 CEHV=    .500
*SECNO 14.600
 2800 NAT Q1=     565.30  WSEL=     618.47  ENC Q1=     565.30  WSEL=     618.57  RATIO=  .0000
 NAT Q1=     595.  RATIOS LOB,CH,ROB=    .4529    .4123    .1348  WSEL=     618.57

3470 ENCROACHMENT STATIONS=      655.7     1127.6  TYPE=      4  TARGET=          .050
     14.60       8.98     618.58       0.00     618.47     618.80        .22        .25        .06     616.00
     3500.      1587.      1509.       405.       797.       289.       208.       417.       106.      616.30
      1.23       1.99       5.22       1.95       .080       .060       .080       .065     609.60     655.74
   .003748         50.        50.        50.          2          0          0       0.00     471.89    1127.63

*SECNO 14.610
      3700.  BRIDGE STENCL=     655.74    STENCR=    1127.63
 2800 NAT Q1=     527.34  WSEL=     618.47  ENC Q1=     527.34  WSEL=     618.57  RATIO=  0.0000
 NAT Q1=     560.  RATIOS LOB,CH,ROB=    .4839    .3720    .1441  WSEL=     618.57
3370 NORMAL BRIDGE,NRD=  4 MIN ELTRD=  616.00 MAX ELLC=  615.30

3470 ENCROACHMENT STATIONS=      658.6     1125.9  TYPE=      4  TARGET=          .058
     14.61       8.98     618.58       0.00     618.47     618.80        .22        .00        .00     616.00
     3500.      1697.      1377.       426.       791.       255.       204.       417.       106.      616.30
      1.23       2.14       5.40       2.10       .080       .030       .080       .065     609.60     658.62
   .004352          1.         1.         1.          0          0          0     -33.70     467.26    1125.88

*SECNO 14.620
 2800 NAT Q1=     551.60  WSEL=     618.64  ENC Q1=     551.60  WSEL=     618.73  RATIO=  0.0000
 NAT Q1=     585.  RATIOS LOB,CH,ROB=    .4863    .3685    .1452  WSEL=     618.73
3370 NORMAL BRIDGE,NRD=  4 MIN ELTRD=  616.00 MAX ELLC=  615.40
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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	OLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IOC	ICONT	CORAR	TOPWID	ENDST

3470 ENCROACHMENT STATIONS= 654.1 1127.4 TYPE= 4 TARGET= .056
U/S FACE OF CEMETERY BRIDGE. (F)

14.62	9.04	618.74	0.00	618.63	618.95	.21	.14	.00	616.10
3500.	1704.	1363.	433.	819.	260.	212.	418.	106.	616.40
1.24	2.08	5.24	2.04	.080	.030	.080	.065	609.70	654.15
.003967	34.	34.	34.	2	0	0	-30.33	473.24	1127.39

*SECNO 14.630
2800 NAT QI= 585.99 WSEL= 618.64 ENC QI= 585.99 WSEL= 618.74 RATIO= 0.0000
NAT QI= 619. RATIOS LOB.CH.ROB= .4605 .4019 .1375 WSEL= 618.74

3470 ENCROACHMENT STATIONS= 653.9 1127.5 TYPE= 4 TARGET= .053

14.63	9.05	618.75	0.00	618.64	618.95	.20	.00	.00	616.10
3500.	1609.	1482.	409.	820.	291.	213.	418.	106.	616.40
1.24	1.96	5.16	1.92	.080	.060	.080	.065	609.70	653.91
.003535	1.	1.	1.	0	0	0	0.00	473.56	1127.47

*SECNO 14.650
2800 NAT QI= 718.76 WSEL= 619.01 ENC QI= 718.76 WSEL= 619.11 RATIO= 0.0000
NAT QI= 755. RATIOS LOB.CH.ROB= .4959 .3537 .1504 WSEL= 619.11

3470 ENCROACHMENT STATIONS= 627.2 1137.0 TYPE= 4 TARGET= .049

14.65	9.42	619.12	0.00	619.01	619.26	.13	.28	.02	616.10
3500.	1740.	1245.	465.	1001.	303.	270.	421.	108.	616.40
1.25	1.74	4.27	1.72	.080	.060	.080	.065	609.70	627.19
.002341	100.	100.	100.	2	0	0	0.00	509.82	1137.01

CCHV= .100 CEHV= .300
*SECNO 14.700
2800 NAT QI= 1365.75 WSEL= 620.90 ENC QI= 1365.75 WSEL= 621.00 RATIO= 0.0000
NAT QI= 1427. RATIOS LOB.CH.ROB= .0009 .1381 .8610 WSEL= 621.00

3470 ENCROACHMENT STATIONS= 106.0 846.9 TYPE= 4 TARGET= .043

14.70	7.72	621.02	0.00	620.90	621.05	.03	1.78	.01	617.20
3500.	0.	480.	3020.	0.	218.	2525.	499.	130.	616.20
1.58	0.00	2.20	1.20	.075	.055	.075	.063	613.30	106.00
.000661	1580.	1580.	1580.	2	0	0	0.00	740.91	846.91

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	QLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 14.800

3470 ENCROACHMENT STATIONS= 1999.0 2480.0 TYPE= 1 TARGET= 481.000

14.80	7.92	621.52	0.00	621.40	621.74	.22	.63	.06	621.20
3500.	0.	1481.	2019.	0.	283.	949.	520.	136.	621.20
1.61	.46	5.23	2.13	.075	.055	.075	.064	613.60	1999.00
.003913	580.	620.	420.	2	0	0	0.00	481.00	2480.00

*SECNO 14.810

3370 NORMAL BRIDGE.NRD= 13 MIN ELTRD= 619.00 MAX ELLC= 620.00

14.81	8.03	621.63	0.00	621.53	621.75	.12	.00	.01	621.20
3500.	1.	754.	2745.	1.	242.	997.	520.	136.	621.20
1.61	.56	3.11	2.75	.075	.055	.075	.064	613.60	1994.21
.006189	1.	1.	1.	2	0	0	-45.00	485.79	2480.00

*SECNO 14.815

3370 NORMAL BRIDGE.NRD= 13 MIN ELTRD= 619.00 MAX ELLC= 620.00

U/S FACE OF PRIVATE DRIVE.

14.82	8.25	621.85	0.00	621.78	621.96	.10	.20	.00	621.20
3500.	2.	698.	2799.	3.	251.	1097.	521.	137.	621.20
1.62	.65	2.78	2.55	.075	.055	.075	.064	613.60	1990.22
.004736	38.	38.	38.	2	0	0	-45.00	489.78	2480.00

*SECNO 14.820

14.82	8.39	621.99	0.00	621.93	622.14	.14	.17	.01	621.20
3500.	3.	1297.	2200.	5.	301.	1159.	523.	137.	621.20
1.62	.53	4.31	1.90	.075	.055	.075	.064	613.60	1987.75
.002451	50.	50.	50.	2	0	0	0.00	492.25	2480.00

*SECNO 14.900

2800 NAT QI= 747.96 WSEL= 622.60 ENC QI= 747.96 WSEL= 622.70 RATIO= 0.0000
NAT QI= 792. RATIOS LOB,CH,ROB= .0117 .3143 .6740 WSEL= 622.70

3470 ENCROACHMENT STATIONS= 575.0 1108.2 TYPE= 4 TARGET= .055

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST
14.90	8.44	622.64	0.00	622.60	622.77	.14	.64	.00	621.90
3500.	0.	1172.	2328.	0.	273.	1191.	532.	141.	618.50
1.65	0.00	4.29	1.96	.075	.055	.075	.063	614.20	575.00
.002339	260.	260.	270.	2	0	0	0.00	533.24	1108.24

*SECNO 14.960

3470 ENCROACHMENT STATIONS= 370.0 820.0 TYPE= 1 TARGET= 450.000

14.96	8.94	623.14	0.00	623.08	623.31	.18	.53	.01	621.90
3500.	140.	1337.	2023.	162.	294.	834.	539.	143.	618.50
1.67	.86	4.55	2.43	.075	.055	.075	.063	614.20	372.52
.002331	225.	225.	225.	2	0	0	0.00	447.48	820.00

CCHV= .300 CEHV= .500
*SECNO 14.980

3265 DIVIDED FLOW

3301 HV CHANGED MORE THAN HVINS

3470 ENCROACHMENT STATIONS= 299.0 1098.0 TYPE= 1 TARGET= 799.000

14.98	8.77	623.07	0.00	623.00	623.78	.71	.20	.27	625.00
3500.	0.	3134.	366.	0.	439.	220.	540.	143.	625.00
1.67	.16	7.14	1.66	.075	.065	.075	.063	614.30	299.00
.008172	50.	50.	50.	2	0	0	0.00	332.03	1098.00

SPECIAL BRIDGE

5070,VARIABLE ELCHU OR ELCHD ON CARD SB NOT SPECIFIED

SE	XK	XKOR	COEQ	RDLEN	BWC	PWP	BAREA	SS	ELCHU	ELCHD
	0.00	1.72	2.00	0.00	52.50	0.00	368.00	0.00	614.30	614.30

*SECNO 15.090

3265 DIVIDED FLOW

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VCL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

PRESSURE AND WEIR FLOW

EGPRS	EGLWC	H3	QWEIR	QPR	AREA	TRAPEZOID AREA	ELLC	ELTRD
625.48	625.08	0.00	1091.	2429.	368.	404.	622.00	622.10

3470 ENCROACHMENT STATIONS= 237.0 1166.0 TYPE= 1 TARGET= 929.000
O/S FACE OF IVANPEST AVE. (G)

15.09	9.57	623.87	0.00	623.81	624.23	.36	.45	0.00	625.00
3500.	60.	2636.	804.	79.	482.	488.	540.	144.	625.00
1.67	.76	5.47	1.65	.075	.065	.075	.063	614.30	237.00
.004380	32.	32.	32.	3	0	2	0.00	620.21	1166.00

*SECNO 15.100

3470 ENCROACHMENT STATIONS= 435.0 1160.0 TYPE= 1 TARGET= 725.000

15.10	11.50	624.40	0.00	624.37	624.45	.05	.13	.09	619.30
3500.	1654.	1047.	799.	1313.	384.	835.	545.	145.	619.30
1.69	1.26	2.73	.96	.075	.055	.075	.063	612.90	435.00
.000597	100.	100.	100.	2	0	0	0.00	725.00	1160.00

CCHV= .100 CEHV= .300
*SECNO 15.300
2800 NAT Q1= 1018.18 WSEL= 626.05 ENC Q1= 1018.18 WSEL= 626.15 RATIO= 0.0000
NAT Q1= 1075. RATIOS LOB,CH,ROB= .7696 .2247 .0058 WSEL= 626.15

3470 ENCROACHMENT STATIONS= 270.8 1120.0 TYPE= 4 TARGET= .053
(H)

15.30	9.22	626.12	0.00	626.05	626.18	.06	1.73	.00	620.90
3500.	2727.	773.	0.	2209.	230.	0.	655.	179.	626.80
2.02	1.23	3.37	0.00	.085	.055	.085	.064	616.90	270.83
.001290	1875.	2575.	1725.	1	0	0	0.00	849.17	1120.00

*SECNO 15.500

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3265 DIVIDED FLOW

3470 ENCROACHMENT STATIONS= 193.0 823.0 TYPE= 1 TARGET= 630.000
(I)

15.50	9.05	629.85	0.00	629.73	630.03	.18	3.81	.04	625.70
3500.	1281.	2006.	213.	879.	468.	132.	771.	220.	625.70
2.26	1.46	4.28	1.61	.085	.055	.085	.063	620.80	193.00
.001716	2575.	2575.	2575.	3	0	0	0.00	545.28	823.00

*SECNO 15.800
2800 NAT Q1= 1013.92 WSEL= 631.50 ENC Q1= 1013.92 WSEL= 631.60 RATIO= 0.0000
NAT Q1= 1043. RATIOS LOB,CH,ROB= .2203 .5307 .2491 WSEL= 631.60

3470 ENCROACHMENT STATIONS= 1056.0 1324.6 TYPE= 4 TARGET= .027

15.80	11.05	631.55	0.00	631.50	631.72	.16	1.69	.00	626.10
3500.	743.	1917.	840.	393.	465.	544.	810.	231.	625.20
2.36	1.89	4.12	1.54	.085	.055	.085	.062	620.50	1056.03
.001223	1175.	1175.	1175.	2	0	0	0.00	268.56	1324.58

*SECNO 15.840

3470 ENCROACHMENT STATIONS= 52.0 362.0 TYPE= 1 TARGET= 310.000

15.84	10.97	632.17	0.00	632.11	632.25	.08	.52	.01	627.20
3500.	1627.	1151.	721.	969.	356.	453.	828.	235.	628.00
2.43	1.68	3.24	1.59	.085	.055	.085	.062	621.20	52.00
.000905	500.	500.	500.	2	0	0	0.00	310.00	362.00

CCHV= .300 CEHV= .500
*SECNO 15.850
(J)

15.85	10.85	632.25	0.00	632.20	632.32	.06	.06	.01	624.00
3500.	1688.	851.	962.	1213.	261.	691.	832.	235.	623.20
2.44	1.39	3.26	1.39	.085	.055	.085	.062	621.40	75.96
.000694	80.	80.	80.	0	0	0	0.00	388.08	464.04

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

SPECIAL BRIDGE

SR	XK	XKOR	COEG	BOLEN	BWC	BWP	BAREA	SS	ELCHO	ELCHD
	0.00	1.70	3.05	0.00	24.50	0.00	177.20	0.00	623.20	623.20

*SECNO 15.860
PRESSURE AND WEIR FLOW

EGPRS	EGLWC	H3	QWEIR	QPR	BAREA	TRAPEZOID AREA	ELLC	ELTRD
642.55	634.12	0.00	2554.	947.	177.	177.	629.20	630.00

PRIVATE DRIVE

15.86	11.56	632.96	0.00	632.94	633.01	.05	.69	0.00	624.00
3500.	1727.	791.	982.	1377.	279.	784.	833.	236.	623.20
2.44	1.25	2.83	1.25	.085	.055	.085	.062	621.40	75.41
.000477	25.	25.	25.	2	0	5	0.00	389.17	464.59

#SECNO 15.870

15.87	11.35	632.95	0.00	632.93	633.06	.10	.02	.03	625.00
3500.	2075.	1165.	261.	1234.	310.	161.	834.	236.	626.50
2.45	1.68	3.75	1.62	.085	.055	.085	.062	621.60	46.64
.000972	30.	30.	30.	2	0	0	0.00	303.22	349.86

1) COUNTY: KENT

2) STUDY NAME: GRANDVIEW, CITY OF

3) WATERCOURSE: BUCK CREEK

4) DOCUMENT TYPE: 100-YEAR NATURAL

00BREAK00

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**********************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED APRI 1980
  ERROR CORR -  01.02.03.04
  MODIFICATION -  50.51.52.53.54
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Floodway

C
T1 GRANDVILLE CITY FLOOD INSURANCE STUDY
T2
T3 BUCK CREEK

RECEIVED
DEC 22 1980
WATER MANAGEMENT

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
	0.	4.	0.	0.	0.000000	0.00	0.0	0.	590.000	0.000
J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	1.000	0.000	-1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
J3	VARIABLE CODES FOR SUMMARY PRINTOUT									
	38.000	1.000	53.000	21.000	22.000	54.000	4.000	39.000	150.000	200.000
QT	5.000	2050.000	3070.000	3500.000	4710.000	3500.000	0.000	0.000	0.000	0.000
NC	0.000	0.000	0.000	.100	.300	0.000	0.000	0.000	0.000	0.000
NC	.110	.110	.065	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	(A)									
X1	9.500	25.000	2673.000	2710.000	0.000	0.000	0.000	0.000	0.000	0.000
X3	0.000	0.000	0.000	2558.000	0.000	2825.000	0.000	0.000	0.000	0.000
GR	602.400	2100.000	602.400	2100.000	598.800	2180.000	599.200	2313.000	598.300	2418.000
GR	597.600	2453.000	588.600	2493.000	589.900	2543.000	588.700	2568.000	588.900	2643.000
GR	588.800	2673.000	587.400	2676.000	585.500	2681.000	584.900	2693.000	585.400	2705.000
GR	587.400	2710.000	589.700	2715.000	588.900	2813.000	588.600	2918.000	591.100	3018.000
GR	592.200	3116.000	591.800	3218.000	589.000	3318.000	590.000	3700.000	605.000	3900.000
X1	9.600	0.000	0.000	0.000	269.000	311.000	299.000	0.000	0.000	0.000
X3	0.000	0.000	0.000	2647.000	0.000	2736.000	0.000	0.000	0.000	0.000
NC	0.000	0.000	0.000	.300	.500	0.000	0.000	0.000	0.000	0.000
X1	9.890	28.000	2163.700	2256.800	50.000	50.000	50.000	0.000	0.000	0.000
X3	10.000	0.000	0.000	0.000	0.000	0.000	0.000	607.000	607.000	0.000
GR	612.500	1960.000	610.500	2010.000	609.400	2110.000	609.200	2120.000	609.000	2130.000
GR	609.000	2140.000	608.900	2163.700	602.300	2163.700	589.300	2192.200	589.300	2192.300
GR	585.200	2195.900	585.200	2196.000	585.200	2200.000	585.200	2205.000	585.500	2210.000
GR	585.500	2215.000	585.500	2220.000	585.500	2224.300	585.500	2224.400	589.500	2227.900
GR	589.500	2228.000	601.400	2256.800	608.100	2256.800	608.000	2300.000	607.600	2410.000
GR	607.600	2410.000	607.900	2610.000	607.900	2810.000	0.000	0.000	0.000	0.000

NC	0.000	0.000	.030	0.000	0.000	0.000	0.000	0.000	0.000	0.000
X1	9.900	0.000	0.000	0.000	1.000	1.000	1.000	0.000	0.000	0.000
RT	12.000	2163.700	608.900	0.000	2163.700	608.900	604.800	2192.200	608.400	604.300
RT	2192.300	608.400	589.300	2195.900	608.400	585.200	2196.000	608.400	604.300	2224.300
RT	608.100	604.000	2224.400	608.100	585.500	2227.900	608.100	589.500	2228.000	608.100
RT	604.000	2256.800	608.100	604.000	2256.800	608.100	0.000	0.000	0.000	0.000

U/S FACE SOUTHBOUND I-196

X1	9.910	0.000	0.000	0.000	50.000	50.000	50.000	0.000	0.000	0.000
X2	0.000	0.000	0.000	0.000	0.000	0.000	1.000	0.000	0.000	0.000
NC	0.000	0.000	.060	0.000	0.000	0.000	0.000	0.000	0.000	0.000
X1	9.920	0.000	0.000	0.000	1.000	1.000	1.000	0.000	.100	0.000
X3	10.000	0.000	0.000	0.000	0.000	0.000	0.000	607.600	607.600	0.000
NC	.110	.110	.060	0.000	0.000	0.000	0.000	0.000	0.000	0.000
X1	9.950	23.000	2600.000	2700.000	50.000	50.000	50.000	0.000	0.000	0.000
X3	0.000	0.000	0.000	2568.000	0.000	2732.000	0.000	0.000	0.000	0.000
GR	604.000	2000.000	593.800	2200.000	593.700	2300.000	592.500	2400.000	592.000	2550.000
GR	592.800	2600.000	592.000	2635.000	586.100	2637.000	586.000	2646.000	588.500	2655.000
GR	589.100	2670.000	591.600	2680.000	592.000	2690.000	592.500	2700.000	592.800	2750.000
GR	592.300	2900.000	592.600	3000.000	596.600	3100.000	598.000	3200.000	599.100	3300.000
GR	600.000	3400.000	600.600	3700.000	604.000	3800.000	0.000	0.000	0.000	0.000
X1	9.960	28.000	2003.000	2117.000	200.000	200.000	200.000	0.000	0.000	0.000
X3	10.000	0.000	0.000	0.000	0.000	0.000	0.000	612.000	607.500	0.000
GR	616.500	1950.000	616.000	1970.000	615.500	1990.000	615.200	2003.000	606.500	2003.000
GR	591.700	2038.600	591.700	2038.700	590.600	2042.300	590.600	2042.400	587.000	2049.000
GR	587.000	2050.000	587.000	2055.000	585.800	2055.100	586.000	2065.000	587.000	2070.000
GR	588.000	2075.000	588.700	2077.400	588.700	2077.500	588.700	2081.700	590.000	2081.800
GR	606.400	2117.000	612.800	2117.000	612.000	2130.000	612.000	2150.000	611.500	2160.000
GR	609.500	2260.000	608.000	2360.000	607.500	2460.000	0.000	0.000	0.000	0.000
NC	0.000	0.000	.030	0.000	0.000	0.000	0.000	0.000	0.000	0.000
X1	10.000	0.000	0.000	0.000	1.000	1.000	1.000	0.000	0.000	0.000
RT	16.000	2003.000	615.200	0.000	2003.000	615.200	609.600	2038.600	615.000	609.600
RT	2038.700	615.000	591.700	2042.300	614.800	590.600	2042.400	614.900	609.600	2049.000
RT	614.500	609.600	2050.000	614.500	587.000	2055.000	614.500	609.600	2055.100	614.500
RT	585.800	2077.400	614.000	609.600	2077.500	614.000	588.700	2081.700	614.000	588.700
RT	2081.800	614.000	609.600	2117.000	612.800	609.600	2117.000	612.800	0.000	0.000

U/S FACE OF NORTHBOUND I-196.

X1	10.060	0.000	0.000	0.000	45.000	45.000	45.000	0.000	0.000	0.000
X2	0.000	0.000	0.000	0.000	0.000	0.000	1.000	0.000	0.000	0.000
NC	0.000	0.000	.060	0.000	0.000	0.000	0.000	0.000	0.000	0.000
X1	10.080	0.000	0.000	0.000	1.000	1.000	1.000	0.000	0.000	0.000
X3	10.000	0.000	0.000	0.000	0.000	0.000	0.000	607.500	607.500	0.000
NC	.110	.110	.060	0.000	0.000	0.000	0.000	0.000	0.000	0.000
X1	10.100	23.000	2635.000	2680.000	82.000	82.000	82.000	0.000	0.000	0.000
X3	0.000	0.000	0.000	2538.000	0.000	2777.000	0.000	0.000	0.000	0.000
GR	598.900	2100.000	593.800	2200.000	593.700	2300.000	592.500	2400.000	592.000	2500.000
GR	592.800	2600.000	592.000	2635.000	586.100	2637.000	586.000	2646.000	588.500	2655.000
GR	589.100	2670.000	591.600	2680.000	592.000	2690.000	592.500	2700.000	592.800	2800.000
GR	592.300	2900.000	592.600	3000.000	596.600	3100.000	598.000	3200.000	599.100	3300.000
GR	600.200	3400.000	600.600	3700.000	603.000	4200.000	0.000	0.000	0.000	0.000
NC	.110	.110	.060	0.000	0.000	0.000	0.000	0.000	0.000	0.000
X1	10.980	25.000	2006.000	2074.000	115.000	225.000	325.000	0.000	0.000	0.000
X3	10.000	0.000	0.000	0.000	0.000	0.000	0.000	602.000	602.000	0.000
GR	603.600	1440.000	603.500	1640.000	603.500	1840.000	603.500	1940.000	603.500	1950.000
GR	603.600	2000.000	603.600	2006.000	592.800	2006.000	587.800	2015.500	587.300	2026.000
GR	587.000	2026.100	587.000	2029.000	587.200	2029.100	587.000	2040.000	588.000	2050.000
GR	586.200	2050.100	588.200	2053.000	588.500	2053.100	599.700	2074.000	602.200	2074.000
GR	603.700	2074.000	603.700	2090.000	603.700	2140.000	603.700	2240.000	603.700	2440.000
NC	0.000	0.000	.030	0.000	0.000	0.000	0.000	0.000	0.000	0.000
X1	11.000	0.000	0.000	0.000	1.000	1.000	1.000	0.000	0.000	0.000
RT	16.000	2006.000	603.600	0.000	2006.000	603.600	599.800	2026.000	603.700	599.800
RT	2026.100	603.700	587.000	2029.000	603.700	587.000	2029.100	603.700	599.800	2050.000
RT	603.700	599.800	2050.100	603.700	588.200	2053.000	603.700	588.200	2053.100	603.700
RT	599.800	2053.100	603.700	599.800	2053.100	603.700	599.800	2053.100	603.700	599.800
RT	2074.000	603.700	599.700	2074.000	603.700	0.000	2140.000	603.700	0.000	0.000

U/S FACE OF C & O RAILROAD

X1	11.060	0.000	0.000	0.000	60.000	60.000	60.000	0.000	0.000	0.000
X2	0.000	0.000	0.000	0.000	0.000	0.000	1.000	0.000	0.000	0.000
NC	.110	.110	.060	0.000	0.000	0.000	0.000	0.000	0.000	0.000
X1	11.100	0.000	0.000	0.000	1.000	1.000	1.000	0.000	0.000	0.000
X3	10.000	0.000	0.000	0.000	0.000	0.000	0.000	603.600	603.600	0.000

X1	11.200	0.000	0.000	0.000	50.000	50.000	50.000	0.000	0.000	0.000
NC	.110	.110	.060	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NC	0.000	0.000	0.000	.100	.300	0.000	0.000	0.000	0.000	0.000
X1	11.900	24.000	2565.000	2640.000	380.000	400.000	630.000	0.000	0.000	0.000
X3	0.000	0.000	0.000	2565.000	0.000	2640.000	0.000	0.000	0.000	0.000
GR	605.000	1700.000	601.200	2100.000	601.200	2200.000	600.800	2300.000	601.600	2400.000
GR	599.200	2500.000	595.200	2565.000	591.700	2580.000	590.500	2600.000	591.500	2621.000
GR	595.200	2636.000	596.300	2640.000	598.100	2670.000	601.700	2690.000	600.700	2725.000
GR	595.200	2750.000	595.500	2780.000	601.500	2800.000	601.300	2900.000	601.700	3000.000
GR	602.400	3100.000	602.700	3200.000	602.700	3200.000	605.000	3400.000	0.000	0.000
NC	0.000	0.000	0.000	.300	.500	0.000	0.000	0.000	0.000	0.000
X1	11.980	18.000	3779.500	3820.800	50.000	50.000	50.000	0.000	0.000	0.000
GR	618.000	3400.000	602.300	3400.000	602.700	3600.000	603.300	3700.000	603.300	3779.500
GR	592.300	3779.500	591.300	3800.000	591.300	3800.000	591.300	3800.000	591.300	3800.000
GR	593.700	3820.800	603.300	3820.800	602.600	3900.000	602.200	4000.000	601.700	4200.000
GR	602.900	4400.000	604.300	4600.000	618.000	4600.000	0.000	0.000	0.000	0.000
NC	0.000	0.000	.030	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SB	0.000	1.760	3.000	0.000	41.300	0.000	348.500	0.000	0.000	0.000

U/S FACE OF CHICAGO DRIVE. (CM 21)

X1	12.060	0.000	0.000	0.000	54.000	54.000	54.000	0.000	0.000	0.000
X2	0.000	0.000	1.000	600.500	603.000	0.000	0.000	0.000	0.000	0.000
X3	0.000	0.000	0.000	3779.500	0.000	3820.800	0.000	0.000	0.000	0.000
RT	4.000	3779.500	603.300	0.000	3779.500	603.300	600.500	3820.800	603.000	600.200
RT	3820.800	603.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NC	.100	.100	.065	0.000	0.000	0.000	0.000	0.000	0.000	0.000
X1	12.200	22.000	726.000	772.000	51.000	51.000	51.000	0.000	0.000	0.000
X3	0.000	0.000	0.000	678.000	0.000	819.000	0.000	0.000	0.000	0.000
GR	604.600	704.000	604.600	704.000	604.600	704.000	604.600	704.000	597.500	720.000
GR	597.500	720.000	595.100	726.000	594.700	728.000	594.200	749.000	594.600	770.000
GR	595.100	772.000	596.400	792.000	597.500	806.000	597.900	905.000	596.900	1005.000
GR	595.400	1014.000	594.700	1020.000	595.400	1026.000	598.500	1038.000	602.300	1097.000
GR	606.000	1132.000	605.000	1300.000	0.000	0.000	0.000	0.000	0.000	0.000
NC	0.000	0.000	0.000	.100	.300	0.000	0.000	0.000	0.000	0.000
ET	0.000	0.000	0.000	0.000	0.000	1.410	0.000	0.000	0.000	0.000

(B)

X1	12.500	0.000	0.000	0.000	600.000	500.000	610.000	0.000	0.000	0.000
NC	.085	.085	.065	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ET	0.000	9.100	9.100	9.100	9.100	9.100	0.000	0.000	211.000	767.000

X1	12.900	20.000	300.000	350.000	650.000	300.000	450.000	0.000	0.000	0.000
GR	606.200	0.000	608.200	0.000	607.400	24.000	606.500	124.000	604.600	224.000
GR	602.600	249.000	602.600	284.000	596.400	300.000	592.700	324.000	596.300	350.000
GR	598.200	359.000	602.600	375.000	603.800	379.000	604.200	399.000	604.700	424.000
GR	604.000	524.000	604.500	624.000	604.200	724.000	604.200	824.000	608.000	1214.000
NC	0.000	0.000	0.000	.300	.500	0.000	0.000	0.000	0.000	0.000

X1	12.980	10.000	300.000	350.000	49.000	49.000	49.000	0.000	0.000	0.000
X3	0.000	0.000	0.000	268.000	0.000	0.000	0.000	0.000	0.000	0.000
RT	4.000	300.000	604.200	0.000	300.000	604.200	601.700	350.000	604.200	601.700
RT	350.000	604.200	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
GR	607.700	0.000	606.400	100.000	604.500	200.000	604.200	300.000	604.200	350.000
GR	603.300	400.000	603.100	500.000	603.300	600.000	603.700	700.000	604.200	800.000

U/S FACE OF CANAL AVE. BRIDGE.

X1	13.060	0.000	0.000	0.000	50.000	50.000	50.000	0.000	0.000	0.000
X2	0.000	0.000	0.000	0.000	0.000	0.000	1.000	0.000	0.000	0.000
X3	0.000	0.000	0.000	280.000	0.000	0.000	0.000	0.000	0.000	0.000
NC	.100	.075	.065	0.000	0.000	0.000	0.000	0.000	0.000	0.000

X1	13.100	0.000	0.000	0.000	1.000	1.000	1.000	0.000	0.000	0.000
X3	10.000	0.000	0.000	280.000	0.000	0.000	0.000	603.800	603.500	0.000

(C)

X1	13.200	18.000	164.000	243.000	100.000	100.000	100.000	0.000	0.000	0.000
GR	608.600	0.000	602.500	100.000	603.300	125.000	601.900	164.000	601.900	164.000
GR	601.300	175.000	595.700	185.000	592.700	200.000	595.700	216.000	596.300	225.000
GR	601.900	243.000	602.600	245.000	601.900	275.000	602.000	300.000	602.800	400.000
GR	602.600	500.000	603.300	600.000	605.800	700.000	0.000	0.000	0.000	0.000
NC	.085	.085	.065	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NC	0.000	0.000	0.000	.100	.300	0.000	0.000	0.000	0.000	0.000
ET	0.000	0.000	0.000	0.000	0.000	1.410	0.000	0.000	0.000	0.000

X1	13.300	20.000	922.000	972.000	580.000	700.000	800.000	0.000	0.000	0.000
GR	608.600	833.000	608.600	833.000	605.500	837.000	601.900	847.000	601.700	881.000
GR	600.800	922.000	598.500	937.000	597.500	940.000	596.300	950.000	597.000	960.000
GR	598.500	963.000	602.100	972.000	601.300	991.000	601.300	1039.000	603.700	1121.000
GR	605.200	1154.000	607.100	1247.000	609.300	1329.000	613.100	1425.000	615.300	1435.000
NC	.085	.085	.065	0.000	0.000	0.000	0.000	0.000	0.000	0.000

(D)

X1	13.700	23.000	785.000	818.000	1150.000	1000.000	1175.000	0.000	0.000	0.000
GR	610.000	0.000	609.200	100.000	609.200	185.000	609.100	281.000	609.000	388.300
GR	609.300	482.000	608.800	582.000	607.700	682.000	607.700	685.000	606.800	715.000
GR	604.900	750.000	603.500	785.000	602.400	790.000	600.300	793.000	599.700	802.000
GR	600.000	811.000	602.400	814.000	604.000	818.000	603.600	856.000	605.400	898.000
GR	609.400	936.000	612.000	976.000	613.000	988.000	0.000	0.000	0.000	0.000
X1	13.800	20.000	760.000	820.000	450.000	375.000	450.000	0.000	0.000	0.000
GR	612.500	0.000	610.700	100.000	610.700	200.000	610.200	300.000	609.800	400.000
GR	609.800	500.000	609.400	600.000	609.000	700.000	608.800	720.000	608.200	740.000
GR	607.600	760.000	604.000	780.000	601.000	800.000	605.300	820.000	608.100	840.000
GR	608.700	850.000	608.700	860.000	609.400	900.000	611.000	940.000	612.300	988.000
NC	.085	.085	.065	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ET	0.000	0.000	0.000	0.000	0.000	9.100	0.000	0.000	243.000	843.000
X1	13.900	21.000	760.000	830.000	500.000	350.000	550.000	0.000	0.000	0.000
GR	614.100	100.000	614.100	100.000	613.200	200.000	612.200	300.000	611.500	400.000
GR	611.400	500.000	611.100	600.000	611.200	700.000	610.500	760.000	604.600	780.000
GR	604.000	783.000	602.000	800.000	604.300	817.000	610.500	829.000	611.100	830.000
GR	613.600	850.000	613.000	900.000	613.000	1000.000	613.800	1100.000	614.000	1200.000
GR	616.100	1300.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NC	0.000	0.000	0.000	.300	.500	0.000	0.000	0.000	0.000	0.000
X1	13.980	20.000	474.500	526.500	48.000	48.000	48.000	0.000	0.000	0.000
X3	10.000	0.000	0.000	0.000	0.000	0.000	0.000	611.000	611.000	0.000
GR	613.700	0.000	611.000	100.000	610.500	200.000	611.100	300.000	611.900	400.000
GR	612.000	450.000	610.500	474.500	605.000	474.600	604.500	480.000	603.500	490.000
GR	602.300	500.000	602.300	500.100	602.300	500.500	602.300	500.600	603.000	526.500
GR	612.500	540.000	612.500	540.000	612.500	600.000	613.100	700.000	615.000	900.000
NC	0.000	0.000	.030	0.000	0.000	0.000	0.000	0.000	0.000	0.000
X1	13.990	0.000	0.000	0.000	1.000	1.000	1.000	0.000	0.000	0.000
X3	10.000	0.000	0.000	0.000	0.000	0.000	0.000	611.000	611.000	0.000
HT	18.000	0.000	613.700	0.000	100.000	611.000	0.000	200.000	610.500	0.000
HT	300.000	611.100	0.000	400.000	611.900	0.000	450.000	612.000	0.000	474.500
HT	612.200	0.000	474.500	612.200	610.500	500.000	612.200	610.500	500.100	612.200
HT	602.300	500.500	612.200	602.300	500.600	612.200	610.500	526.500	612.200	610.500
HT	526.500	612.200	0.000	540.000	612.500	0.000	600.000	612.500	0.000	700.000
HT	613.100	0.000	900.000	615.000	0.000	0.000	0.000	0.000	0.000	0.000

U/S FACE OF WILSON AVENUE. (E)

X1	14.060	0.000	0.000	0.000	45.000	45.000	45.000	0.000	0.000	0.000
X2	0.000	0.000	0.000	0.000	0.000	0.000	1.000	0.000	0.000	0.000
X3	10.000	0.000	0.000	0.000	0.000	0.000	0.000	612.500	612.500	0.000
NC	0.000	0.000	.065	0.000	0.000	0.000	0.000	0.000	0.000	0.000
X1	14.070	0.000	0.000	0.000	1.000	1.000	1.000	0.000	0.000	0.000
X3	10.000	0.000	0.000	0.000	0.000	0.000	0.000	612.500	612.500	0.000
NC	.085	.085	.065	0.000	0.000	0.000	0.000	0.000	0.000	0.000
X1	14.200	0.000	0.000	0.000	49.000	49.000	49.000	0.000	0.000	0.000
NC	.085	.085	.065	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NC	0.000	0.000	0.000	.100	.300	0.000	0.000	0.000	0.000	0.000
FT	0.000	0.000	0.000	0.000	0.000	1.410	0.000	0.000	0.000	0.000
X1	14.300	23.000	418.000	466.000	1300.000	1250.000	1610.000	0.000	0.000	0.000
GR	616.800	100.000	616.800	100.000	616.400	246.000	614.800	276.000	611.600	318.000
GR	610.700	418.000	608.500	425.000	606.500	430.000	604.300	438.000	604.100	444.000
GR	604.300	454.000	606.500	460.000	608.500	468.000	609.700	510.000	609.300	636.000
GR	609.900	736.000	609.800	786.000	609.900	965.000	611.500	1084.000	609.800	1248.000
GR	610.700	1348.000	614.200	1398.000	617.900	1480.000	0.000	0.000	0.000	0.000
NC	.080	.080	.060	0.000	0.000	0.000	0.000	0.000	0.000	0.000
X1	14.500	27.000	764.000	804.000	1880.000	1880.000	1880.000	0.000	0.000	0.000
GR	629.300	100.000	629.300	100.000	625.400	230.000	621.700	340.000	621.600	438.000
GR	619.300	522.000	618.100	622.000	613.600	714.000	611.800	764.000	610.300	768.000
GR	607.800	771.000	605.800	780.000	608.000	789.000	610.300	792.000	611.400	798.000
GR	612.200	804.000	611.000	904.000	612.300	1005.000	612.700	1105.000	613.300	1163.000
GR	614.000	1260.000	615.000	1355.000	616.600	1417.000	617.500	1520.000	619.700	1625.000
GR	620.000	1730.000	620.300	1805.000	0.000	0.000	0.000	0.000	0.000	0.000
X1	14.550	20.000	760.000	800.000	450.000	550.000	275.000	0.000	0.000	0.000
GR	625.000	0.000	623.000	100.000	620.000	200.000	618.600	300.000	616.800	400.000
GR	615.300	500.000	614.800	600.000	614.600	680.000	614.400	700.000	614.300	740.000
GR	614.000	760.000	611.800	763.000	607.700	780.000	613.900	800.000	614.200	850.000
GR	614.000	900.000	614.800	1000.000	615.800	1100.000	617.000	1200.000	618.200	1300.000
X1	14.580	19.000	1003.000	1036.700	150.000	275.000	350.000	0.000	0.000	0.000
GR	623.000	0.000	616.500	720.000	616.000	920.000	616.000	970.000	616.000	1000.000
GR	616.000	1003.000	610.200	1003.000	609.900	1010.000	609.800	1015.000	609.600	1020.000
GR	610.000	1025.000	610.200	1030.000	610.700	1036.700	616.300	1036.700	616.500	1070.000
GR	616.000	1120.000	617.000	1140.000	619.000	1220.000	623.000	1300.000	0.000	0.000
NC	0.000	0.000	0.000	.300	.500	0.000	0.000	0.000	0.000	0.000

X1	14.600	0.000	0.000	0.000	50.000	50.000	50.000	0.000	0.000	0.000
X3	10.000	0.000	0.000	0.000	0.000	0.000	0.000	615.500	615.500	0.000
NC	0.000	0.000	.030	0.000	0.000	0.000	0.000	0.000	0.000	0.000
X1	14.610	0.000	0.000	0.000	1.000	1.000	1.000	0.000	0.000	0.000
RT	4.000	1003.000	616.000	0.000	1003.000	616.000	615.000	1036.700	616.300	615.300
RT	1036.700	616.300	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

U/S FACE OF CEMETERY BRIDGE. (F)

X1	14.620	0.000	0.000	0.000	34.000	34.000	34.000	0.000	.100	0.000
X2	0.000	0.000	0.000	0.000	0.000	0.000	1.000	0.000	0.000	0.000
NC	0.000	0.000	.060	0.000	0.000	0.000	0.000	0.000	0.000	0.000
X1	14.630	0.000	0.000	0.000	1.000	1.000	1.000	0.000	0.000	0.000
X3	10.000	0.000	0.000	0.000	0.000	0.000	0.000	616.000	616.000	0.000
X1	14.650	0.000	0.000	0.000	100.000	100.000	100.000	0.000	0.000	0.000
NC	0.000	0.000	0.000	.100	.300	0.000	0.000	0.000	0.000	0.000
NC	.075	.075	.055	0.000	0.000	0.000	0.000	0.000	0.000	0.000
X1	14.700	19.000	106.000	140.000	1580.000	1580.000	1580.000	0.000	0.000	0.000
GR	623.200	100.000	623.200	100.000	617.800	106.000	615.800	108.000	613.300	119.000
GR	613.500	124.000	614.300	129.000	615.800	139.000	616.200	140.000	617.900	154.000
GR	618.200	204.000	617.900	298.000	616.900	498.000	617.700	600.000	616.800	702.000
GR	616.600	762.000	618.000	826.000	619.300	928.000	633.000	928.000	0.000	0.000
FT	0.000	0.000	0.000	0.000	0.000	9.100	0.000	0.000	1999.000	2480.000
X1	14.800	18.000	2001.000	2038.500	580.000	420.000	620.000	0.000	0.000	0.000
GR	627.000	1850.000	624.000	1950.000	623.000	1970.000	621.300	2000.000	621.200	2001.000
GR	614.200	2001.000	614.000	2014.000	614.000	2020.000	613.900	2030.000	613.600	2038.500
GP	621.200	2038.500	621.200	2040.000	620.000	2090.000	620.000	2100.000	619.200	2200.000
GR	619.000	2300.000	619.000	2480.000	633.000	2480.000	0.000	0.000	0.000	0.000
X1	14.810	0.000	0.000	0.000	1.000	1.000	1.000	0.000	0.000	0.000
X3	10.000	0.000	0.000	0.000	0.000	0.000	0.000	620.000	619.000	0.000
BT	13.000	1850.000	627.000	0.000	1950.000	624.000	0.000	1970.000	623.000	0.000
BT	2001.000	621.200	0.000	2001.000	621.200	620.000	2038.500	621.200	620.000	2038.500
BT	621.200	0.000	2090.000	620.000	0.000	2100.000	620.000	0.000	2200.000	619.200
BT	0.000	2300.000	619.000	0.000	2480.000	619.000	0.000	2480.000	633.000	0.000

U/S FACE OF PRIVATE DRIVE.

X1	14.815	0.000	0.000	0.000	38.000	38.000	38.000	0.000	0.000	0.000
X2	0.000	0.000	0.000	0.000	0.000	0.000	1.000	0.000	0.000	0.000
X3	10.000	0.000	0.000	0.000	0.000	0.000	0.000	621.200	619.000	0.000
X1	14.820	0.000	0.000	0.000	50.000	50.000	50.000	0.000	0.000	0.000
NC	.075	.075	.055	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ET	0.000	0.000	0.000	0.000	0.000	1.400	0.000	0.000	0.000	0.000
X1	14.900	23.000	575.000	617.000	260.000	270.000	260.000	0.000	0.000	0.000
GR	628.400	100.000	628.400	100.000	626.500	200.000	622.600	400.000	622.000	500.000
GR	622.400	550.000	621.900	575.000	618.500	581.000	616.200	585.000	614.200	600.000
GR	615.800	615.000	618.500	617.000	619.300	675.000	619.400	700.000	618.700	800.000
GR	620.500	900.000	622.200	1000.000	621.300	1100.000	621.600	1200.000	622.600	1300.000
GR	624.400	1400.000	625.400	1500.000	627.000	1600.000	0.000	0.000	0.000	0.000
X1	14.960	0.000	0.000	0.000	225.000	225.000	225.000	0.000	0.000	0.000
X3	0.000	0.000	0.000	370.000	0.000	820.000	0.000	0.000	0.000	0.000
NC	0.000	0.000	.065	.300	.500	0.000	0.000	0.000	0.000	0.000
X1	14.980	22.000	673.000	726.000	50.000	50.000	50.000	0.000	0.000	0.000
X3	10.000	0.000	0.000	299.000	0.000	1098.000	0.000	621.800	621.800	0.000
GR	627.000	0.000	623.000	300.000	624.500	500.000	624.700	600.000	624.800	620.000
GR	624.900	640.000	625.000	670.000	625.000	673.000	615.800	673.000	615.200	680.000
GR	615.000	690.000	614.500	700.000	614.300	710.000	614.500	720.000	615.000	726.000
GR	625.000	726.000	624.000	770.000	623.500	800.000	622.000	900.000	621.800	1000.000
GR	624.000	1180.000	636.000	1180.000	0.000	0.000	0.000	0.000	0.000	0.000
ET	0.000	1.720	2.000	0.000	52.500	0.000	368.000	0.000	0.000	0.000

U/S FACE OF IVANREST AVE. (G)

X1	15.090	0.000	0.000	0.000	32.000	32.000	32.000	0.000	0.000	0.000
X2	0.000	0.000	1.000	622.000	622.100	0.000	0.000	0.000	0.000	0.000
X3	10.000	0.000	0.000	237.000	0.000	1166.000	0.000	623.000	621.800	0.000
RT	16.000	0.000	627.000	0.000	300.000	625.000	0.000	500.000	624.500	0.000
RT	600.000	624.700	0.000	620.000	624.800	0.000	640.000	624.900	0.000	673.000
RT	625.000	0.000	673.000	625.000	622.000	726.000	625.000	622.000	726.000	625.000
RT	0.000	770.000	624.000	0.000	800.000	623.500	0.000	900.000	622.500	0.000
RT	1000.000	622.500	0.000	1180.000	624.000	0.000	1180.000	636.000	0.000	0.000
NC	.075	.075	.055	0.000	0.000	0.000	0.000	0.000	0.000	0.000

X1	15.100	21.000	775.000	818.000	100.000	100.000	100.000	0.000	0.000	0.000
X3	0.000	0.000	0.000	435.000	0.000	1160.000	0.000	0.000	0.000	0.000
GR	629.500	100.000	625.700	200.000	623.700	300.000	623.200	400.000	622.400	500.000
GR	619.600	600.000	619.500	700.000	619.300	775.000	616.400	785.000	612.900	800.000
GR	615.700	815.000	619.300	818.000	619.500	825.000	620.300	875.000	622.800	900.000
GR	621.700	1000.000	623.000	1100.000	623.000	1200.000	624.700	1300.000	625.500	1400.000
GR	626.500	1500.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NC	0.000	0.000	0.000	.100	.300	0.000	0.000	0.000	0.000	0.000
NC	.085	.085	.055	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ET	0.000	0.000	0.000	0.000	0.000	1.410	0.000	0.000	0.000	0.000

(H)

X1	15.300	23.000	1092.000	1120.000	1875.000	1725.000	2575.000	0.000	0.000	0.000
GR	626.500	0.000	624.500	205.000	624.300	302.000	623.300	428.000	623.700	540.000
GR	623.600	635.000	623.500	734.000	623.700	836.000	622.700	1000.000	622.900	1050.000
GR	621.700	1074.000	620.900	1092.000	617.900	1095.000	616.900	1106.000	618.000	1116.000
GR	620.800	1120.000	624.900	1124.000	626.200	1152.000	629.000	1222.000	633.500	1362.000
GR	633.700	1622.000	635.700	1682.000	638.000	1770.000	0.000	0.000	0.000	0.000
NC	.085	.085	.055	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ET	0.000	0.000	0.000	0.000	0.000	9.100	0.000	0.000	193.000	823.000

(I)

X1	15.500	20.000	719.000	780.000	2575.000	2575.000	2575.000	0.000	0.000	0.000
GR	631.600	100.000	629.600	200.000	628.000	240.000	629.400	320.000	630.400	418.000
GR	629.500	468.000	626.900	579.000	625.900	619.000	625.700	669.000	625.700	719.000
GR	623.100	728.000	621.300	733.000	620.800	750.000	621.200	768.000	623.100	772.000
GR	624.600	775.000	625.700	780.000	626.200	805.000	630.600	828.200	634.400	928.000
NC	.085	.085	.055	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ET	0.000	0.000	0.000	0.000	0.000	1.400	0.000	0.000	0.000	0.000

X1	15.800	23.000	1127.000	1176.000	1175.000	1175.000	1175.000	0.000	0.000	0.000
GR	633.600	100.000	632.800	253.000	633.300	374.000	632.800	518.000	632.000	643.800
GR	632.500	760.000	633.300	896.000	630.900	1020.000	630.400	1044.000	625.600	1074.000
GR	625.400	1092.000	626.100	1127.000	623.900	1131.000	623.000	1134.000	620.500	1153.000
GR	622.000	1172.000	623.900	1175.000	625.200	1176.000	626.100	1199.000	629.300	1285.000
GR	631.300	1415.000	633.500	1531.000	635.000	1545.000	0.000	0.000	0.000	0.000
ET	0.000	0.000	0.000	0.000	0.000	9.100	0.000	0.000	52.000	362.000

X1	15.840	16.000	231.000	273.000	500.000	500.000	500.000	0.000	0.000	0.000
GR	635.000	30.000	630.000	65.000	626.300	80.000	625.500	130.000	626.500	180.000
GR	627.200	231.000	625.100	233.000	621.200	250.000	624.800	266.000	626.600	272.000
GR	628.000	273.000	628.000	285.000	625.700	320.000	625.600	335.000	626.000	345.000
GR	634.500	370.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NC	0.000	0.000	0.000	.300	.500	0.000	0.000	0.000	0.000	0.000

(J)

X1	15.850	10.000	307.000	333.000	80.000	80.000	80.000	0.000	0.000	0.000
GR	640.000	70.000	627.000	80.000	627.000	300.000	624.000	307.000	621.400	320.000
GR	621.400	328.000	623.200	333.000	627.000	340.000	627.000	460.000	640.000	470.000
SB	0.000	1.700	3.050	0.000	29.500	0.000	177.200	0.000	623.200	623.200

PRIVATE DRIVE

X1	15.850	0.000	0.000	0.000	25.000	25.000	25.000	0.000	0.000	0.000
X2	0.000	0.000	1.000	629.200	630.000	0.000	0.000	0.000	0.000	0.000
RT	11.000	80.000	634.300	0.000	210.000	630.800	0.000	300.000	630.800	0.000
RT	307.000	630.800	624.000	307.000	630.800	628.200	333.000	630.800	628.200	333.000
RT	630.800	623.200	340.000	630.800	0.000	365.000	630.000	0.000	410.000	630.000
RT	0.000	470.000	640.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

X1	15.870	21.000	283.000	314.000	30.000	30.000	30.000	0.000	0.000	0.000
GR	640.000	10.000	627.500	75.000	628.200	125.000	627.400	200.000	626.900	250.000
GR	626.100	270.000	625.000	283.000	623.300	287.000	621.600	300.000	623.800	312.000
GR	626.500	314.000	627.000	323.000	628.200	338.000	630.300	342.000	633.000	350.000
GR	633.200	375.000	633.800	380.000	633.900	403.000	633.800	453.000	633.500	503.000
GR	640.000	505.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
EJ	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	QLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*PROF 1

CCHV= .100 CEHV= .300

*SECNO 9.500

3720 CRITICAL DEPTH ~~ASSUMED~~

3470 ENCROACHMENT STATIONS= 2558.0 2825.0 TYPE= 1 TARGET= 267.000

(A)

9.50	6.04	590.94	590.94	590.00	592.05	1.10	0.00	0.00	588.80
3500.	853.	2047.	600.	244.	192.	198.	0.	0.	587.40
0.00	3.50	10.65	3.03	.110	.065	.110	0.000	584.90	2558.00
.025071	0.	0.	0.	0	10	0	0.00	267.00	2825.00

*SECNO 9.600

3470 ENCROACHMENT STATIONS= 2647.0 2736.0 TYPE= 1 TARGET= 89.000

9.60	9.83	594.73	0.00	0.00	595.48	.75	3.40	.03	588.80
3500.	478.	2614.	409.	153.	332.	138.	4.	1.	587.40
.01	3.12	7.87	2.96	.110	.065	.110	.066	584.90	2647.00
.006596	269.	299.	311.	4	0	0	0.00	89.00	2736.00

CCHV= .300 CEHV= .500

*SECNO 9.890

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE.ELLEA= 607.00 ELREA= 607.00

9.89	9.77	594.97	0.00	0.00	596.16	1.19	.46	.22	608.90
3500.	0.	3500.	0.	0.	400.	0.	5.	1.	608.10
.01	0.00	8.75	0.00	.110	.065	.110	.065	585.20	2179.76
.013651	50.	50.	50.	2	0	0	0.00	61.48	2241.24

*SECNO 9.900

3301 HV CHANGED MORE THAN HVINS

3370 NORMAL BRIDGE.NRD= 12 MIN ELTRD= 608.10 MAX ELLC= 604.80

9.90	9.51	594.71	0.00	0.00	596.44	1.73	.01	.27	608.90
3500.	0.	3500.	0.	0.	331.	0.	5.	1.	608.10
.01	0.00	10.57	0.00	.110	.030	.110	.065	585.20	2180.35
.007391	1.	1.	1.	2	0	0	-52.73	60.26	2240.60

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
G	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 9.910

3370 NORMAL BRIDGE,NRD= 12 MIN ELTRD= 608.10 MAX ELLC= 604.80

U/S FACE SOUTHBOUND I-196

9.91	10.33	595.53	0.00	0.00	596.87	1.34	.31	.12	608.90
3500.	0.	3500.	0.	0.	377.	0.	5.	1.	608.10
.02	0.00	9.29	0.00	.110	.030	.110	.061	585.20	2178.52
.005382	50.	50.	50.	2	0	0	-58.78	64.09	2242.61

*SECNO 9.920

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA= 607.60 ELREA= 607.60

9.92	10.86	596.16	0.00	0.00	597.02	.86	.01	.14	609.00
3500.	0.	3500.	0.	0.	469.	0.	5.	1.	608.20
.02	0.00	7.46	0.00	.110	.060	.110	.060	585.30	2177.39
.007570	1.	1.	1.	3	0	0	0.00	66.48	2243.87

*SECNO 9.950

3301 HV CHANGED MORE THAN HVINS

3470 ENCROACHMENT STATIONS= 2568.0 2732.0 TYPE= 1 TARGET= 164.000

9.95	11.14	597.14	0.00	0.00	597.41	.27	.21	.18	592.80
3500.	263.	2977.	260.	147.	667.	146.	6.	1.	592.50
.02	1.79	4.46	1.79	.110	.060	.110	.060	586.00	2568.00
.002757	50.	50.	50.	2	0	0	0.00	164.00	2732.00

*SECNO 9.960

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA= 612.00 ELREA= 607.50

9.96	11.90	597.70	0.00	0.00	598.35	.65	.75	.19	615.20
3500.	0.	3500.	0.	0.	542.	0.	10.	2.	612.80
.03	0.00	6.46	0.00	.110	.060	.110	.060	585.80	2024.16
.005373	200.	200.	200.	2	0	0	0.00	74.17	2098.33

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 10.000

3301 HV CHANGED MORE THAN HVINS

3370 NORMAL BRIDGE,NRD= 16 MIN ELTRD= 612.80 MAX ELLC= 609.60

10.00	11.58	597.38	0.00	0.00	598.69	1.31	.01	.33	615.20
3500.	0.	3500.	0.	0.	381.	0.	10.	2.	612.80
.03	0.00	9.18	0.00	.110	.030	.110	.060	585.80	2024.93
.009847	1.	1.	1.	2	0	0	-136.89	72.71	2097.64

*SECNO 10.060

3370 NORMAL BRIDGE,NRD= 16 MIN ELTRD= 612.80 MAX ELLC= 609.60

U/S FACE OF NORTHBOUND I-196.

10.06	12.25	598.05	0.00	0.00	599.15	1.10	.40	.06	615.20
3500.	0.	3500.	0.	0.	417.	0.	10.	2.	612.80
.03	0.00	8.40	0.00	.110	.030	.110	.058	585.80	2023.31
.007931	45.	45.	45.	2	0	0	-151.74	75.78	2099.09

*SECNO 10.080

3301 HV CHANGED MORE THAN HVINS

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA= 607.50 ELREA= 607.50

10.08	13.06	598.86	0.00	0.00	599.34	.48	.01	.19	615.20
3500.	0.	3500.	0.	0.	631.	0.	10.	2.	612.80
.03	0.00	5.55	0.00	.110	.060	.110	.058	585.80	2021.38
.003551	1.	1.	1.	3	0	0	0.00	79.44	2100.82

*SECNO 10.100

3470 ENCROACHMENT STATIONS= 2538.0 2777.0 TYPE= 1 TARGET= 239.000

10.10	13.48	599.48	0.00	0.00	599.58	.10	.12	.11	592.00
3500.	915.	1667.	918.	677.	503.	678.	12.	2.	591.60
.04	1.35	3.31	1.36	.110	.060	.110	.058	586.00	2538.00
.000820	82.	82.	82.	2	0	0	0.00	239.00	2777.00

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 10.980

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE.ELLEA= 602.00 ELREA= 602.00

10.98	12.70	599.70	0.00	0.00	600.12	.43	.38	.17	603.60
3500.	0.	3500.	0.	0.	668.	0.	19.	3.	603.70
.05	0.00	5.24	0.00	.110	.060	.110	.061	587.00	2006.00
.002626	115.	325.	225.	2	0	0	0.00	68.00	2074.00

*SECNO 11.000

3370 NORMAL BRIDGE.NRD= 16 MIN ELTRD= 603.60 MAX ELLC= 599.80

11.00	12.64	599.64	0.00	0.00	600.18	.54	.00	.06	603.60
3500.	0.	3500.	0.	0.	592.	0.	19.	3.	603.70
.05	0.00	5.91	0.00	.110	.030	.110	.061	587.00	2006.00
.001862	1.	1.	1.	2	0	0	-72.22	67.89	2073.89

*SECNO 11.060

3370 NORMAL BRIDGE.NRD= 16 MIN ELTRD= 603.60 MAX ELLC= 599.80

U/S FACE OF C & O RAILROAD

11.06	12.78	599.78	0.00	0.00	600.31	.53	.12	.00	603.60
3500.	0.	3500.	0.	0.	600.	0.	20.	3.	603.70
.06	0.00	5.84	0.00	.110	.030	.110	.059	587.00	2006.00
.002103	60.	60.	60.	0	0	0	-73.67	68.00	2074.00

*SECNO 11.100

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE.ELLEA= 603.60 ELREA= 603.60

11.10	12.94	599.94	0.00	0.00	600.35	.41	.00	.04	603.60
3500.	0.	3500.	0.	0.	685.	0.	20.	3.	603.70
.06	0.00	5.11	0.00	.110	.060	.110	.059	587.00	2006.00
.002441	1.	1.	1.	2	0	0	0.00	68.00	2074.00

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST
*SECNO 11.200									
11.20	13.07	600.07	0.00	0.00	600.47	.40	.12	.00	603.60
3500.	0.	3500.	0.	0.	693.	0.	21.	3.	603.70
.06	0.00	5.05	0.00	.110	.060	.110	.059	587.00	2006.00
.002354	50.	50.	50.	1	0	0	0.00	68.00	2074.00

CCHV= .100 CEHV= .300
*SECNO 11.900

3470 ENCROACHMENT STATIONS= 2565.0 2640.0 TYPE= 1 TARGET= 75.000

11.90	11.12	601.62	0.00	0.00	602.00	.38	1.53	.00	595.20
3500.	0.	3500.	0.	0.	703.	0.	31.	4.	100000.00
.09	0.00	4.98	0.00	.110	.060	.110	.059	590.50	2565.00
.002521	380.	630.	400.	2	0	0	0.00	75.00	2640.00

CCHV= .300 CEHV= .500
*SECNO 11.980

3301 HV CHANGED MORE THAN HVINS

11.98	10.09	601.39	0.00	0.00	602.70	1.31	.23	.46	603.30
3500.	0.	3500.	0.	0.	382.	0.	32.	4.	603.30
.10	0.00	9.17	0.00	.110	.060	.110	.059	591.30	3779.50
.011186	50.	50.	50.	2	0	0	0.00	41.30	3820.80

SPECIAL BRIDGE

5070,VARIABLE ELCHU OR ELCHD ON CARD SB NOT SPECIFIED

SB XK	XKOR	CDFG	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
0.00	1.76	3.00	0.00	41.30	0.00	348.50	0.00	591.30	591.30

*SECNO 12.060
PRESSURE AND WEIR FLOW

EGPRS	EGLWC	H3	QWEIR	QPR	BAREA	TRAPEZOID AREA	ELLC	ELTRD
604.15	602.70	0.00	97.	3406.	349.	380.	600.50	603.00

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	QLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	FNDST

3470 ENCROACHMENT STATIONS= 3779.5 3820.8 TYPE= 1 TARGET= 41.300
U/S FACE OF CHICAGO DRIVE.

12.06	11.77	603.07	0.00	0.00	604.00	.93	1.30	0.00	603.30
3500.	0.	3500.	0.	0.	451.	0.	32.	5.	100000.00
.10	0.00	7.76	0.00	.110	.030	.110	.058	591.30	3779.50
.001725	54.	54.	54.	2	0	2	0.00	41.30	3820.80

*SECNO 12.200

3301 HV CHANGED MORE THAN HVINS

3470 ENCROACHMENT STATIONS= 678.0 819.0 TYPE= 1 TARGET= 141.000

12.20	9.76	603.96	0.00	0.00	604.29	.33	.11	.18	595.10
3500.	206.	2328.	965.	93.	437.	346.	33.	5.	595.10
.10	2.22	5.33	2.79	.100	.065	.100	.059	594.20	705.43
.002707	51.	51.	51.	2	0	0	0.00	113.57	819.00

CCHV= .100 CEHV= .300

*SECNO 12.500

3280 CROSS SECTION 12.50 EXTENDED .13 FEET

(B)

12.50	10.53	604.73	0.00	0.00	604.76	.03	.44	.03	595.10
3500.	95.	984.	2421.	109.	472.	2287.	56.	8.	595.10
.22	.87	2.08	1.06	.100	.065	.100	.061	594.20	704.00
.000373	600.	610.	500.	2	0	0	0.00	415.98	1119.98

*SECNO 12.900

3470 ENCROACHMENT STATIONS= 211.0 767.0 TYPE= 1 TARGET= 556.000

12.90	12.13	604.83	0.00	0.00	605.15	.32	.30	.09	596.40
3500.	350.	2650.	500.	196.	516.	357.	72.	12.	596.30
.24	1.78	5.14	1.40	.085	.065	.085	.063	592.70	211.40
.002281	650.	450.	300.	2	0	0	0.00	555.60	767.00

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

CCHV= .300 CEHV= .500
*SECNO 12.980
3280 CROSS SECTION 12.98 EXTENDED .95 FEET

3370 NORMAL BRIDGE,NRD= 4 MIN ELTRD= 604.20 MAX ELLC= 601.70

3470 ENCROACHMENT STATIONS= 268.0 800.0 TYPE= 1 TARGET= -268.000

12.98	2.05	605.15	0.00	0.00	605.44	.29	.28	.01	604.20
3500.	81.	183.	3236.	29.	47.	745.	73.	12.	604.20
.25	2.80	3.85	4.35	.085	.065	.085	.063	603.10	268.00
.030446	49.	49.	49.	3	0	0	0.00	532.00	800.00

*SECNO 13.060
3280 CROSS SECTION 13.06 EXTENDED 1.82 FEET

3370 NORMAL BRIDGE,NRD= 4 MIN ELTRD= 604.20 MAX ELLC= 601.70

3470 ENCROACHMENT STATIONS= 280.0 800.0 TYPE= 1 TARGET= -280.000
U/S FACE OF CANAL AVE. BRIDGE.

13.06	2.92	606.02	0.00	0.00	606.14	.12	.65	.05	604.20
3500.	74.	265.	3161.	36.	91.	1138.	75.	13.	604.20
.25	2.08	2.90	2.78	.085	.065	.085	.063	603.10	280.00
.007247	50.	50.	50.	2	0	0	0.00	520.00	800.00

Bridge flow not included

*SECNO 13.100
3280 CROSS SECTION 13.10 EXTENDED 1.84 FEET

3470 ENCROACHMENT STATIONS= 280.0 800.0 TYPE= 1 TARGET= -280.000

13.10	2.93	606.03	0.00	0.00	606.15	.12	.01	.00	604.20
3500.	57.	238.	3206.	36.	92.	1144.	75.	13.	604.20
.25	1.57	2.59	2.80	.100	.065	.075	.063	603.10	280.00
.005703	1.	1.	1.	1	0	0	0.00	520.00	800.00

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	FNDST

*SECNO 13.200
3280 CROSS SECTION 13.20 EXTENDED .45 FEET
(C)

13.20	13.55	606.25	0.00	0.00	606.30	.05	.13	.02	601.90
3500.	247.	1676.	1577.	342.	723.	1476.	79.	14.	601.90
.27	.72	2.32	1.07	.100	.065	.075	.063	592.70	38.50
.000563	100.	100.	100.	2	0	0	0.00	661.50	700.00

CCHV= .100 CEHV= .300
*SECNO 13.300

13.30	10.50	606.80	0.00	0.00	606.89	.09	.58	.01	600.80
3500.	778.	1358.	1364.	430.	420.	854.	113.	23.	602.10
.36	1.81	3.23	1.60	.085	.065	.085	.065	596.30	835.32
.001218	580.	800.	700.	3	0	0	0.00	397.11	1232.43

*SECNO 13.700
(D)

13.70	9.19	608.89	0.00	0.00	609.13	.24	2.19	.05	603.50
3500.	866.	1393.	1241.	388.	260.	436.	148.	32.	604.00
.44	2.23	5.37	2.85	.085	.065	.085	.066	599.70	563.90
.003806	1150.	1175.	1000.	3	0	0	0.00	367.26	931.16

*SECNO 13.800

13.80	9.65	610.65	0.00	0.00	610.98	.33	1.82	.03	607.60
3500.	782.	2280.	438.	551.	410.	204.	159.	38.	605.30
.47	1.42	5.56	2.14	.085	.065	.085	.066	601.00	210.65
.004673	450.	450.	375.	3	0	0	0.00	720.52	931.17

Enter pol

*SECNO 13.900

13.90	10.77	612.77	0.00	0.00	613.06	.30	2.08	.00	610.50
3500.	870.	2620.	10.	668.	526.	11.	173.	45.	611.10
.50	1.30	4.98	.90	.085	.065	.085	.066	602.00	243.26
.003408	500.	550.	350.	2	0	0	0.00	600.08	843.34

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

CCHV= .300 CEHV= .500

*SECNO 13.980

13.98	10.67	612.97	0.00	0.00	613.21	.24	.13	.02	610.50
3500.	932.	2393.	175.	747.	509.	116.	174.	46.	603.00
.51	1.25	4.71	1.51	.085	.065	.085	.066	602.30	27.34
.002319	48.	48.	48.	0	0	0	0.00	649.64	676.98

*SECNO 13.990

3370 NORMAL BRIDGE,NRD= 18 MIN ELTRD= 610.50 MAX ELLC= 610.50

13.99	10.63	612.93	0.00	0.00	613.26	.33	.00	.04	610.50
3500.	1178.	2292.	29.	713.	414.	49.	174.	46.	603.00
.51	1.65	5.53	.60	.085	.030	.085	.066	602.30	28.47
.004236	1.	1.	1.	2	0	0	-175.43	643.40	671.87

*SECNO 14.060

3370 NORMAL BRIDGE,NRD= 18 MIN ELTRD= 610.50 MAX ELLC= 610.50

U/S FACE OF WILSON AVENUE. (E)

14.06	10.90	613.20	0.00	0.00	613.45	.25	.17	.02	610.50
3500.	1312.	2122.	66.	836.	429.	95.	176.	46.	603.00
.51	1.57	4.95	.69	.085	.030	.085	.066	602.30	18.40
.003245	45.	45.	45.	2	0	0	-175.43	692.46	710.86

*SECNO 14.070

14.07	10.98	613.28	0.00	0.00	613.47	.18	.00	.02	610.50
3500.	1077.	2220.	203.	893.	525.	172.	176.	46.	603.00
.51	1.21	4.23	1.18	.085	.065	.085	.066	602.30	15.42
.001792	1.	1.	1.	2	0	0	0.00	703.91	719.33

*SECNO 14.200

14.20	11.09	613.39	0.00	0.00	613.56	.17	.08	.01	610.50
3500.	1124.	2160.	216.	946.	531.	195.	178.	47.	603.00
.52	1.19	4.07	1.11	.085	.065	.085	.066	602.30	11.16
.001634	49.	49.	49.	1	0	0	0.00	720.30	731.45

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

CCHV= .100 CEHV= .300

*SECNO 14.300									
14.30	10.17	614.27	0.00	0.00	614.29	.01	.71	.02	610.70
3500.	199.	575.	2726.	360.	406.	3816.	272.	74.	608.50
.99	.55	1.42	.71	.085	.065	.085	.067	604.10	282.86
.000245	1300.	1610.	1250.	3	0	0	0.00	1116.85	1399.71
*SECNO 14.500									
14.50	9.44	615.24	0.00	0.00	615.33	.09	1.03	.02	611.80
3500.	223.	936.	2341.	155.	252.	1359.	409.	113.	612.20
1.22	1.44	3.72	1.72	.080	.060	.080	.066	605.80	680.38
.002108	1880.	1880.	1880.	2	0	0	0.00	684.09	1364.47
*SECNO 14.550									
14.55	8.82	616.52	0.00	0.00	616.74	.22	1.36	.04	614.00
3500.	953.	1325.	1221.	516.	240.	599.	426.	122.	613.90
1.26	1.85	5.52	2.04	.080	.060	.080	.065	607.70	418.84
.004873	450.	275.	550.	3	0	0	0.00	740.95	1159.79
*SECNO 14.580									
14.58	8.35	617.95	0.00	0.00	618.36	.41	1.57	.06	616.00
3500.	1301.	1827.	373.	618.	267.	184.	433.	125.	616.30
1.28	2.10	6.83	2.03	.080	.060	.080	.065	609.60	559.45
.007108	150.	350.	275.	3	0	0	0.00	618.53	1177.98

CCHV= .300 CEHV= .500

*SECNO 14.600									
14.60	8.87	618.47	0.00	0.00	618.68	.21	.25	.06	616.00
3500.	1549.	1492.	459.	866.	285.	263.	434.	126.	616.30
1.28	1.79	5.24	1.74	.080	.060	.080	.065	609.60	501.41
.003833	50.	50.	50.	2	0	0	0.00	697.52	1198.93
*SECNO 14.610									
3370 NORMAL BRIDGE,NRD= 4 MIN ELTRD= 616.00 MAX ELLC= 615.30									
14.61	8.87	618.47	0.00	0.00	618.68	.21	.00	.00	616.00
3500.	1657.	1351.	491.	865.	251.	263.	434.	126.	616.30
1.28	1.92	5.38	1.87	.080	.030	.080	.065	609.60	501.65
.004405	1.	1.	1.	0	0	0	-33.70	697.20	1198.85

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	QLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 14.620

3370 NORMAL BRIDGE,NRD= 4 MIN ELTRD= 616.00 MAX ELLC= 615.40

U/S FACE OF CEMETERY BRIDGE. (F)

14.62	8.93	618.63	0.00	0.00	618.83	.19	.14	.00	616.10
3500.	1667.	1338.	495.	896.	257.	273.	435.	126.	616.40
1.28	1.86	5.21	1.82	.080	.030	.080	.065	609.70	494.76
.004026	34.	34.	34.	2	0	0	-30.33	706.57	1201.34

*SECNO 14.630

14.63	8.94	618.64	0.00	0.00	618.83	.19	.00	.00	616.10
3500.	1574.	1458.	468.	898.	287.	274.	435.	126.	616.40
1.28	1.75	5.08	1.71	.080	.060	.080	.065	609.70	494.30
.003567	1.	1.	1.	0	0	0	0.00	707.20	1201.50

*SECNO 14.650

14.65	9.31	619.01	0.00	0.00	619.14	.13	.29	.02	616.10
3500.	1707.	1278.	515.	1099.	300.	339.	439.	128.	616.40
1.30	1.55	4.26	1.52	.080	.060	.080	.065	609.70	452.31
.002371	100.	100.	100.	0	0	0	0.00	764.36	1216.67

CCHV= .100 CEHV= .300

*SECNO 14.700

14.70	7.60	620.90	0.00	0.00	620.93	.03	1.78	.01	617.80
3500.	3.	493.	3004.	5.	214.	2620.	522.	157.	616.20
1.63	.56	2.30	1.15	.075	.055	.075	.063	613.30	102.55
.000657	1580.	1580.	1580.	4	0	0	0.00	825.45	928.00

*SECNO 14.800

14.80	7.80	621.40	0.00	0.00	621.65	.25	.65	.07	621.20
3500.	0.	1533.	1967.	0.	279.	899.	543.	163.	621.20
1.67	.24	5.49	2.19	.075	.055	.075	.064	613.60	1998.12
.004413	580.	620.	420.	2	0	0	0.00	481.88	2480.00

*SECNO 14.810

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3370 NORMAL BRIDGE.NRD= 13 MIN ELTRD= 619.00 MAX ELLC= 620.00

14.81	7.93	621.53	0.00	0.00	621.67	.13	.01	.01	621.20
3500.	0.	780.	2719.	1.	239.	955.	543.	163.	621.20
1.67	.51	3.27	2.85	.075	.055	.075	.064	613.60	1995.89
.006965	1.	1.	1.	2	0	0	-45.00	484.11	2480.00

*SECNO 14.815

3370 NORMAL BRIDGE.NRD= 13 MIN ELTRD= 619.00 MAX ELLC= 620.00

U/S FACE OF PRIVATE DRIVE.

14.82	8.18	621.78	0.00	0.00	621.90	.11	.23	.00	621.20
3500.	2.	714.	2784.	3.	248.	1066.	544.	164.	621.20
1.67	.63	2.88	2.61	.075	.055	.075	.064	613.60	1991.45
.005131	38.	38.	38.	2	0	0	-45.00	488.55	2480.00

*SECNO 14.820

14.82	8.33	621.93	0.00	0.00	622.08	.15	.18	.01	621.20
3500.	2.	1317.	2180.	4.	299.	1132.	545.	164.	621.20
1.68	.52	4.41	1.93	.075	.055	.075	.064	613.60	1988.80
.002592	50.	50.	50.	2	0	0	0.00	491.20	2480.00

*SECNO 14.900

14.90	8.40	622.60	0.00	0.00	622.72	.12	.63	.00	621.90
3500.	29.	1135.	2337.	61.	271.	1326.	555.	168.	618.50
1.71	.47	4.18	1.76	.075	.055	.075	.063	614.20	400.05
.002190	260.	260.	270.	2	0	0	0.00	899.92	1299.97

*SECNO 14.960

3470 ENCROACHMENT STATIONS= 370.0 820.0 TYPE= 1 TARGET= 450.000

14.96	8.88	623.08	0.00	0.00	623.26	.18	.52	.02	621.90
3500.	127.	1350.	2023.	150.	291.	822.	562.	172.	618.50
1.72	.85	4.63	2.46	.075	.055	.075	.063	614.20	375.58
.002445	225.	225.	225.	2	0	0	0.00	444.42	820.00

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	QLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

CCHV= .300 CEHV= .500
*SECNO 14.980

3265 DIVIDED FLOW

3301 HV CHANGED MORE THAN HVINS

3470 ENCROACHMENT STATIONS= 299.0 1098.0 TYPE= 1 TARGET= 799.000

14.98	8.70	623.00	0.00	0.00	623.75	.75	.21	.28	625.00
3500.	0.	3168.	332.	0.	436.	203.	563.	172.	625.00
1.73	.02	7.27	1.64	.075	.065	.075	.063	614.30	299.75
.008545	50.	50.	50.	2	0	0	0.00	318.60	1098.00

SPECIAL BRIDGE

5070,VARIABLE ELCHU OR ELCHD ON CARD SB NOT SPECIFIED

SB	XK	XKOR	COEG	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
	0.00	1.72	2.00	0.00	52.50	0.00	368.00	0.00	614.30	614.30

*SECNO 15.090

3265 DIVIDED FLOW

PRESSURE AND WEIR FLOW

EGPRS	EGLWC	H3	QWEIR	QPR	BAREA	TRAPEZOID AREA	ELLC	ELTRD
625.42	623.75	0.00	1047.	2459.	368.	404.	622.00	622.10

3470 ENCROACHMENT STATIONS= 237.0 1166.0 TYPE= 1 TARGET= 929.000
U/S FACE OF IVANREST AVE. (G)

15.09	9.51	623.81	0.00	0.00	624.19	.38	.45	0.00	625.00
3500.	51.	2678.	771.	69.	479.	467.	564.	173.	625.00
1.73	.74	5.60	1.65	.075	.065	.075	.063	614.30	238.96
.004605	32.	32.	32.	3	0	2	0.00	606.16	1164.77

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	OLOB	OCH	OROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 15.100

3470 ENCROACHMENT STATIONS= 435.0 1160.0 TYPE= 1 TARGET= 725.000

15.10	11.47	624.37	0.00	0.00	624.43	.05	.13	.10	619.30
3500.	1653.	1052.	795.	1305.	383.	827.	568.	174.	619.30
1.75	1.27	2.75	.96	.075	.055	.075	.063	612.90	435.00
.000609	100.	100.	100.	2	0	0	0.00	725.00	1160.00

CCHV= .100 CEHV= .300

*SECNO 15.300
(H)

15.30	9.15	626.05	0.00	0.00	626.12	.06	1.69	.00	620.90
3500.	2667.	814.	19.	2389.	228.	27.	682.	213.	620.80
2.08	1.12	3.57	.70	.085	.055	.085	.064	616.90	45.51
.001182	1875.	2575.	1725.	4	0	0	0.00	1103.39	1148.90

*SECNO 15.500

3265 DIVIDED FLOW

(I)

15.50	8.93	629.73	0.00	0.00	629.93	.19	3.77	.04	625.70
3500.	1249.	2041.	210.	832.	462.	128.	803.	262.	625.70
2.31	1.50	4.42	1.64	.085	.055	.085	.063	620.80	192.96
.001863	2575.	2575.	2575.	2	0	0	0.00	529.47	823.67

*SECNO 15.800

15.80	11.00	631.50	0.00	0.00	631.66	.15	1.73	.00	626.10
3500.	766.	1879.	855.	446.	463.	621.	842.	275.	625.20
2.42	1.72	4.05	1.38	.085	.055	.085	.062	620.50	988.42
.001192	1175.	1175.	1175.	1	0	0	0.00	437.72	1426.14

*SECNO 15.840

15.84	10.91	632.11	0.00	0.00	632.19	.08	.53	.01	627.20
3500.	1625.	1157.	718.	959.	353.	448.	861.	279.	628.00
2.48	1.69	3.27	1.60	.085	.055	.085	.062	621.20	50.25
.000934	500.	500.	500.	2	0	0	0.00	312.72	362.96

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	QLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

CCHV= .300 CEHV= .500
*SECNO 15.850
(J)

15.85	10.80	632.20	0.00	0.00	632.26	.06	.07	.01	624.00
3500.	1684.	856.	960.	1600.	259.	683.	865.	280.	623.20
2.49	1.40	3.30	1.41	.085	.055	.085	.062	621.40	76.01
.000717	80.	80.	80.	0	0	0	0.00	387.99	463.99

SPECIAL BRIDGE

SB	XK	AROR	COFQ	ROLEN	RWC	RWP	BAREA	SS	ELCHU	ELCHD
	0.00	1.70	3.05	0.00	29.50	0.00	177.20	0.00	623.20	623.20

*SECNO 15.860
PRESSURE AND WEIR FLOW

EGPRS	EGLWC	H3	QWEIR	QPR	BAREA	TRAPEZOID AREA	ELLC	ELTRD
642.50	634.06	0.00	2531.	969.	177.	177.	629.20	630.00

PRIVATE DRIVE

15.86	11.54	632.94	0.00	0.00	632.99	.05	.73	0.00	624.00
3500.	1726.	792.	982.	1373.	279.	781.	866.	280.	623.20
2.50	1.26	2.84	1.26	.085	.055	.085	.062	621.40	75.43
.000482	25.	25.	25.	2	0	5	0.00	389.14	464.57

*SECNO 15.870

15.87	11.33	632.93	0.00	0.00	633.04	.10	.02	.03	625.00
3500.	2073.	1167.	260.	1230.	310.	161.	868.	280.	626.50
2.50	1.69	3.77	1.62	.085	.055	.085	.062	621.60	46.75
.000982	30.	30.	30.	2	0	0	0.00	303.05	349.80

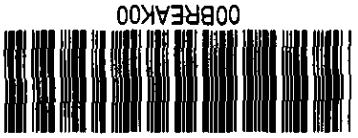


1) COUNTY: KENT

2) STUDY NAME: GRANDVILLE, CITY OF

3) WATERCOURSE: BUCK CREEK

4) DOCUMENT TYPE: REPORT



HYDRAULIC ANALYSIS REPORT

BUCK CREEK AT GRANDVILLE
KENT COUNTY, MICHIGAN

Prepared by

COMMONWEALTH ASSOCIATES INC.
209 EAST WASHINGTON AVENUE
JACKSON, MICHIGAN 49201

AUGUST, 1980

High-Water Marks

None

Starting Conditions

Since Buck Creek is quite small when compared to Grand River, mean flood level of Grand River was used to start hydraulic calculations for Buck Creek. A mean annual flood flow of 19,000 cfs was estimated for Grand River at Buck Creek (Figure 1). Based on the hydraulics of Grand River, a mean flood level of 595.3 was estimated at the confluence of Buck Creek (Figure 2). How? by HEC-2 run

Special Problems

None

References

1. "Flood Hazard Analysis, Buck Creek, Kent County, Michigan," by Soil Conservation Service, June, 1972.

Introduction

Hydraulic calculations were performed for the Buck Creek within the entire corporate boundaries of Grandville. Field cross section data, surveyed in 1970 and 1971 for the flood hazard study, was obtained from the Soil Conservation Service at East Lansing, Michigan. This study matches with the FIS of Wyoming at the upstream corporate boundary. In general, the elevations are comparable to the SCS study except the reach between Grand River and Canal Avenue due to different starting conditions. The flows for 50-, 100-, and 500-year recurrence intervals calculated by SCS were approved by the Michigan DNR. The extrapolated flows for 10-year was also approved by the DNR. The U.S.G.S. maps with 10-foot contour interval available for the area were used. This study was performed by Commonwealth Associates Inc., Jackson, Michigan, and the Project Manager was V. Danushkodi, P.E.

Method of Analysis

The HEC-2 computer program was utilized for the entire hydraulic analysis.

Variables and Coefficients

Manning's Roughness Coefficients

For channel	0.030-0.065
For overbanks	0.075-0.110

Coefficients for floodway

Contraction	0.10
Expansion	0.30

Coefficients for Bridges

Contraction	0.30
Expansion	0.50

Ratios

Contraction	1:1
Expansion	1:4

Coefficients for Weir Flow

Provided with bridge notes.

CROSS SECTION REFERENCE

SECNO	ID in Profile	DESCRIPTION
9.50	A	SCS Valley Section 9.5 at 500 feet upstream of Grand River
9.60	-	Repeated Valley Section 9.5
9.89	-	
9.90	-	
9.91	-	
9.92	-	Bridge Sections for I-196 (both eastbound
9.95	-	and westbound lanes)
9.96	-	
10.00	-	
10.06	-	
10.08	-	
10.10	-	
10.98	-	
11.00	-	
11.06	-	RR Bridge Sections
11.10	-	
11.20	-	
11.90	-	
11.98	-	
12.00	-	Bridge Sections for Chicago Drive
12.06	-	
12.10		
12.20		
12.50	B	SCS Valley Section 12.50
12.90	-	
12.98	-	
13.06	-	Canal Avenue Bridge Sections.
13.10	-	50-foot X 6.5-foot concrete box
13.20	C	
13.30	-	SCS Valley Section 13.30
13.70	D	SCS Valley Section 13.70
13.80	-	Interpolated Section

SECNO	ID in Profile	DESCRIPTION
13.90	-	
13.98	-	
14.06	E	Wilson Avenue Bridge Sections 25-foot X 7-foot concrete box - two bays
14.20	-	
14.30	-	SCS Valley Section 14.30
14.50	-	SCS Valley Section 14.50
14.55	-	Interpolated Section
14.58	-	
14.60	-	
14.61	-	
14.62	F	Cemetery Bridge Sections
14.63	-	
14.65	-	
14.70	-	SCS Valley Section 14.7
14.80	-	SCS Valley Section 14.8
14.81	-	
14.815	-	Bridge Sections for private drive 12.5-foot X 6-foot plus two bays
14.82	-	10.5-foot X 6 foot concrete boxes
14.90	-	SCS Valley Section 14.90
14.96	-	Repeated Section 14.90
14.98	-	
15.09	G	Ivanrest Avenue Bridge Sections 52.5-foot X 7-foot concrete box
15.10	-	
15.30	H	SCS Valley Section 15.30
15.50	I	SCS Valley Section 15.50
15.80	-	SCS Valley Section 15.80
15.84	-	SCS Valley Section 15.84
15.85	J	Private drive Bridge Sections
15.86	-	26-foot X 6-foot concrete box
15.87	-	plus three 3-foot diameter RC pipes

Bridge Notes and Sketches

Gilbert/Commonwealth
209 E Washington Avenue Jackson MI 49201

CALCULATION SHEET

REV

CLIENT/OWNER		FILING CODE
		JOB NO.
CALC. BY/DATE (SIGNATURE) [illegible] 7-11-80	SUBJECT	SHEET OF
CHECKED BY/DATE (SIGNATURE)	Buck Creek	BOOK NO.

Canal Ave Bridge (XSEC 13)
Special Bridge Calculations

50' x 6.5' Concrete Box
30' long
with rough bottom $n \approx 0.03$

$C_f = \frac{29.1 \, n^2 \, C}{R^{4/3}}$ $R = \frac{50 \times 6.5}{(50+6.5)^2}$

$= 2.876$ ft

$= 0.32$

$X_{60.2} = 1.0 + 0.5 + 0.32 = 1.82$

Coefficient for Hen Flow
Paved Surface $C = 3.5$

Area of Bridge $= 325$ ft^2

width 50'
Side Slope 0

FORM CAI/DCP 112 (9/78)

Gilbert/Commonwealth
209 E Washington Avenue, Jackson, MI 49201

CALCULATION SHEET

REV.

CLIENT/OWNER		FILING CODE
		JOB NO.
CALC BY/DATE (SIGNATURE) [illegible] 7-11-80	SUBJECT	SHEET OF
CHECKED BY/DATE (SIGNATURE)	Buck Creek	BOOK NO.

Special Bridge Calculations
Wilson Ave (XSEC14)

25' x 7' Concrete Box — Two spans

Area = 350 ft²

$R = \frac{350}{(25+7)2\times 2} = 2.13$ ft

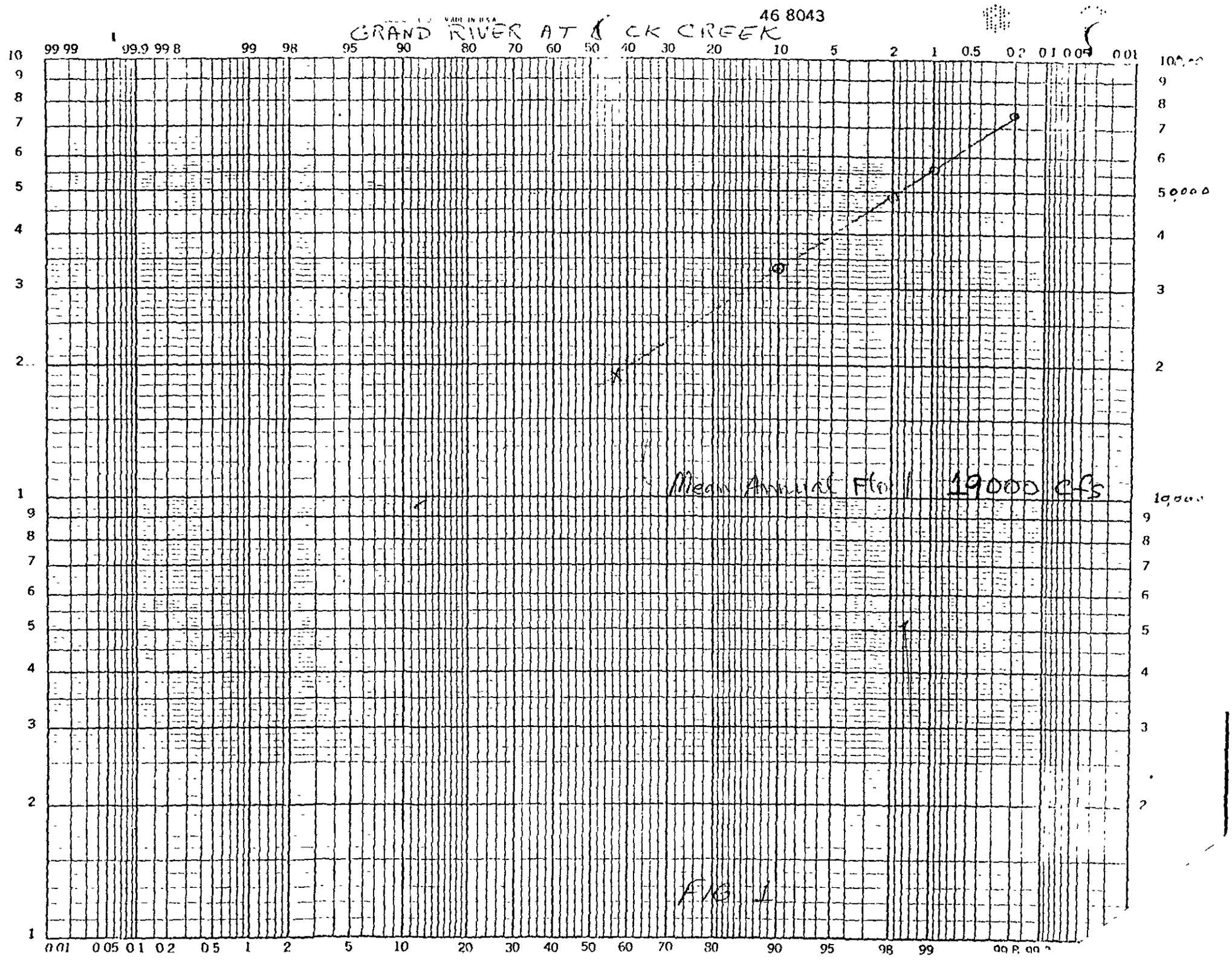
Rough bottom use n = .03
45 ft long bridge

$K_f = \frac{29.1\, n^2 L}{R^{4/3}} = .31$

$XK_oR = 1.0 + .5 + .31 = \underline{1.81}$

Width of Channel 52 ft
Side Slope 0
Width of Piers 2 ft

FORM CAI/DCP 112 (9/78)


46 8043
GRAND RIVER AT CK CREEK
Mean Annual Flow 19000 cfs
FIG 1

CLIENT/OWNER		FILING CODE / JOB NO.
CALC. BY/DATE (SIGNATURE) KWD 7-11-80	SUBJECT	SHEET OF
CHECKED BY/DATE (SIGNATURE)	Buck Creek	BOOK NO.

Special Bridge Calculations

Private Drive (Sec 14.8)

12.5' ~~first~~ 1st bay
10.5' ~~Second~~ bay
10.5' third bay
} depth 6'

Rough bottom use $n = .03$

38' long bridge

$A = 201\ ft^2$

$R = 1.95\ ft$

$$K_f = \frac{29.1\, n^2 L}{R^{4/3}}$$

$= 0.41$

$\Sigma K_{OR} = 1.0 + 0.5 + 0.41 = \underline{1.91}$

Coefficient for weir flow ≈ 2.8 (Dirt surface)

Width of Channel = 38 ft
Width of Pier = 9.5 ft
Side Slope = 0

Gilbert/Commonwealth
209 E Washington Avenue Jackson MI 49201

CALCULATION SHEET

REV.

CLIENT/OWNER		FILING CODE
		JOB NO
CALC BY/DATE (SIGNATURE) [illegible] 7-14-80	SUBJECT	SHEET OF
CHECKED BY/DATE (SIGNATURE)	Buck Creek	BOOK NO.

Special Bridge Calculations for Buck Creek at Ivanrest Bridge (XSEC 15)

52.5' x 7' Concrete Box
32 ft long

Rough bottom [illegible]

Area = 368 ft²

$R = \frac{368}{(52.1+7)^2} = 3.08$ ft

$K_f = \frac{24 \, m^2 \, l}{R^{4/3}} = 0.22$

XKOR = 1.0 + 0.5 + 0.22 = 1.72

Paved Surface = 0 = 3.0

Width of Channel = 52.5 ft

FORM CAI/DCP 112 (9/78)

Gilbert/Commonwealth
209 E Washington Avenue Jackson, MI 49201

CALCULATION SHEET

REV.

CLIENT/OWNER		FILING CODE
		JOB NO.
CALC. BY/DATE (SIGNATURE) [illegible] 2-16-80	SUBJECT	SHEET OF
CHECKED BY/DATE (SIGNATURE)	Buck Creek	BOOK NO.

special Bridge Calc for

Private Driveway (Sec 15 St)

20' x 6' Box 25 ft long — and 3 RCP [illegible]

Rough bottom : n = 0.03

Area = 156 ft² + 21.2 = 177.2 ft²

R = 2.44 ft

$$K_f = \frac{29.1\, n^2 L}{R^{4/3}} = 0.2$$

$$XKOR = 1.0 + 0.5 + 0.2 = \underline{\underline{1.7}}$$

Weir Flow Coefficient, C

Fixed Surf $\frac{h}{L} > 0.15$, H ≈ 3 ft

C = 3.05

FORM CAI/DCP 112 (9/78)

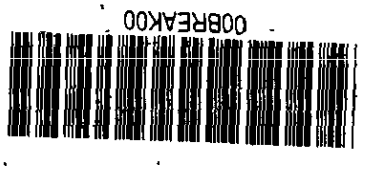


1) COUNTY: KENT

2) STUDY NAME: GRANDVILLE, ~~CITY~~ CITY OF

3) WATERCOURSE: HUIZENGA DRAIN

4) DOCUMENT TYPE: 10, 50, 100, 500 YEAR SUMMARYS



THIS RUN EXECUTED 06/05/81

```
**************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED  AUG1977
  ERROR CORR -  01,02
  MODIFICATION -  50,51,52,53
**************************************************

C
T1       FIS GRANDVILLE, KENT CO.
T2        10-YEAR FLOOD
T3       HUIZENGA DRAIN
```

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
	0.	2.	0.	0.	0.0	0.0	0.0	0.	613.990	0.0
J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	1.000	0.0	-1.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0
J3	VARIABLE CODES FOR SUMMARY PRINTOUT									
	38.000	1.000	53.000	21.000	22.000	54.000	4.000	39.000	150.000	203.000
	51.000	76.000	90.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0

J5	LPRNT	NUMSEC				********REQUESTED SECTION NUMBERS********					
	-10.000	-10.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
NC	0.070	0.070	0.040	0.100	0.300	0.0	0.0	0.0	0.0	0.0	0.0
QT	5.000	215.000	340.000	385.000	605.000	385.000	0.0	0.0	0.0	0.0	0.0
NC	0.0	0.0	0.0	0.300	0.500	0.0	0.0	0.0	0.0	0.0	0.0
X1	1.800	17.000	2000.000	2011.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GR	618.600	1530.000	618.500	1684.000	618.200	1826.000	618.100	1962.000	617.800	2000.000	
GR	612.300	2000.000	611.300	2000.500	610.300	2002.500	610.300	2004.500	610.300	2006.500	
GR	610.300	2008.500	611.300	2010.500	612.300	2011.000	617.800	2011.000	618.900	2104.000	
GR	618.100	2248.000	617.200	2470.000	0.0	0.0	0.0	0.0	0.0	0.0	
SB	0.0	1.984	3.000	0.0	8.240	0.0	57.000	0.0	609.900	610.300	

KENOWA AVE U/S (A)

X1	2.000	17.000	2000.000	2011.000	43.000	43.000	43.000	0.0	0.0	0.0
X2	0.0	0.0	1.000	616.900	617.800	0.0	0.0	0.0	0.0	0.0
BT	17.000	1530.000	618.600	618.600	1684.000	618.500	618.500	1826.000	618.200	618.200
BT	1962.000	618.100	618.100	2000.000	617.800	617.800	2000.000	617.800	611.900	2000.500
BT	617.800	613.900	2002.500	617.800	615.900	2004.500	617.800	616.900	2006.500	617.800
BT	616.900	2008.500	617.800	615.900	2010.500	617.800	613.900	2011.000	617.800	611.900
BT	2011.000	617.800	617.800	2104.000	618.900	618.900	2248.000	618.100	618.100	2270.000
BT	618.300	618.300	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GR	618.600	1530.000	618.500	1684.000	618.200	1826.000	618.100	1962.000	617.800	2000.000
GR	611.900	2000.000	610.900	2000.500	609.900	2002.500	609.900	2004.500	609.900	2006.500
GR	609.900	2008.500	610.900	2010.500	611.900	2011.000	617.800	2011.000	618.900	2104.000
GR	618.100	2248.000	618.300	2270.000	0.0	0.0	0.0	0.0	0.0	0.0
QT	5.000	175.000	275.000	310.000	530.000	310.000	0.0	0.0	0.0	0.0

MOORE BUSINESS FORMS, INC 23

X1	2.200	11.000	2124.000	2144.000	30.000	30.000	30.000	0.0	0.0	0.0
GR	619.700	2000.000	617.900	2098.000	617.500	2114.000	614.300	2124.000	611.300	2132.000
GR	610.700	2134.000	611.200	2140.000	613.600	2144.000	616.000	2150.000	618.400	2180.000
GR	621.000	2253.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.0	0.0	0.0	0.100	0.300	0.0	0.0	0.0	0.0	0.0
X1	2.700	11.000	1998.000	2013.000	859.000	859.000	859.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	1990.000	0.0	2035.000	0.0	0.0	0.0	0.0
GR	619.700	1980.000	617.200	1992.000	614.800	1998.000	612.600	2000.000	612.000	2005.000
GR	612.600	2011.000	614.100	2013.000	616.400	2017.000	616.600	2038.000	616.300	2120.000
GR	621.000	2166.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.0	0.0	0.0	0.300	0.500	0.0	0.0	0.0	0.0	0.0
X1	2.800	18.000	2000.000	2020.000	50.000	50.000	50.000	0.0	0.0	0.0
X3	0.0	612.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GR	622.700	1800.000	622.500	1900.000	622.200	2000.000	612.000	2000.000	610.500	2000.500
GR	609.000	2002.500	609.000	2006.500	610.500	2008.500	612.000	2009.000	612.000	2011.000
GR	610.500	2011.500	609.000	2013.500	609.000	2017.500	610.500	2019.500	612.000	2020.000
GR	622.200	2020.000	622.000	2100.000	622.800	2200.000	0.0	0.0	0.0	0.0
SB	1.250	4.420	3.000	0.0	17.400	2.000	46.100	0.0	609.500	609.000

I-196 U/S (B)

X1	3.000	18.000	2000.000	2020.000	270.000	270.000	270.000	0.0	0.0	0.0
X2	0.0	0.0	1.000	615.500	621.800	0.0	0.0	0.0	0.0	0.0
X3	0.0	612.500	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BT	18.000	1800.000	622.700	622.700	1900.000	622.500	622.500	2000.000	622.200	622.200
BT	2000.000	622.200	612.500	2000.500	622.200	614.000	2002.500	622.200	615.500	2006.200
BT	622.200	615.500	2008.500	622.200	614.000	2009.000	622.200	612.500	2011.000	622.200
BT	612.500	2011.500	622.200	614.000	2013.500	622.200	615.500	2017.500	622.200	615.500
BT	2019.500	622.200	614.000	2020.000	622.200	612.500	2020.000	622.200	622.200	2100.000
BT	622.000	622.000	2200.000	621.800	621.800	0.0	0.0	0.0	0.0	0.0
GR	622.700	1800.000	622.500	1900.000	622.200	2000.000	612.500	2000.000	611.000	2000.500
GR	609.500	2002.500	609.500	2006.500	611.000	2008.500	612.500	2009.000	612.500	2011.000
GR	611.000	2011.500	609.500	2013.500	609.500	2017.500	611.000	2019.500	612.500	2020.000
GR	622.200	2020.000	622.000	2100.000	621.800	2200.000	0.0	0.0	0.0	0.0
X1	3.200	11.000	1992.000	2030.000	50.000	50.000	50.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	1951.000	0.0	2071.000	0.0	0.0	0.0	0.0
GR	617.000	1890.000	617.500	1992.000	614.900	2000.000	613.100	2006.000	612.500	2011.000
GR	613.100	2016.000	613.400	2022.000	616.300	2030.000	616.800	2044.000	617.300	2132.000
GR	621.300	2204.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.0	0.0	0.0	0.100	0.300	0.0	0.0	0.0	0.0	0.0
X1	3.700	9.000	2000.000	2019.000	1367.000	1367.000	1367.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	1850.000	0.0	2080.000	0.0	0.0	0.0	0.0
GR	619.200	1792.000	617.700	1960.000	618.600	1996.000	617.300	2000.000	615.300	2003.000
GR	614.900	2009.500	615.300	2016.000	617.600	2019.000	619.600	2162.000	0.0	0.0
NC	0.0	0.0	0.0	0.300	0.500	0.0	0.0	0.0	0.0	0.0
X1	3.800	20.000	2000.000	2014.000	30.000	30.000	30.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	1850.000	0.0	2080.000	0.0	618.200	618.200	0.0
GR	620.000	1640.000	620.000	1640.000	620.000	1640.000	620.000	1640.000	616.200	2000.000
GR	615.200	2000.500	614.700	2001.500	614.200	2003.000	614.700	2004.500	615.200	2005.500
GR	616.200	2006.000	616.200	2008.000	615.200	2008.500	614.700	2009.500	614.200	2011.000
GR	614.700	2012.500	615.200	2013.500	616.200	2014.000	620.000	2300.000	620.000	2300.000
SB	1.250	1.700	3.000	0.0	11.650	2.000	35.400	0.0	614.200	614.200

CANAL AVE U/S (C)

X1	4.000	0.0	0.0	0.0	36.000	36.000	36.000	0.0	0.0	0.0

MOORE BUSINESS FORMS, INC. 23

X2	0.0	0.0	1.000	618.200	620.060	0.0	0.0	0.0	0.0	0.0
X3	10.000	0.0	0.0	1850.000	0.0	2080.000	0.0	620.060	620.060	0.0
BT	21.000	1850.000	625.000	625.000	1850.000	620.060	620.060	1940.000	620.060	620.060
BT	2000.000	620.060	620.060	2000.000	620.060	616.200	2000.500	620.060	617.200	2001.500
BT	620.060	617.700	2003.000	620.060	618.200	2004.500	620.060	617.700	2005.500	620.060
BT	617.200	2006.000	620.060	616.200	2008.000	620.060	616.200	2008.500	620.060	617.200
BT	2009.500	620.060	617.700	2011.000	620.060	618.200	2012.500	620.060	617.700	2015.500
BT	620.060	617.200	2014.000	620.060	616.200	2014.000	620.060	620.060	2080.000	620.060
BT	620.060	2080.000	625.000	625.000	0.0	0.0	0.0	0.0	0.0	0.0
X1	4.200	15.000	2000.000	2020.000	30.000	30.000	30.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	1850.000	0.0	2100.000	0.0	0.0	0.0	0.0
GR	625.000	1380.000	620.000	1600.000	620.000	1600.000	620.000	1600.000	620.000	1600.000
GR	619.500	1766.000	619.900	1966.000	619.800	1992.000	617.200	2000.000	615.500	2003.000
GR	614.600	2009.500	615.500	2016.000	618.100	2020.000	618.500	2124.000	620.000	2210.000
QT	5.000	195.000	305.000	350.000	530.000	350.000	0.0	0.0	0.0	0.0
NC	0.0	0.0	0.0	0.100	0.300	0.0	0.0	0.0	0.0	0.0

VALLEY SECTION D

X1	4.500	7.000	2012.000	2050.000	1360.000	1360.000	1360.000	0.0	0.0	0.0
GR	625.000	1940.000	619.900	2000.000	620.000	2012.000	615.700	2024.000	615.700	2039.000
GR	619.900	2050.000	625.000	2110.000	0.0	0.0	0.0	0.0	0.0	0.0

SECTION E AT CONFLUENCE BRANCH NO. 3

X1	4.600	6.000	2010.000	2057.000	1000.000	1000.000	1000.000	0.0	0.0	0.0
GR	625.400	2000.000	624.900	2010.000	616.500	2032.000	616.500	2044.000	621.600	2057.000
GR	623.200	2122.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
QT	5.000	140.000	255.000	300.000	480.000	300.000	0.0	0.0	0.0	0.0
X1	4.620	0.0	0.0	0.0	133.000	133.000	133.000	0.0	1.400	0.0
X1	4.650	0.0	0.0	0.0	132.000	132.000	132.000	0.0	1.300	0.0
X1	4.700	10.000	2008.000	2016.000	265.000	265.000	265.000	0.0	-1.200	0.0
X3	0.0	0.0	0.0	1970.000	0.0	2045.000	0.0	0.0	0.0	0.0
GR	628.800	1928.000	628.900	1993.000	624.800	2000.000	623.400	2008.000	623.000	2011.000
GR	623.400	2015.000	624.200	2016.000	629.400	2027.000	630.400	2064.000	630.600	2144.000
NC	0.0	0.0	0.0	0.300	0.500	0.0	0.0	0.0	0.0	0.0
X1	4.800	0.0	0.0	0.0	30.000	30.000	30.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	1970.000	0.0	2030.000	0.0	0.0	0.0	0.0
SB	1.250	1.800	3.000	0.0	9.000	2.000	21.000	0.0	622.700	622.700

44TH STREET U/S (F)

X1	5.000	15.000	2000.000	2012.000	40.000	40.000	40.000	0.0	0.0	0.0
X2	0.0	0.0	1.000	625.700	627.400	0.0	0.0	0.0	0.0	0.0
X3	0.0	0.0	0.0	1975.000	0.0	2020.000	0.0	0.0	0.0	0.0
BT	16.000	1975.000	630.000	630.000	1975.000	627.500	627.500	2000.000	627.400	627.400
BT	2000.000	627.400	624.200	2001.000	627.400	625.200	2002.500	627.400	625.700	2004.000
BT	627.400	625.200	2005.000	627.400	624.200	2007.000	627.400	624.200	2008.000	627.400
BT	625.200	2009.500	627.400	625.700	2011.000	627.400	625.200	2012.000	627.400	624.200
BT	2012.000	627.400	627.400	2020.000	627.400	627.400	2020.000	630.000	630.000	0.0
GR	629.300	1787.000	629.300	1787.000	629.300	1787.000	624.200	2000.000	623.200	2001.000
GR	622.700	2002.500	623.200	2004.000	624.200	2005.000	624.200	2007.000	623.200	2008.000
GR	622.700	2009.500	623.200	2011.000	624.200	2012.000	626.700	2135.000	626.700	2135.000

MOORE BUSINESS FORMS, INC 23

X1	5.200	10.000	2008.000	2016.000	30.000	30.000	30.000	0.0	0.0	0.0
GR	628.800	1928.000	628.900	1993.000	624.800	2000.000	623.400	2008.000	623.000	2011.000
GR	623.400	2015.000	624.200	2016.000	629.400	2027.000	630.400	2064.000	630.600	2144.000
NC	0.0	0.0	0.0	0.100	0.300	0.0	0.0	0.0	0.0	0.0
X1	7.900	8.000	5840.000	5852.000	630.000	630.000	630.000	0.0	-0.700	0.0
GR	633.400	5800.000	632.900	5832.000	628.000	5840.000	624.900	5840.000	624.900	5852.000
GR	628.000	5852.000	632.700	5862.000	632.800	5900.000	0.0	0.0	0.0	0.0
NC	0.0	0.0	0.0	0.300	0.500	0.0	0.0	0.0	0.0	0.0
X1	8.000	0.0	0.0	0.0	50.000	50.000	50.000	0.0	0.0	0.0
SB	0.0	4.170	3.000	0.0	7.200	0.0	22.800	0.0	624.900	624.200

RIVERTOWN PARKWAY TWIN CMP CULVERT 140 FT LONG U/S

X1	8.100	0.0	0.0	0.0	140.000	140.000	140.000	0.0	0.700	0.0
X2	0.0	0.0	1.000	628.200	633.600	0.0	0.0	0.0	0.0	0.0
BT	4.000	5800.000	633.930	0.0	5850.000	634.030	0.0	5900.000	633.920	0.0
BT	5950.000	633.600	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X1	8.200	0.0	0.0	0.0	50.000	50.000	50.000	0.0	0.0	0.0
NC	0.0	0.0	0.0	0.100	0.300	0.0	0.0	0.0	0.0	0.0
X1	5.700	8.000	2041.000	2063.000	883.000	883.000	883.000	0.0	0.0	0.0
GR	635.500	2031.000	632.400	2041.000	629.400	2051.000	629.000	2053.000	629.400	2055.000
GR	631.900	2063.000	635.200	2074.000	635.400	2098.000	0.0	0.0	0.0	0.0
NC	0.0	0.0	0.0	0.300	0.500	0.0	0.0	0.0	0.0	0.0
X1	5.800	0.0	0.0	0.0	30.000	30.000	30.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	1970.000	0.0	2112.000	0.0	0.0	0.0	0.0
SB	0.0	1.769	3.000	0.0	3.530	0.0	15.900	0.0	629.500	629.500

WILSON AVE U/S (G)

X1	6.000	15.000	2000.000	2004.500	50.000	50.000	50.000	0.0	0.0	0.0
X2	0.0	0.0	1.000	634.000	635.700	0.0	0.0	0.0	0.0	0.0
X3	10.000	0.0	0.0	1982.000	0.0	2100.000	0.0	635.700	635.700	0.0
BT	16.000	1982.000	637.700	637.700	1982.000	635.800	635.800	1982.000	635.800	635.800
BT	2000.000	635.700	635.700	2000.000	635.700	632.300	2000.500	635.700	633.300	2001.300
BT	635.700	633.800	2001.800	635.700	634.000	2002.800	635.700	634.000	2003.300	635.700
BT	633.800	2004.000	635.700	633.300	2004.500	635.700	632.300	2004.500	635.700	635.700
BT	2022.000	635.700	635.700	2100.000	635.700	635.700	2100.000	638.000	638.000	0.0
GR	637.800	1570.000	636.500	1808.000	635.800	1970.000	635.700	2000.000	631.300	2000.000
GR	630.300	2000.500	629.800	2001.300	629.500	2001.800	629.500	2002.800	629.800	2003.300
GR	630.300	2004.000	631.300	2004.500	633.400	2004.500	635.700	2100.000	638.000	2100.000
X1	6.200	10.000	2031.000	2054.000	100.000	100.000	100.000	0.0	0.0	0.0
GR	637.500	2015.000	637.500	2015.000	636.800	2031.000	633.600	2036.000	630.200	2041.000
GR	629.900	2043.000	630.200	2045.000	633.400	2054.000	636.300	2060.000	636.900	2094.000
NC	0.0	0.0	0.0	0.100	0.300	0.0	0.0	0.0	0.0	0.0
QT	5.000	65.000	120.000	140.000	225.000	140.000	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	0.0	1.400	0.0	0.0	0.0	0.0

CITY LIMITS (H)

X1	6.300	6.000	259.000	282.000	1350.000	1350.000	1350.000	0.0	0.0	0.0
GR	640.000	0.0	637.000	259.000	635.000	259.000	635.000	282.000	637.000	282.000
GR	640.000	1120.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
[illegible]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

MOORE BUSINESS FORMS INC 23

THIS RUN EXECUTED 06/05/81

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  HEC2 RELEASE DATED NOV 76 UPDATED  AUG1977
  ERROR CORR =  01,02
  MODIFICATION =  50,51,52,53
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NOTE= ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

HUIZENGA DRAIN

SUMMARY PRINTOUT

SECNO	CWSEL	SSTA	STCHL	STCHR	ENDST	TOPWID	XLCH
1.800	613.99	2000.00	2000.00	2011.00	2011.00	11.00	0.0
1.800	614.77	2000.00	2000.00	2011.00	2011.00	11.00	0.0
1.800	615.02	2000.00	2000.00	2011.00	2011.00	11.00	0.0
1.800	616.00	2000.00	2000.00	2011.00	2011.00	11.00	0.0
2.000	614.49	2000.00	2000.00	2011.00	2011.00	11.00	43.00
2.000	615.49	2000.00	2000.00	2011.00	2011.00	11.00	43.00
2.000	615.81	2000.00	2000.00	2011.00	2011.00	11.00	43.00
2.000	617.45	2000.00	2000.00	2011.00	2011.00	11.00	43.00
2.200	614.88	2122.18	2124.00	2144.00	2147.20	25.02	30.00
2.200	616.24	2117.93	2124.00	2144.00	2153.03	35.10	30.00
2.200	616.70	2116.49	2124.00	2144.00	2158.77	42.28	30.00
2.200	618.48	2066.24	2124.00	2144.00	2182.34	116.10	30.00
2.700	616.23	1994.40	1998.00	2013.00	2016.72	22.33	859.00
2.700	617.26	1991.69	1998.00	2013.00	2035.00	43.31	859.00
2.700	617.61	1990.01	1998.00	2013.00	2035.00	44.99	859.00
2.700	619.22	1990.00	1998.00	2013.00	2035.00	45.00	859.00
2.800	616.39	2000.00	2000.00	2020.00	2020.00	20.00	50.00
2.800	617.43	2000.00	2000.00	2020.00	2020.00	20.00	50.00
2.800	617.76	2000.00	2000.00	2020.00	2020.00	20.00	50.00
2.800	619.29	2000.00	2000.00	2020.00	2020.00	20.00	50.00
3.000	617.33	2000.00	2000.00	2020.00	2020.00	20.00	270.00
3.000	619.81	2000.00	2000.00	2020.00	2020.00	20.00	270.00
3.000	620.81	2000.00	2000.00	2020.00	2020.00	20.00	270.00
3.000	622.39	1936.69	2000.00	2020.00	2200.00	263.31	270.00
3.200	617.38	1951.00	1992.00	2030.00	2071.00	93.08	50.00
3.200	619.88	1951.00	1992.00	2030.00	2071.00	120.00	50.00
3.200	620.87	1951.00	1992.00	2030.00	2071.00	120.00	50.00
3.200	622.51	1951.00	1992.00	2030.00	2071.00	120.00	50.00
3.700	618.19	1903.98	2000.00	2019.00	2061.90	140.69	1367.00
3.700	620.01	1850.00	2000.00	2019.00	2080.00	230.00	1367.00
3.700	620.95	1850.00	2000.00	2019.00	2080.00	230.00	1367.00
3.700	622.59	1850.00	2000.00	2019.00	2080.00	230.00	1367.00

MOORE BUSINESS FORMS INC 23

	SECNO	CWSEL	SSTA	STCHL	STCHR	ENDST	TOPWID	XLCH
	3.800	618.39	1850.00	2000.00	2014.00	2080.00	230.00	30.00
	3.800	620.03	1850.00	2000.00	2014.00	2080.00	230.00	30.00
	3.800	620.96	1850.00	2000.00	2014.00	2080.00	230.00	30.00
	3.800	622.59	1850.00	2000.00	2014.00	2080.00	230.00	30.00
	4.000	618.87	2000.00	2000.00	2014.00	2014.00	14.00	36.00
	4.000	620.41	1850.00	2000.00	2014.00	2080.00	230.00	36.00
	4.000	621.01	1850.00	2000.00	2014.00	2080.00	230.00	36.00
	4.000	622.65	1850.00	2000.00	2014.00	2080.00	230.00	36.00
	4.200	619.04	1994.34	2000.00	2020.00	2100.00	105.66	30.00
	4.200	620.40	1850.00	2000.00	2020.00	2100.00	250.00	30.00
	4.200	621.00	1850.00	2000.00	2020.00	2100.00	250.00	30.00
	4.200	622.65	1850.00	2000.00	2020.00	2100.00	250.00	30.00
	4.500	619.88	2012.34	2012.00	2050.00	2049.94	37.60	1360.00
	4.500	620.85	1988.86	2012.00	2050.00	2061.14	72.27	1360.00
	4.500	621.30	1983.54	2012.00	2050.00	2066.46	82.93	1360.00
	4.500	622.81	1965.71	2012.00	2050.00	2084.29	118.59	1360.00
	4.600	620.57	2021.34	2010.00	2057.00	2054.38	33.04	1000.00
	4.600	621.51	2018.89	2010.00	2057.00	2056.76	37.88	1000.00
	4.600	621.89	2017.89	2010.00	2057.00	2068.67	50.78	1000.00
	4.600	623.23	2014.38	2010.00	2057.00	2122.00	107.62	1000.00
	4.620	620.71	2024.65	2010.00	2057.00	2051.16	26.51	133.00
	4.620	621.64	2022.21	2010.00	2057.00	2053.53	31.32	133.00
	4.620	622.01	2021.24	2010.00	2057.00	2054.47	33.24	133.00
	4.620	623.30	2017.87	2010.00	2057.00	2068.97	51.10	133.00
	4.650	621.05	2027.14	2010.00	2057.00	2048.73	21.59	132.00
	4.650	621.96	2024.76	2010.00	2057.00	2051.05	26.29	132.00
	4.650	622.30	2023.87	2010.00	2057.00	2051.91	28.04	132.00
	4.650	623.51	2020.70	2010.00	2057.00	2054.99	34.29	132.00
	4.700	624.02	1999.28	2008.00	2016.00	2018.16	18.87	265.00
*	4.700	624.70	1998.13	2008.00	2016.00	2019.59	21.46	265.00
*	4.700	624.95	1997.69	2008.00	2016.00	2020.13	22.44	265.00
*	4.700	625.76	1996.31	2008.00	2016.00	2021.84	25.53	265.00
	4.800	624.77	1998.00	2008.00	2016.00	2019.75	21.74	30.00
	4.800	625.69	1996.44	2008.00	2016.00	2021.68	25.25	30.00
	4.800	625.97	1995.95	2008.00	2016.00	2022.28	26.33	30.00
	4.800	626.99	1994.21	2008.00	2016.00	2024.44	30.22	30.00
*	5.000	626.12	1975.00	2000.00	2012.00	2020.00	45.00	40.00
*	5.000	627.98	1975.00	2000.00	2012.00	2020.00	45.00	40.00
*	5.000	628.23	1975.00	2000.00	2012.00	2020.00	45.00	40.00
*	5.000	629.01	1975.00	2000.00	2012.00	2020.00	45.00	40.00
	5.200	626.10	1997.79	2008.00	2016.00	2020.01	22.22	30.00
	5.200	627.93	1994.65	2008.00	2016.00	2023.90	29.25	30.00
	5.200	628.18	1994.23	2008.00	2016.00	2024.42	30.19	30.00
	5.200	628.91	1928.00	2008.00	2016.00	2025.97	97.97	30.00

MOORE BUSINESS FORMS, INC. 23

SECNO	CWSEL	SSTA	STCHL	STCHR	ENDST	TOPWID	XLCH
7.900	627.95	5838.95	5840.00	5852.00	5853.37	14.43	630.00
7.900	629.22	5836.86	5840.00	5852.00	5856.08	19.22	630.00
7.900	629.60	5836.25	5840.00	5852.00	5856.88	20.63	630.00
7.900	630.82	5834.26	5840.00	5852.00	5859.48	25.22	630.00
8.000	628.06	5838.76	5840.00	5852.00	5853.61	14.85	50.00
8.000	629.36	5836.63	5840.00	5852.00	5856.39	19.75	50.00
8.000	629.75	5836.00	5840.00	5852.00	5857.21	21.22	50.00
8.000	631.01	5833.93	5840.00	5852.00	5859.90	25.96	50.00
8.100	630.44	5836.02	5840.00	5852.00	5857.18	21.16	140.00
8.100	634.13	5800.00	5840.00	5852.00	5900.00	100.00	140.00
8.100	634.25	5800.00	5840.00	5852.00	5900.00	100.00	140.00
8.100	634.60	5800.00	5840.00	5852.00	5900.00	100.00	140.00
8.200	630.46	5835.97	5840.00	5852.00	5857.24	21.27	50.00
8.200	634.14	5800.00	5840.00	5852.00	5900.00	100.00	50.00
8.200	634.26	5800.00	5840.00	5852.00	5900.00	100.00	50.00
8.200	634.62	5800.00	5840.00	5852.00	5900.00	100.00	50.00
5.700	631.45	2044.15	2041.00	2063.00	2061.58	17.43	883.00
5.700	634.39	2034.58	2041.00	2063.00	2071.30	36.73	883.00
5.700	634.58	2033.98	2041.00	2063.00	2071.92	37.93	883.00
5.700	635.21	2031.94	2041.00	2063.00	2075.15	43.21	883.00
5.800	632.20	2041.67	2041.00	2063.00	2063.99	22.32	30.00
5.800	634.42	2034.50	2041.00	2063.00	2071.39	36.89	30.00
5.800	634.61	2033.89	2041.00	2063.00	2072.02	38.13	30.00
5.800	635.27	2031.73	2041.00	2063.00	2082.75	51.02	30.00
* 6.000	633.13	2000.00	2000.00	2004.50	2004.50	4.50	50.00
6.000	636.17	1982.00	2000.00	2004.50	2100.00	118.00	50.00
6.000	636.28	1982.00	2000.00	2004.50	2100.00	118.00	50.00
6.000	636.66	1982.00	2000.00	2004.50	2100.00	118.00	50.00
6.200	635.37	2033.24	2031.00	2054.00	2058.07	24.84	100.00
6.200	636.26	2031.85	2031.00	2054.00	2059.91	28.07	100.00
6.200	636.38	2031.66	2031.00	2054.00	2060.43	32.77	100.00
6.200	636.79	2031.02	2031.00	2054.00	2087.72	56.70	100.00
6.300	636.41	259.00	259.00	282.00	282.00	23.00	1350.00
6.300	637.53	212.99	259.00	282.00	430.87	217.88	1350.00
6.300	637.77	192.20	259.00	282.00	498.13	305.93	1350.00
6.300	638.42	136.42	259.00	282.00	678.60	542.18	1350.00

MOORE BUSINESS FORMS, INC. 23

HUIZENGA DRAIN

SUMMARY PRINTOUT TABLE 150

SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10K*8	VCH	AREA	.01K
1.800	0.0	0.0	0.0	610.30	215.00	613.99	0.0	614.51	79.94	5.80	37.09	24.05
1.800	0.0	0.0	0.0	610.30	340.00	614.77	0.0	615.63	113.03	7.44	45.67	31.98
1.800	0.0	0.0	0.0	610.30	385.00	615.02	0.0	616.00	123.79	7.95	48.42	34.60
1.800	0.0	0.0	0.0	610.30	605.00	616.00	0.0	617.62	158.33	10.22	59.20	45.18
2.000	43.00	617.80	616.90	609.90	215.00	614.49	0.0	614.86	61.07	4.86	44.20	27.51
2.000	43.00	617.80	616.90	609.90	340.00	615.49	0.0	616.15	99.26	6.51	52.23	34.13
2.000	43.00	617.80	616.90	609.90	385.00	615.81	0.0	616.57	112.42	7.03	54.80	36.28
2.000	43.00	617.80	616.90	609.90	605.00	617.45	0.0	618.35	83.98	7.61	79.52	66.02
2.200	30.00	0.0	0.0	610.70	175.00	614.88	0.0	615.02	17.14	3.00	60.51	42.27
2.200	30.00	0.0	0.0	610.70	275.00	616.24	0.0	616.38	10.96	3.10	100.07	83.08
2.200	30.00	0.0	0.0	610.70	310.00	616.70	0.0	616.84	9.53	3.09	117.84	100.43
2.200	30.00	0.0	0.0	610.70	530.00	618.48	0.0	618.63	7.42	3.38	238.29	194.54
2.700	859.00	0.0	0.0	612.00	175.00	616.23	0.0	616.38	14.68	3.14	60.81	45.68
2.700	859.00	0.0	0.0	612.00	275.00	617.26	0.0	617.45	13.79	3.59	99.23	74.07
2.700	859.00	0.0	0.0	612.00	310.00	617.61	0.0	617.80	12.85	3.84	114.67	86.48
2.700	859.00	0.0	0.0	612.00	530.00	619.22	0.0	619.43	11.48	4.14	186.86	156.57
2.800	50.00	0.0	0.0	612.00	175.00	616.39	0.0	616.46	6.49	1.99	87.89	68.71
2.800	50.00	0.0	0.0	612.00	275.00	617.43	0.0	617.53	8.69	2.53	108.53	93.26
2.800	50.00	0.0	0.0	612.00	310.00	617.76	0.0	617.87	9.32	2.69	115.19	101.53
2.800	50.00	0.0	0.0	612.00	530.00	619.29	0.0	619.49	14.06	3.64	145.78	141.35
3.000	270.00	621.80	615.50	612.50	175.00	617.33	0.0	617.38	4.92	1.81	96.64	78.90
3.000	270.00	621.80	615.50	612.50	275.00	619.81	0.0	619.87	3.75	1.88	146.27	142.01
3.000	270.00	621.80	615.50	612.50	310.00	620.81	0.0	620.86	3.36	1.87	166.19	169.24
3.000	270.00	621.80	615.50	612.50	530.00	622.39	0.0	622.49	5.58	2.57	275.99	224.31
3.200	50.00	0.0	0.0	612.50	175.00	617.38	0.0	617.41	3.14	1.40	145.49	98.69
3.200	50.00	0.0	0.0	612.50	275.00	619.88	0.0	619.89	0.64	0.93	444.73	342.46
3.200	50.00	0.0	0.0	612.50	310.00	620.87	0.0	620.88	0.42	0.83	564.17	478.51
3.200	50.00	0.0	0.0	612.50	530.00	622.51	0.0	622.52	0.51	1.07	760.37	740.24
3.700	1367.00	0.0	0.0	614.90	175.00	618.19	0.0	618.34	21.08	3.15	84.38	38.15
3.700	1367.00	0.0	0.0	614.90	275.00	620.01	0.0	620.02	1.71	1.27	482.54	210.04
3.700	1367.00	0.0	0.0	614.90	310.00	620.95	0.0	620.96	0.74	0.94	698.19	361.56
3.700	1367.00	0.0	0.0	614.90	530.00	622.59	0.0	622.59	0.57	0.99	1075.08	703.06
3.800	30.00	0.0	0.0	614.20	175.00	618.39	0.0	618.39	1.98	1.02	371.39	124.39
3.800	30.00	0.0	0.0	614.20	275.00	620.03	0.0	620.03	0.55	0.70	747.77	369.91
3.800	30.00	0.0	0.0	614.20	310.00	620.96	0.0	620.96	0.31	0.59	961.77	553.34
3.800	30.00	0.0	0.0	614.20	530.00	622.59	0.0	622.60	0.32	0.70	1338.46	942.07
4.000	36.00	620.06	618.20	614.20	175.00	618.87	0.0	619.03	20.25	3.25	53.83	38.89
4.000	36.00	620.06	618.20	614.20	275.00	620.41	0.0	620.41	0.39	0.62	836.66	442.58
4.000	36.00	620.06	618.20	614.20	310.00	621.01	0.0	621.01	0.30	0.58	974.46	565.11
4.000	36.00	620.06	618.20	614.20	530.00	622.65	0.0	622.65	0.31	0.69	1352.42	957.72
4.200	30.00	0.0	0.0	614.60	175.00	619.04	0.0	619.09	6.58	2.08	136.94	68.21
4.200	30.00	0.0	0.0	614.60	275.00	620.40	0.0	620.42	2.45	1.59	370.52	175.61
4.200	30.00	0.0	0.0	614.60	310.00	621.00	0.0	621.01	1.45	1.32	520.24	257.27
4.200	30.00	0.0	0.0	614.60	530.00	622.65	0.0	622.66	0.88	1.22	930.82	566.17

MOORE BUSINESS FORMS INC 23

	SECNO	XLCH	ELTRO	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10K*S	VCH	AREA	.01K
	4.500	1360.00	0.0	0.0	615.70	195.00	619.88	0.0	619.93	5.75	1.77	109.89	81.31
	4.500	1360.00	0.0	0.0	615.70	305.00	620.85	0.0	620.91	5.17	2.03	167.98	134.10
	4.500	1360.00	0.0	0.0	615.70	350.00	621.30	0.0	621.36	4.49	2.03	203.11	165.18
	4.500	1360.00	0.0	0.0	615.70	530.00	622.81	0.0	622.87	3.09	2.06	355.83	301.53
	4.600	1000.00	0.0	0.0	616.50	195.00	620.57	0.0	620.64	8.92	2.13	91.69	65.28
	4.600	1000.00	0.0	0.0	616.50	305.00	621.51	0.0	621.60	6.39	2.44	124.87	99.52
	4.600	1000.00	0.0	0.0	616.50	350.00	621.89	0.0	621.99	5.81	2.51	141.22	117.27
	4.600	1000.00	0.0	0.0	616.50	530.00	623.23	0.0	623.33	4.08	2.54	248.22	202.07
	4.620	133.00	0.0	0.0	617.90	140.00	620.71	0.0	620.81	19.79	2.59	54.05	31.47
	4.620	133.00	0.0	0.0	617.90	255.00	621.64	0.0	621.79	11.45	3.15	80.99	55.06
	4.620	133.00	0.0	0.0	617.90	300.00	622.01	0.0	622.17	10.16	3.35	92.94	66.50
	4.620	133.00	0.0	0.0	617.90	480.00	623.30	0.0	623.49	7.05	3.65	141.60	117.64
	4.650	132.00	0.0	0.0	619.20	140.00	621.05	0.0	621.36	93.62	4.09	31.15	14.47
	4.650	132.00	0.0	0.0	619.20	255.00	621.96	0.0	622.32	60.67	4.82	52.92	30.55
	4.650	132.00	0.0	0.0	619.20	300.00	622.30	0.0	622.66	51.70	4.83	62.14	38.19
	4.650	132.00	0.0	0.0	619.20	480.00	623.51	0.0	623.87	42.65	4.81	99.82	73.33
	4.700	265.00	0.0	0.0	621.80	140.00	624.02	623.98	624.69	163.75	7.21	25.75	10.94
*	4.700	265.00	0.0	0.0	621.80	255.00	624.70	624.70	625.67	170.87	8.69	39.40	19.55
*	4.700	265.00	0.0	0.0	621.80	300.00	624.95	624.95	626.00	165.96	9.37	45.02	23.43
*	4.700	265.00	0.0	0.0	621.80	480.00	625.76	625.76	627.12	160.29	10.85	64.38	37.91
	4.800	30.00	0.0	0.0	621.80	140.00	624.77	0.0	625.04	45.97	4.75	41.02	20.65
	4.800	30.00	0.0	0.0	621.80	255.00	625.69	0.0	626.09	48.89	5.95	62.55	36.47
	4.800	30.00	0.0	0.0	621.80	300.00	625.97	0.0	626.43	50.42	6.36	69.84	42.25
	4.800	30.00	0.0	0.0	621.80	480.00	626.99	0.0	627.59	51.87	7.53	98.65	66.65
*	5.000	40.00	627.40	625.70	622.70	140.00	626.12	0.0	626.18	14.51	2.48	67.69	36.75
*	5.000	40.00	627.40	625.70	622.70	255.00	627.98	0.0	628.05	9.31	2.92	121.39	101.51
*	5.000	40.00	627.40	625.70	622.70	300.00	628.23	0.0	628.30	7.16	2.86	165.91	112.18
*	5.000	40.00	627.40	625.70	622.70	480.00	629.01	0.0	629.12	10.72	3.46	217.71	146.60
	5.200	30.00	0.0	0.0	623.00	140.00	626.10	0.0	626.34	38.53	4.48	43.78	22.56
	5.200	30.00	0.0	0.0	623.00	255.00	627.93	0.0	628.13	18.04	4.29	91.10	60.04
	5.200	30.00	0.0	0.0	623.00	300.00	628.18	0.0	628.42	20.39	4.72	98.42	66.44
	5.200	30.00	0.0	0.0	623.00	480.00	628.91	0.0	629.31	29.95	6.27	125.81	87.71
	7.900	630.00	0.0	0.0	624.20	140.00	627.95	0.0	628.10	20.96	3.11	45.73	30.58
	7.900	630.00	0.0	0.0	624.20	255.00	629.22	0.0	629.48	24.99	4.12	67.15	51.01
	7.900	630.00	0.0	0.0	624.20	300.00	629.60	0.0	629.90	26.60	4.46	74.65	58.17
	7.900	630.00	0.0	0.0	624.20	480.00	630.82	0.0	631.27	31.64	5.58	102.61	85.33
	8.000	50.00	0.0	0.0	624.20	140.00	628.06	0.0	628.20	18.96	3.01	47.37	32.15
	8.000	50.00	0.0	0.0	624.20	255.00	629.36	0.0	629.60	22.57	3.99	69.94	53.67
	8.000	50.00	0.0	0.0	624.20	300.00	629.75	0.0	630.03	24.05	4.38	77.91	61.30
	8.000	50.00	0.0	0.0	624.20	480.00	631.01	0.0	631.43	28.22	5.57	107.70	90.36
	8.100	140.00	633.60	628.20	624.90	140.00	630.44	0.0	630.50	5.26	2.02	77.61	61.01
	8.100	140.00	633.60	628.20	624.90	255.00	634.13	0.0	634.16	1.83	1.67	261.55	188.57
	8.100	140.00	633.60	628.20	624.90	300.00	634.25	0.0	634.29	2.33	1.91	271.48	196.55
	8.100	140.00	633.60	628.20	624.90	480.00	634.60	0.0	634.68	4.70	2.78	308.40	221.34

MOORE BUSINESS FORMS INC 23

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10K*Q	VCH	AREA	.01K
	8.200	50.00	0.0	0.0	624.90	140.00	630.46	0.0	630.52	5.17	2.01	78.20	61.57
	8.200	50.00	0.0	0.0	624.90	255.00	634.14	0.0	634.17	1.82	1.67	262.40	189.13
	8.200	50.00	0.0	0.0	624.90	300.00	634.26	0.0	634.30	2.31	1.90	274.68	197.56
	8.200	50.00	0.0	0.0	624.90	480.00	634.62	0.0	634.70	4.63	2.76	310.87	223.17
	5.700	883.00	0.0	0.0	629.00	140.00	631.45	631.38	632.04	200.40	6.13	22.83	9.89
	5.700	883.00	0.0	0.0	629.00	255.00	634.39	0.0	634.51	10.06	2.66	102.35	80.39
	5.700	883.00	0.0	0.0	629.00	300.00	634.58	0.0	634.72	11.79	3.17	109.22	87.49
	5.700	883.00	0.0	0.0	629.00	480.00	635.21	0.0	635.47	17.77	4.28	134.60	113.86
	5.800	30.00	0.0	0.0	629.00	140.00	632.20	0.0	632.42	50.51	3.74	37.57	19.70
	5.800	30.00	0.0	0.0	629.00	255.00	634.42	0.0	634.54	9.83	2.82	103.26	81.31
	5.800	30.00	0.0	0.0	629.00	300.00	634.61	0.0	634.76	11.48	3.14	110.33	88.53
	5.800	30.00	0.0	0.0	629.00	480.00	635.27	0.0	635.53	16.69	4.21	137.59	116.79
*	6.000	50.00	635.70	634.00	629.50	140.00	633.13	633.13	634.76	530.35	10.27	13.63	6.08
	6.000	50.00	635.70	634.00	629.50	255.00	636.17	0.0	636.23	16.03	2.60	190.89	63.69
	6.000	50.00	635.70	634.00	629.50	300.00	636.28	0.0	636.33	18.54	2.72	203.56	69.68
	6.000	50.00	635.70	634.00	629.50	480.00	636.66	0.0	636.73	26.85	3.41	247.76	92.63
	6.200	100.00	0.0	0.0	629.90	140.00	635.37	0.0	635.42	5.89	1.89	77.18	59.72
	6.200	100.00	0.0	0.0	629.90	255.00	636.26	0.0	636.37	9.02	2.69	100.72	84.93
	6.200	100.00	0.0	0.0	629.90	300.00	636.38	0.0	636.52	11.43	3.07	104.28	88.73
	6.200	100.00	0.0	0.0	629.90	480.00	636.79	0.0	637.08	21.71	4.42	122.66	103.01
	6.300	1350.00	0.0	0.0	635.00	65.00	636.41	0.0	636.47	21.67	2.01	32.34	13.96
	6.300	1350.00	0.0	0.0	635.00	120.00	637.53	0.0	637.58	8.69	1.85	110.21	40.71
	6.300	1350.00	0.0	0.0	635.00	140.00	637.77	0.0	637.81	6.63	1.70	173.26	54.38
	6.300	1350.00	0.0	0.0	635.00	225.00	638.42	0.0	638.43	3.41	1.40	447.25	121.88

MOORE BUSINESS FORMS, INC. 23

1) COUNTY: KENT

2) STUDY NAME: GRANDVILLE, CITY OF

3) WATERCOURSE: HUIZENGA DRAIN

4) DOCUMENT TYPE: 100-YEAR ENCROACHED

THIS RUN EXECUTED 06/04/81

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**************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED  AUG1977
  ERROR CORR -  01,02
  MODIFICATION -  50,51,52,53
**************************************************

T1      FIS GRANDVILLE, KENT CO.
T2      100-YEAR FLOOD   FLOODWAY
T3      HUIZENGA DRAIN

J1  ICHECK     INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ
      -10.       6.        0.        0.  0.0           0.0       0.0       0.   615.020     0.0
J2  NPROF      IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE
     15.000     0.0       -1.000    0.0       0.0       0.0       0.0       0.0       0.0       0.0

*PROF 2

CCHV=    0.100 CEHV=    0.300
CCHV=    0.300 CEHV=    0.500
*SECNO 1.800
   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     BANK ELEV
   Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       LEFT/RIGHT
   TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
   SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST

      1.80      4.72    615.02       0.0    615.02    616.00      0.98       0.0       0.0    617.80
     385.        0.       385.        0.        0.       48.        0.        0.        0.    617.80
       0.0       0.0      7.95       0.0     0.070     0.040     0.070       0.0    610.30   2000.00
  0.012379        0.        0.        0.         0         0         0       0.0     11.00   2011.00

SPECIAL BRIDGE

SB  XK        XKOR      COFQ      RDLEN     BWC       BWP       BAREA     SS        ELCHU     ELCHD
      0.0      1.98      3.00        0.0      8.24       0.0     57.00       0.0    609.90    610.30

*SECNO 2.000

6070.LOW FLOW BY NORMAL BRIDGE

EGPRS=      0.0     EGLWC=    615.602  ELLC=    616.900  PCWSE=    615.020  ELTRD=    617.800

3370 NORMAL BRIDGE.NRD= 17 MIN ELTRD=  617.80 MAX ELLC=  616.90

          KENOWA AVE U/S (A)

      2.00      5.91    615.81       0.0       0.0    616.57      0.77      0.51      0.06    617.80
     385.        0.       385.        0.        0.       55.        0.        0.        0.    617.80
      0.00       0.0      7.03       0.0     0.070     0.040     0.070     0.039    609.90   2000.00
  0.011262       43.       43.       43.         3         0         0     -6.74     11.00   2011.00
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3301 HV CHANGED MORE THAN HVINS

2.20	6.00	616.70	0.0	0.0	616.84	0.14	0.08	0.19	614.30
310.	6.	292.	12.	9.	94.	14.	0.	0.	613.60
0.00	0.72	3.09	0.82	0.070	0.040	0.070	0.039	610.70	2116.49
0.000953	30.	30.	30.	2	0	0	0.0	42.28	2158.77

CCHV= 0.100 CEHV= 0.300
*SECNO 2.700

3470 ENCROACHMENT STATIONS= 1990.0 2035.0 TYPE= 1 TARGET= 45.000

2.70	5.61	617.61	0.0	0.0	617.80	0.18	0.95	0.01	614.80
310.	10.	272.	28.	10.	75.	30.	2.	1.	614.10
0.08	0.97	3.64	0.93	0.070	0.040	0.070	0.040	612.00	1990.01
0.001285	859.	859.	859.	4	0	0	0.0	44.99	2035.00

CCHV= 0.300 CEHV= 0.500
*SECNO 2.800

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	QLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST
2.80	5.76	617.76	0.0	0.0	617.87	0.11	0.05	0.02	622.20
310.	0.	310.	0.	0.	115.	0.	3.	1.	622.20
0.08	0.0	2.69	0.0	0.070	0.040	0.070	0.040	612.00	2000.00
0.000932	50.	50.	50.	2	0	0	0.0	20.00	2020.00

SPECIAL BRIDGE

SB	XK	XKOR	COFQ	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
	1.25	4.42	3.00	0.0	17.40	2.00	46.10	0.0	609.50	609.00

*SECNO 3.000
PRESSURE FLOW

EGPRS	EGLWC	H3	QWEIR	QPR	BAREA	TRAPEZOID AREA	ELLC	ELTRD
620.86	617.92	0.03	0.	310.	46.	92.	615.50	621.80

I-196 U/S (B)

3.00	8.31	620.81	0.0	0.0	620.86	0.05	2.99	0.0	622.20
310.	0.	310.	0.	0.	166.	0.	3.	1.	622.20
0.12	0.0	1.87	0.0	0.070	0.040	0.070	0.040	612.50	2000.00
0.000336	270.	270.	270.	2	0	0	0.0	20.00	2020.00

*SECNO 3.200

3470 ENCROACHMENT STATIONS= 1951.0 2071.0 TYPE= 1 TARGET= 120.000

3.20	8.37	620.87	0.0	0.0	620.88	0.01	0.00	0.01	617.50
310.	43.	211.	56.	142.	253.	168.	4.	1.	616.30
0.14	0.30	0.83	0.33	0.070	0.040	0.070	0.040	612.50	1951.00
0.000042	50.	50.	50.	2	0	0	0.0	120.00	2071.00

CCHV= 0.100 CEHV= 0.300

3280 CROSS SECTION 3.70 EXTENDED 1.35 FEET

3470 ENCROACHMENT STATIONS=			1850.0	2080.0	TYPE=	1	TARGET=		230.000	
3.70	6.05	620.95	0.0	0.0	620.96	0.01	0.07	0.00		617.30
310.	148.	97.	65.	416.	104.	178.	24.	7.		617.60
0.85	0.36	0.94	0.36	0.070	0.040	0.070	0.040	614.90		1850.00
0.000074	1367.	1367.	1367.	2	0	0	0.0	230.00		2080.00

CCHV= 0.300 CEHV= 0.500

*SECNO 3.800

3280 CROSS SECTION 3.80 EXTENDED 0.95 FEET

3470 ENCROACHMENT STATIONS=			1850.0	2080.0	TYPE=	1	TARGET=		230.000	
3.80	6.76	620.96	0.0	0.0	620.96	0.00	0.00	0.00		616.20
310.	174.	49.	86.	594.	83.	285.	24.	7.		616.20
0.87	0.29	0.59	0.30	0.070	0.040	0.070	0.040	614.20		1850.00
0.000031	30.	30.	30.	0	0	0	0.0	230.00		2080.00

SPECIAL BRIDGE

SB	XK	XKOR	COFQ	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
	1.25	1.70	3.00	0.0	11.65	2.00	35.40	0.0	614.20	614.20

*SECNO 4.000

3280 CROSS SECTION 4.00 EXTENDED 1.01 FEET

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

PRESSURE AND WEIR FLOW

EGPRS	EGLWC	H3	QWEIR	QPR	BAREA	TRAPEZOID AREA	ELLC	ELTRD
622.98	620.96	0.00	260.	49.	35.	39.	618.20	620.06

3470 ENCROACHMENT STATIONS=			1850.0	2080.0	TYPE=	1	TARGET=		230.000	
CANAL AVE U/S (C)										
4.00	6.81	621.01	0.0	0.0	621.01	0.00	0.05	0.0		616.20
310.	175.	49.	86.	602.	84.	288.	25.	7.		616.20
0.90	0.29	0.58	0.30	0.070	0.040	0.070	0.040	614.20		1850.00
0.000030	36.	36.	36.	0	0	7	0.0	230.00		2080.00

*SECNO 4.200

3280 CROSS SECTION 4.20 EXTENDED 1.01 FEET

3470 ENCROACHMENT STATIONS=			1850.0	2100.0	TYPE=	1	TARGET=		250.000	
4.20	6.40	621.00	0.0	0.0	621.01	0.01	0.00	0.01		617.20
310.	59.	143.	108.	192.	108.	220.	26.	7.		618.10
0.91	0.31	1.32	0.49	0.070	0.040	0.070	0.040	614.60		1850.00

0.000145	30.	30.	30.	0	0	0	0.0	250.00	2100.00

CCHV= 0.100 CEHV= 0.300

*SECNO 4.500

VALLEY SECTION D

4.50	5.60	621.30	0.0	0.0	621.36	0.06	0.33	0.01	620.00
350.	13.	333.	4.	28.	164.	12.	37.	12.	619.90
1.10	0.47	2.03	0.35	0.070	0.040	0.070	0.040	615.70	1983.54
0.000449	1360.	1360.	1360.	2	0	0	0.0	82.93	2066.46

*SECNO 4.600

SECTION E AT CONFLUENCE BRANCH NO. 3

4.60	5.39	621.89	0.0	0.0	621.99	0.10	0.61	0.01	624.90
350.	0.	350.	0.	0.	140.	2.	41.	14.	621.60
1.21	0.0	2.51	0.17	0.070	0.040	0.070	0.040	616.50	2017.89
0.000891	1000.	1000.	1000.	2	0	0	0.0	50.78	2068.67

*SECNO 4.620

4.62	4.11	622.01	0.0	0.0	622.17	0.16	0.17	0.02	626.30
300.	0.	300.	0.	0.	93.	0.	41.	14.	623.00
1.22	0.0	3.23	0.0	0.070	0.040	0.070	0.040	617.90	2021.24
0.002035	133.	133.	133.	2	0	0	0.0	33.24	2054.47

*SECNO 4.650

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST
4.65	3.10	622.30	0.0	0.0	622.66	0.36	0.43	0.06	627.60
300.	0.	300.	0.	0.	62.	0.	41.	14.	624.30
1.23	0.0	4.83	0.0	0.070	0.040	0.070	0.040	619.20	2023.87
0.006170	132.	132.	132.	2	0	0	0.0	28.04	2051.91

*SECNO 4.700

3301 HV CHANGED MORE THAN HVINS

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 1970.0 2045.0 TYPE= 1 TARGET= 75.000

4.70	3.15	624.95	624.95	0.0	626.00	1.05	2.51	0.21	622.20
300.	74.	216.	10.	18.	23.	4.	42.	14.	623.00
1.24	4.13	9.37	2.50	0.070	0.040	0.070	0.040	621.80	1997.69
0.016396	265.	265.	265.	9	5	0	0.0	22.44	2020.13

CCHV= 0.300 CEHV= 0.500

*SECNO 4.800

3301 HV CHANGED MORE THAN HVINS

3470 ENCROACHMENT STATIONS= 1970.0 2030.0 TYPE= 1 TARGET= 60.000

4.80	4.17	625.97	0.0	0.0	626.43	0.45	0.25	0.18	622.20
300.	85.	198.	17.	29.	31.	9.	42.	14.	623.00
1.24	2.89	6.36	1.83	0.070	0.040	0.070	0.040	621.80	1995.95
0.005042	30.	30.	30.	3	0	0	0.0	26.33	2022.28

SPECIAL BRIDGE

5227 DOWNSTREAM ELEV IS 624.95 ,NOT 625.97 HYDRAULIC JUMP OCCURS DOWNSTREAM (IF LOW FLOW CONTROLS)

SB	XK	XKOR	COFQ	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
	1.25	1.80	3.00	0.0	9.00	2.00	21.00	0.0	622.70	622.70

*SECNO 5.000
3280 CROSS SECTION 5.00 EXTENDED 1.53 FEET

PRESSURE AND WEIR FLOW

EGPRS	EGLWC	H3	QWEIR	QPR	BAREA	TRAPEZOID AREA	ELLC	ELTRD
631.68	628.84	0.0	109.	191.	21.	21.	625.70	627.40

3470 ENCROACHMENT STATIONS= 1975.0 2020.0 TYPE= 1 TARGET= 45.000

44TH STREET U/S (F)

5.00	5.53	628.23	0.0	0.0	628.30	0.06	1.87	0.0	624.20
300.	117.	148.	34.	93.	58.	32.	42.	14.	624.20
1.25	1.25	2.56	1.09	0.070	0.040	0.070	0.040	622.70	1975.00
0.000715	40.	40.	40.	2	0	4	0.0	45.00	2020.00

*SECNO 5.200

5.20	5.18	628.18	0.0	0.0	628.42	0.24	0.03	0.09	623.40
300.	91.	185.	24.	42.	39.	17.	42.	14.	624.20
1.25	2.15	4.72	1.42	0.070	0.040	0.070	0.040	623.00	1994.23
0.002039	30.	30.	30.	2	0	0	0.0	30.19	2024.42

CCHV= 0.100 CEHV= 0.300
*SECNO 7.900

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST
7.90	5.40	629.60	0.0	0.0	629.90	0.30	1.46	0.02	627.30
300.	5.	289.	6.	4.	65.	6.	43.	15.	627.30
1.29	1.08	4.46	1.12	0.070	0.040	0.070	0.040	624.20	5836.25
0.002660	630.	630.	630.	2	0	0	0.0	20.63	5856.88

CCHV= 0.300 CEHV= 0.500
*SECNO 8.000

8.00	5.55	629.73	0.0	0.0	630.03	0.28	0.13	0.01	627.30
300.	5.	288.	7.	5.	67.	6.	43.	15.	627.30
1.29	1.07	4.32	1.11	0.070	0.040	0.070	0.040	624.20	5836.00
0.002395	50.	50.	50.	2	0	0	0.0	21.22	5857.21

SPECIAL BRIDGE

SB	XK	XKOR	COFQ	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
	0.0	4.17	3.00	0.0	7.20	0.0	22.80	0.0	624.90	624.20

*SECNO 8.100
3280 CROSS SECTION 8.10 EXTENDED 1.45 FEET

PRESSURE AND WEIR FLOW

EGPRS	EGLWC	H3	QWEIR	QPR	BAREA	TRAPEZOID AREA	ELLC	ELTRD
640.96	630.73	0.0	110.	191.	23.	24.	628.20	633.60

RIVERTOWN PARKWAY TWIN CMP CULVERT 140 FT LONG U/S

8.10	9.35	634.25	0.0	0.0	634.29	0.04	4.26	0.0	628.00
300.	33.	214.	53.	65.	112.	96.	44.	15.	628.00
1.32	0.51	1.91	0.55	0.070	0.040	0.070	0.040	624.90	5800.00
0.000233	140.	140.	140.	2	0	6	0.0	100.00	5900.00

*SECNO 8.200
3280 CROSS SECTION 8.20 EXTENDED 1.46 FEET

8.20	9.36	634.26	0.0	0.0	634.30	0.04	0.01	0.00	628.00
300.	34.	213.	53.	66.	112.	96.	44.	15.	628.00
1.33	0.51	1.90	0.55	0.070	0.040	0.070	0.040	624.90	5800.00
0.000231	50.	50.	50.	2	0	0	0.0	100.00	5900.00

CCHV= 0.100 CEHV= 0.300
*SECNO 5.700

5.70	5.58	634.58	0.0	0.0	634.72	0.15	0.39	0.03	632.40
300.	6.	284.	10.	8.	90.	12.	48.	16.	631.90
1.41	0.75	3.17	0.86	0.070	0.040	0.070	0.040	629.00	2033.98
0.001179	883.	883.	883.	2	0	0	0.0	37.93	2071.92

CCHV= 0.300 CEHV= 0.500
*SECNO 5.800

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	QLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3470 ENCROACHMENT STATIONS= 1970.0 2112.0 TYPE= 1 TARGET= 142.000

5.80	5.61	634.61	0.0	0.0	634.76	0.15	0.03	0.00	632.40
300.	6.	284.	10.	8.	90.	12.	48.	16.	631.90
1.41	0.74	3.14	0.85	0.070	0.040	0.070	0.040	629.00	2033.89
0.001148	30.	30.	30.	1	0	0	0.0	38.13	2072.02

SPECIAL BRIDGE

SB	XK	XKOR	COFQ	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
	0.0	1.77	3.00	0.0	3.53	0.0	15.90	0.0	629.50	629.50

*SECNO 6.000
PRESSURE AND WEIR FLOW

EGPRS	EGLWC	H3	QWEIR	QPR	BAREA	TRAPEZOID AREA	ELLC	ELTRD
644.39	637.76	0.0	174.	126.	16.	16.	634.00	635.70

3470 ENCROACHMENT STATIONS= 1982.0 2100.0 TYPE= 1 TARGET= 118.000

WILSON AVE D/S (G)

6.00	6.78	636.28	0.0	0.0	636.33	0.05	1.57	0.0	635.70
300.	6.	77.	217.	10.	28.	165.	48.	17.	633.40
1.42	0.60	2.72	1.31	0.070	0.040	0.070	0.040	629.50	1982.00
0.001854	50.	50.	50.	2	0	6	0.0	118.00	2100.00

*SECNO 6.200

6.20	6.48	636.38	0.0	0.0	636.52	0.14	0.14	0.05	636.80
300.	0.	292.	8.	0.	95.	9.	49.	17.	633.40
1.43	0.0	3.07	0.87	0.070	0.040	0.070	0.040	629.90	2031.66
0.001143	100.	100.	100.	2	0	0	0.0	32.77	2064.43

CCHV= 0.100 CEHV= 0.300
*SECNO 6.300
2800 NAT Q1= 54.38 WSEL= 637.77 ENC Q1= 54.38 WSEL= 637.87 RATIO= 0.0
NAT Q1= 62. RATIOS LOB,CH,ROB= 0.0653 0.7236 0.2112 WSEL= 637.87

3470 ENCROACHMENT STATIONS= 256.4 357.7 TYPE= 4 TARGET= 0.118

CITY LIMITS (H)

6.30	2.81	637.81	0.0	637.77	637.86	0.04	1.32	0.01	637.00
140.	1.	116.	23.	2.	65.	51.	52.	19.	637.00
1.67	0.42	1.80	0.44	0.070	0.040	0.070	0.040	635.00	256.35
0.000732	1350.	1350.	1350.	2	0	0	0.0	101.35	357.71

SEE REVISED FLOOD PLAIN INFO.

1) COUNTY: KENT

2) STUDY NAME: GRANDVILLE, CITY OF

3) WATERCOURSE: HUIZENGA DRAIN

4) DOCUMENT TYPE: 100-YEAR NATURAL

THIS RUN EXECUTED 06/04/81

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**************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED  AUG1977
  ERROR CORR -  01,02
  MODIFICATION -  50,51,52,53
**************************************************

C
T1      FIS GRANDVILLE, KENT CO.
T2      100-YEAR FLOOD
T3      HUIZENGA DRAIN
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J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
	0.	4.	0.	0.	0.0	0.0	0.0	0.	615.020	0.0

J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	1.000	0.0	-1.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0

J3	VARIABLE CODES FOR SUMMARY PRINTOUT									
	38.000	1.000	53.000	21.000	22.000	54.000	4.000	39.000	150.000	200.000

NC	0.070	0.070	0.040	0.100	0.300	0.0	0.0	0.0	0.0	0.0
QT	5.000	215.000	340.000	385.000	605.000	385.000	0.0	0.0	0.0	0.0
NC	0.0	0.0	0.0	0.300	0.500	0.0	0.0	0.0	0.0	0.0
X1	1.800	17.000	2000.000	2011.000	0.0	0.0	0.0	0.0	0.0	0.0
GR	618.600	1530.000	618.500	1684.000	618.200	1826.000	618.100	1962.000	617.800	2000.000
GR	612.300	2000.000	611.300	2000.500	610.300	2002.500	610.300	2004.500	610.300	2006.500
GR	610.300	2008.500	611.300	2010.500	612.300	2011.000	617.800	2011.000	618.900	2104.000
GR	618.100	2248.000	617.200	2470.000	0.0	0.0	0.0	0.0	0.0	0.0
SB	0.0	1.984	3.000	0.0	8.240	0.0	57.000	0.0	609.900	610.300

KENOWA AVE U/S (A)

X1	2.000	17.000	2000.000	2011.000	43.000	43.000	43.000	0.0	0.0	0.0
X2	0.0	0.0	1.000	616.900	617.800	0.0	0.0	0.0	0.0	0.0
BT	17.000	1530.000	618.600	618.600	1684.000	618.500	618.500	1826.000	618.200	618.200
BT	1962.000	618.100	618.100	2000.000	617.800	617.800	2000.000	617.800	611.900	2000.500
BT	617.800	613.900	2002.500	617.800	615.900	2004.500	617.800	616.900	2006.500	617.800
BT	616.900	2008.500	617.800	615.900	2010.500	617.800	613.900	2011.000	617.800	611.900
BT	2011.000	617.800	617.800	2104.000	618.900	618.900	2248.000	618.100	618.100	2270.000
BT	618.300	618.300	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GR	618.600	1530.000	618.500	1684.000	618.200	1826.000	618.100	1962.000	617.800	2000.000
GR	611.900	2000.000	610.900	2000.500	609.900	2002.500	609.900	2004.500	609.900	2006.500
GR	609.900	2008.500	610.900	2010.500	611.900	2011.000	617.800	2011.000	618.900	2104.000
GR	618.100	2248.000	618.300	2270.000	0.0	0.0	0.0	0.0	0.0	0.0
QT	5.000	175.000	275.000	310.000	530.000	310.000	0.0	0.0	0.0	0.0
X1	2.200	11.000	2124.000	2144.000	30.000	30.000	30.000	0.0	0.0	0.0
GR	619.700	2000.000	617.900	2098.000	617.500	2114.000	614.300	2124.000	611.300	2132.000
GR	610.700	2134.000	611.200	2140.000	613.600	2144.000	616.000	2150.000	618.400	2180.000
GR	621.000	2253.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.0	0.0	0.0	0.100	0.300	0.0	0.0	0.0	0.0	0.0

X1	2.700	11.000	1998.000	2013.000	859.000	859.000	859.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	1990.000	0.0	2035.000	0.0	0.0	0.0	0.0
GR	619.700	1980.000	617.200	1992.000	614.800	1998.000	612.600	2000.000	612.000	2005.000
GR	612.600	2011.000	614.100	2013.000	616.400	2017.000	616.600	2038.000	616.300	2120.000
GR	621.000	2166.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.0	0.0	0.0	0.300	0.500	0.0	0.0	0.0	0.0	0.0

X1	2.800	18.000	2000.000	2020.000	50.000	50.000	50.000	0.0	0.0	0.0
X3	0.0	612.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GR	622.700	1800.000	622.500	1900.000	622.200	2000.000	612.000	2000.000	610.500	2000.500
GR	609.000	2002.500	609.000	2006.500	610.500	2008.500	612.000	2009.000	612.000	2011.000
GR	610.500	2011.500	609.000	2013.500	609.000	2017.500	610.500	2019.500	612.000	2020.000
GR	622.200	2020.000	622.000	2100.000	622.800	2200.000	0.0	0.0	0.0	0.0
SB	1.250	4.420	3.000	0.0	17.400	2.000	46.100	0.0	609.500	609.000

I-196 U/S (B)

X1	3.000	18.000	2000.000	2020.000	270.000	270.000	270.000	0.0	0.0	0.0
X2	0.0	0.0	1.000	615.500	621.800	0.0	0.0	0.0	0.0	0.0
X3	0.0	612.500	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BT	18.000	1800.000	622.700	622.700	1900.000	622.500	622.500	2000.000	622.200	622.200
BT	2000.000	622.200	612.500	2000.500	622.200	614.000	2002.500	622.200	615.500	2006.500
BT	622.200	615.500	2008.500	622.200	614.000	2009.000	622.200	612.500	2011.000	622.200
BT	612.500	2011.500	622.200	614.000	2013.500	622.200	615.500	2017.500	622.200	615.500
BT	2019.500	622.200	614.000	2020.000	622.200	612.500	2020.000	622.200	622.200	2100.000
BT	622.000	622.000	2200.000	621.800	621.800	0.0	0.0	0.0	0.0	0.0
GR	622.700	1800.000	622.500	1900.000	622.200	2000.000	612.500	2000.000	611.000	2000.500
GR	609.500	2002.500	609.500	2006.500	611.000	2008.500	612.500	2009.000	612.500	2011.000
GR	611.000	2011.500	609.500	2013.500	609.500	2017.500	611.000	2019.500	612.500	2020.000
GR	622.200	2020.000	622.000	2100.000	621.800	2200.000	0.0	0.0	0.0	0.0

X1	3.200	11.000	1992.000	2030.000	50.000	50.000	50.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	1951.000	0.0	2071.000	0.0	0.0	0.0	0.0
GR	617.000	1890.000	617.500	1992.000	614.900	2000.000	613.100	2006.000	612.500	2011.000
GR	613.100	2016.000	613.400	2022.000	616.300	2030.000	616.800	2044.000	617.300	2132.000
GR	621.300	2204.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.0	0.0	0.0	0.100	0.300	0.0	0.0	0.0	0.0	0.0

X1	3.700	9.000	2000.000	2019.000	1367.000	1367.000	1367.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	1850.000	0.0	2080.000	0.0	0.0	0.0	0.0
GR	619.200	1792.000	617.700	1960.000	618.600	1996.000	617.300	2000.000	615.300	2003.000
GR	614.900	2009.500	615.300	2016.000	617.600	2019.000	619.600	2162.000	0.0	0.0
NC	0.0	0.0	0.0	0.300	0.500	0.0	0.0	0.0	0.0	0.0

X1	3.800	20.000	2000.000	2014.000	30.000	30.000	30.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	1850.000	0.0	2080.000	0.0	618.200	618.200	0.0
GR	620.000	1640.000	620.000	1640.000	620.000	1640.000	620.000	1640.000	616.200	2000.000
GR	615.200	2000.500	614.700	2001.500	614.200	2003.000	614.700	2004.500	615.200	2005.500
GR	616.200	2006.000	616.200	2008.000	615.200	2008.500	614.700	2009.500	614.200	2011.000
GR	614.700	2012.500	615.200	2013.500	616.200	2014.000	620.000	2300.000	620.000	2300.000
SB	1.250	1.700	3.000	0.0	11.650	2.000	35.400	0.0	614.200	614.200

CANAL AVE U/S (C)

X1	4.000	0.0	0.0	0.0	36.000	36.000	36.000	0.0	0.0	0.0
X2	0.0	0.0	1.000	618.200	620.060	0.0	0.0	0.0	0.0	0.0
X3	10.000	0.0	0.0	1850.000	0.0	2080.000	0.0	620.060	620.060	0.0
BT	21.000	1850.000	625.000	625.000	1850.000	620.060	620.060	1940.000	620.060	620.060
BT	2000.000	620.060	620.060	2000.000	620.060	616.200	2000.500	620.060	617.200	2001.500
BT	620.060	617.700	2003.000	620.060	618.200	2004.500	620.060	617.700	2005.500	620.060
BT	617.200	2006.000	620.060	616.200	2008.000	620.060	616.200	2008.500	620.060	617.200

BT	2009.500	620.060	617.700	2011.000	620.060	618.200	2012.500	620.060	617.700	2013.500
BT	620.060	617.200	2014.000	620.060	616.200	2014.000	620.060	620.060	2080.000	620.060
BT	620.060	2080.000	625.000	625.000	0.0	0.0	0.0	0.0	0.0	0.0
X1	4.200	15.000	2000.000	2020.000	30.000	30.000	30.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	1850.000	0.0	2100.000	0.0	0.0	0.0	0.0
GR	625.000	1380.000	620.000	1600.000	620.000	1600.000	620.000	1600.000	620.000	1600.000
GR	619.500	1766.000	619.900	1966.000	619.800	1992.000	617.200	2000.000	615.500	2003.000
GR	614.600	2009.500	615.500	2016.000	618.100	2020.000	618.500	2124.000	620.000	2210.000
QT	5.000	195.000	305.000	350.000	530.000	350.000	0.0	0.0	0.0	0.0
NC	0.0	0.0	0.0	0.100	0.300	0.0	0.0	0.0	0.0	0.0

VALLEY SECTION D

X1	4.500	7.000	2012.000	2050.000	1360.000	1360.000	1360.000	0.0	0.0	0.0
GR	625.000	1940.000	619.900	2000.000	620.000	2012.000	615.700	2024.000	615.700	2039.000
GR	619.900	2050.000	625.000	2110.000	0.0	0.0	0.0	0.0	0.0	0.0

SECTION E AT CONFLUENCE BRANCH NO. 3

X1	4.600	6.000	2010.000	2057.000	1000.000	1000.000	1000.000	0.0	0.0	0.0
GR	625.400	2000.000	624.900	2010.000	616.500	2032.000	616.500	2044.000	621.600	2057.000
GR	623.200	2122.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
QT	5.000	140.000	255.000	300.000	480.000	300.000	0.0	0.0	0.0	0.0

X1	4.620	0.0	0.0	0.0	133.000	133.000	133.000	0.0	1.400	0.0

X1	4.650	0.0	0.0	0.0	132.000	132.000	132.000	0.0	1.300	0.0

X1	4.700	10.000	2008.000	2016.000	265.000	265.000	265.000	0.0	-1.200	0.0
X3	0.0	0.0	0.0	1970.000	0.0	2045.000	0.0	0.0	0.0	0.0
GR	628.800	1928.000	628.900	1993.000	624.800	2000.000	623.400	2008.000	623.000	2011.000
GR	623.400	2015.000	624.200	2016.000	629.400	2027.000	630.400	2064.000	630.600	2144.000
NC	0.0	0.0	0.0	0.300	0.500	0.0	0.0	0.0	0.0	0.0

X1	4.800	0.0	0.0	0.0	30.000	30.000	30.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	1970.000	0.0	2030.000	0.0	0.0	0.0	0.0
SB	1.250	1.800	3.000	0.0	9.000	2.000	21.000	0.0	622.700	622.700

44TH STREET U/S (F)

X1	5.000	15.000	2000.000	2012.000	40.000	40.000	40.000	0.0	0.0	0.0
X2	0.0	0.0	1.000	625.700	627.400	0.0	0.0	0.0	0.0	0.0
X3	0.0	0.0	0.0	1975.000	0.0	2020.000	0.0	0.0	0.0	0.0
BT	16.000	1975.000	630.000	630.000	1975.000	627.500	627.500	2000.000	627.400	627.400
BT	2000.000	627.400	624.200	2001.000	627.400	625.200	2002.500	627.400	625.700	2004.000
BT	627.400	625.200	2005.000	627.400	624.200	2007.000	627.400	624.200	2008.000	627.400
BT	625.200	2009.500	627.400	625.700	2011.000	627.400	625.200	2012.000	627.400	624.200
BT	2012.000	627.400	627.400	2020.000	627.400	627.400	2020.000	630.000	630.000	0.0
GR	629.300	1787.000	629.300	1787.000	629.300	1787.000	624.200	2000.000	623.200	2001.000
GR	622.700	2002.500	623.200	2004.000	624.200	2005.000	624.200	2007.000	623.200	2008.000
GR	622.700	2009.500	623.200	2011.000	624.200	2012.000	626.700	2135.000	626.700	2135.000

X1	5.200	10.000	2008.000	2016.000	30.000	30.000	30.000	0.0	0.0	0.0
GR	628.800	1928.000	628.900	1993.000	624.800	2000.000	623.400	2008.000	623.000	2011.000
GR	623.400	2015.000	624.200	2016.000	629.400	2027.000	630.400	2064.000	630.600	2144.000
NC	0.0	0.0	0.0	0.100	0.300	0.0	0.0	0.0	0.0	0.0

X1	7.900	8.000	5840.000	5852.000	630.000	630.000	630.000	0.0	-0.700	0.0
GR	633.400	5800.000	632.900	5832.000	628.000	5840.000	624.900	5840.000	624.900	5852.000
GR	628.000	5852.000	632.700	5862.000	632.800	5900.000	0.0	0.0	0.0	0.0
NC	0.0	0.0	0.0	0.300	0.500	0.0	0.0	0.0	0.0	0.0

629.6
Q=300

X1	8.000	0.0	0.0	0.0	50.000	50.000	50.000	0.0	0.0	0.0
SB	0.0	4.170	3.000	0.0	7.200	0.0	22.800	0.0	624.900	624.200

RIVERTOWN PARKWAY TWIN CMP CULVERT 140 FT LONG U/S

X1	8.100	0.0	0.0	0.0	140.000	140.000	140.000	0.0	0.700	0.0
X2	0.0	0.0	1.000	628.200	633.600	0.0	0.0	0.0	0.0	0.0
BT	4.000	5800.000	633.930	0.0	5850.000	634.030	0.0	5900.000	633.920	0.0
BT	5950.000	633.600	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

X1	8.200	0.0	0.0	0.0	50.000	50.000	50.000	0.0	0.0	0.0
NC	0.0	0.0	0.0	0.100	0.300	0.0	0.0	0.0	0.0	0.0

X1	5.700	8.000	2041.000	2063.000	883.000	883.000	883.000	0.0	0.0	0.0
GR	635.500	2031.000	632.400	2041.000	629.400	2051.000	629.000	2053.000	629.400	2055.000
GR	631.900	2063.000	635.200	2074.000	635.400	2098.000	0.0	0.0	0.0	0.0
NC	0.0	0.0	0.0	0.300	0.500	0.0	0.0	0.0	0.0	0.0

X1	5.800	0.0	0.0	0.0	30.000	30.000	30.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	1970.000	0.0	2112.000	0.0	0.0	0.0	0.0
SB	0.0	1.769	3.000	0.0	3.530	0.0	15.900	0.0	629.500	629.500

WILSON AVE U/S (G)

X1	6.000	15.000	2000.000	2004.500	50.000	50.000	50.000	0.0	0.0	0.0
X2	0.0	0.0	1.000	634.000	635.700	0.0	0.0	0.0	0.0	0.0
X3	10.000	0.0	0.0	1982.000	0.0	2100.000	0.0	635.700	635.700	0.0
BT	16.000	1982.000	637.700	637.700	1982.000	635.800	635.800	1982.000	635.800	635.800
BT	2000.000	635.700	635.700	2000.000	635.700	632.300	2000.500	635.700	633.300	2001.300
BT	635.700	633.800	2001.800	635.700	634.000	2002.800	635.700	634.000	2003.300	635.700
BT	633.800	2004.000	635.700	633.300	2004.500	635.700	632.300	2004.500	635.700	635.700
BT	2022.000	635.700	635.700	2100.000	635.700	635.700	2100.000	638.000	638.000	0.0
GR	637.800	1570.000	636.500	1808.000	635.800	1970.000	635.700	2000.000	631.300	2000.000
GR	630.300	2000.500	629.800	2001.300	629.500	2001.800	629.500	2002.800	629.800	2003.300
GR	630.300	2004.000	631.300	2004.500	633.400	2004.500	635.700	2100.000	638.000	2100.000

X1	6.200	10.000	2031.000	2054.000	100.000	100.000	100.000	0.0	0.0	0.0
GR	637.500	2015.000	637.500	2015.000	636.800	2031.000	633.600	2036.000	630.200	2041.000
GR	629.900	2043.000	630.200	2045.000	633.400	2054.000	636.300	2060.000	636.900	2094.000
NC	0.0	0.0	0.0	0.100	0.300	0.0	0.0	0.0	0.0	0.0
QT	5.000	65.000	120.000	140.000	225.000	140.000	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	0.0	1.400	0.0	0.0	0.0	0.0

CITY LIMITS (H)

X1	6.300	6.000	259.000	282.000	1350.000	1350.000	1350.000	0.0	0.0	0.0
GR	640.000	0.0	637.000	259.000	635.000	259.000	635.000	282.000	637.000	282.000
GR	640.000	1120.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EJ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

*PROF 1

CCHV= 0.100 CEHV= 0.300
CCHV= 0.300 CEHV= 0.500
*SECNO 1.800

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST
1.80	4.72	615.02	0.0	615.02	616.00	0.98	0.0	0.0	617.80
385.	0.	385.	0.	0.	48.	0.	0.	0.	617.80
0.0	0.0	7.95	0.0	0.070	0.040	0.070	0.0	610.30	2000.00
0.012379	0.	0.	0.	0	0	0	0.0	11.00	2011.00

SPECIAL BRIDGE

SB	XK	XKOR	COFQ	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
	0.0	1.98	3.00	0.0	8.24	0.0	57.00	0.0	609.90	610.30

*SECNO 2.000

6070,LOW FLOW BY NORMAL BRIDGE

EGPRS= 0.0 EGLWC= 615.602 ELLC= 616.900 PCWSE= 615.020 ELTRD= 617.800

3370 NORMAL BRIDGE,NRD= 17 MIN ELTRD= 617.80 MAX ELLC= 616.90

615.81
INV 609.90
d= 5.91

KENOWA AVE U/S (A)

2.00	5.91	615.81	0.0	0.0	616.57	0.77	0.51	0.06	617.80
385.	0.	385.	0.	0.	55.	0.	0.	0.	617.80
0.00	0.0	7.03	0.0	0.070	0.040	0.070	0.039	609.90	2000.00
0.011262	43.	43.	43.	3	0	0	-6.74	11.00	2011.00

*SECNO 2.200

3301 HV CHANGED MORE THAN HVINS

2.20	6.00	616.70	0.0	0.0	616.84	0.14	0.08	0.19	614.30
310.	6.	292.	12.	9.	94.	14.	0.	0.	613.60
0.00	0.72	3.09	0.82	0.070	0.040	0.070	0.039	610.70	2116.49
0.000953	30.	30.	30.	2	0	0	0.0	42.28	2158.77

CCHV= 0.100 CEHV= 0.300
*SECNO 2.700

3470 ENCROACHMENT STATIONS= 1990.0 2035.0 TYPE= 1 TARGET= 45.000

2.70	5.61	617.61	0.0	0.0	617.80	0.18	0.95	0.01	614.80
310.	10.	272.	28.	10.	75.	30.	2.	1.	614.10
0.08	0.97	3.64	0.93	0.070	0.040	0.070	0.040	612.00	1990.01
0.001285	859.	859.	859.	4	0	0	0.0	44.99	2035.00

CCHV= 0.300 CEHV= 0.500
*SECNO 2.800

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV

Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST
2.80	5.76	617.76	0.0	0.0	617.87	0.11	0.05	0.02	622.20
310.	0.	310.	0.	0.	115.	0.	3.	1.	622.20
0.08	0.0	2.69	0.0	0.070	0.040	0.070	0.040	612.00	2000.00
0.000932	50.	50.	50.	2	0	0	0.0	20.00	2020.00

SPECIAL BRIDGE

SB	XK	XKOR	COFQ	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
	1.25	4.42	3.00	0.0	17.40	2.00	46.10	0.0	609.50	609.00

*SECNO 3.000
PRESSURE FLOW

EGPRS	EGLWC	H3	QWEIR	QPR	BAREA	TRAPEZOID AREA	ELLC	ELTRD
620.86	617.92	0.03	0.	310.	46.	92.	615.50	621.80

612.5
609.9
2.6 / 373 = .0069

43
50
370
373

I-196 U/S (B)

3.00	8.31	620.81	0.0	0.0	620.86	0.05	2.99	0.0	622.20
310.	0.	310.	0.	0.	166.	0.	3.	1.	622.20
0.12	0.0	1.87	0.0	0.070	0.040	0.070	0.040	612.50	2000.00
0.000336	270.	270.	270.	2	0	0	0.0	20.00	2020.00

*SECNO 3.200

3470 ENCROACHMENT STATIONS= 1951.0 2071.0 TYPE= 1 TARGET= 120.000

3.20	8.37	620.87	0.0	0.0	620.88	0.01	0.00	0.01	617.50
310.	43.	211.	56.	142.	253.	168.	4.	1.	616.30
0.14	0.30	0.83	0.33	0.070	0.040	0.070	0.040	612.50	1951.00
0.000042	50.	50.	50.	2	0	0	0.0	120.00	2071.00

CCHV= 0.100 CEHV= 0.300
*SECNO 3.700
3280 CROSS SECTION 3.70 EXTENDED 1.35 FEET

3470 ENCROACHMENT STATIONS= 1850.0 2080.0 TYPE= 1 TARGET= 230.000

3.70	6.05	620.95	0.0	0.0	620.96	0.01	0.07	0.00	617.30
310.	148.	97.	65.	416.	104.	178.	24.	7.	617.60
0.85	0.36	0.94	0.36	0.070	0.040	0.070	0.040	614.90	1850.00
0.000074	1367.	1367.	1367.	2	0	0	0.0	230.00	2080.00

CCHV= 0.300 CEHV= 0.500
*SECNO 3.800
3280 CROSS SECTION 3.80 EXTENDED 0.95 FEET

3470 ENCROACHMENT STATIONS= 1850.0 2080.0 TYPE= 1 TARGET= 230.000

3.80	6.76	620.96	0.0	0.0	620.96	0.00	0.00	0.00	616.20
310.	174.	49.	86.	594.	83.	285.	24.	7.	616.20
0.87	0.29	0.59	0.30	0.070	0.040	0.070	0.040	614.20	1850.00
0.000031	30.	30.	30.	0	0	0	0.0	230.00	2080.00

SPECIAL BRIDGE

SB	XK	XKOR	COFQ	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
	1.25	1.70	3.00	0.0	11.65	2.00	35.40	0.0	614.20	614.20

*SECNO 4.000
3280 CROSS SECTION 4.00 EXTENDED 1.01 FEET

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

PRESSURE AND WEIR FLOW

EGPRS	EGLWC	H3	QWEIR	QPR	BAREA	TRAPEZOID AREA	ELLC	ELTRD
622.98	620.96	0.00	260.	49.	35.	39.	618.20	620.06

3470 ENCROACHMENT STATIONS= 1850.0 2080.0 TYPE= 1 TARGET= 230.000

CANAL AVE U/S (C)

4.00	6.81	621.01	0.0	0.0	621.01	0.00	0.05	0.0	616.20
310.	175.	49.	86.	602.	84.	288.	25.	7.	616.20
0.90	0.29	0.58	0.30	0.070	0.040	0.070	0.040	614.20	1850.00
0.000030	36.	36.	36.	0	0	7	0.0	230.00	2080.00

*SECNO 4.200
3280 CROSS SECTION 4.20 EXTENDED 1.01 FEET

3470 ENCROACHMENT STATIONS= 1850.0 2100.0 TYPE= 1 TARGET= 250.000

4.20	6.40	621.00	0.0	0.0	621.01	0.01	0.00	0.01	617.20
310.	59.	143.	108.	192.	108.	220.	26.	7.	618.10
0.91	0.31	1.32	0.49	0.070	0.040	0.070	0.040	614.60	1850.00
0.000145	30.	30.	30.	0	0	0	0.0	250.00	2100.00

CCHV= 0.100 CEHV= 0.300
*SECNO 4.500

VALLEY SECTION D

4.50	5.60	621.30	0.0	0.0	621.36	0.06	0.33	0.01	620.00
350.	13.	333.	4.	28.	164.	12.	37.	12.	619.90
1.10	0.47	2.03	0.35	0.070	0.040	0.070	0.040	615.70	1983.54
0.000449	1360.	1360.	1360.	2	0	0	0.0	82.93	2066.46

*SECNO 4.600

SECTION E AT CONFLUENCE BRANCH NO. 3

4.60	5.39	621.89	0.0	0.0	621.99	0.10	0.61	0.01	624.90
350.	0.	350.	0.	0.	140.	2.	41.	14.	621.60
1.21	0.0	2.51	0.17	0.070	0.040	0.070	0.040	616.50	2017.89
[illegible]	[illegible]	1000.	1000.	2	0	0	0.0	50.78	2068.67

*SECNO 4.620

4.62	4.11	622.01	0.0	0.0	622.17	0.16	0.17	0.02	626.30
300.	0.	300.	0.	0.	93.	0.	41.	14.	623.00
1.22	0.0	3.23	0.0	0.070	0.040	0.070	0.040	617.90	2021.24
0.002035	133.	133.	133.	2	0	0	0.0	33.24	2054.47

*SECNO 4.650

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST
4.65	3.10	622.30	0.0	0.0	622.66	0.36	0.43	0.06	627.60
300.	0.	300.	0.	0.	62.	0.	41.	14.	624.30
1.23	0.0	4.83	0.0	0.070	0.040	0.070	0.040	619.20	2023.87
0.006170	132.	132.	132.	2	0	0	0.0	28.04	2051.91

*SECNO 4.700

3301 HV CHANGED MORE THAN HVINS

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

7185 MINIMUM SPECIFIC ENERGY

3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 1970.0 2045.0 TYPE= 1 TARGET= 75.000

4.70	3.15	624.95	624.95	0.0	626.00	1.05	2.51	0.21	622.20
300.	74.	216.	10.	18.	23.	4.	42.	14.	623.00
1.24	4.13	9.37	2.50	0.070	0.040	0.070	0.040	621.80	1997.69
0.016396	265.	265.	265.	9	5	0	0.0	22.44	2020.13

CCHV= 0.300 CEHV= 0.500

*SECNO 4.800

3301 HV CHANGED MORE THAN HVINS

3470 ENCROACHMENT STATIONS= 1970.0 2030.0 TYPE= 1 TARGET= 60.000

4.80	4.17	625.97	0.0	0.0	626.43	0.45	0.25	0.18	622.20
300.	85.	198.	17.	29.	31.	9.	42.	14.	623.00
1.24	2.89	6.36	1.83	0.070	0.040	0.070	0.040	621.80	1995.95
0.005042	30.	30.	30.	3	0	0	0.0	26.33	2022.28

SPECIAL BRIDGE

5227 DOWNSTREAM ELEV IS 624.95 ,NOT 625.97 HYDRAULIC JUMP OCCURS DOWNSTREAM (IF LOW FLOW CONTROLS)

SB	XK	XKOR	COFQ	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
	1.25	1.80	3.00	0.0	9.00	2.00	21.00	0.0	622.70	622.70

*SECNO 5.000

3280 CROSS SECTION 5.00 EXTENDED 1.53 FEET

MOORE BUSINESS FORMS, INC.

EGPRS	EGLWC	H3	QWEIR	QPR	BAREA	TRAPEZOID AREA	ELLC	ELTRD
631.68	628.84	0.0	109.	191.	21.	21.	625.70	627.40

3470 ENCROACHMENT STATIONS= 1975.0 2020.0 TYPE= 1 TARGET= 45.000

44TH STREET U/S (F)

5.00	5.53	628.23	0.0	0.0	628.30	0.06	1.87	0.0	624.20
300.	117.	148.	34.	93.	58.	32.	42.	14.	624.20
1.25	1.25	2.56	1.09	0.070	0.040	0.070	0.040	622.70	1975.00
0.000715	40.	40.	40.	2	0	4	0.0	45.00	2020.00

*SECNO 5.200

5.20	5.18	628.18	0.0	0.0	628.42	0.24	0.03	0.09	623.40
300.	91.	185.	24.	42.	39.	17.	42.	14.	624.20
1.25	2.15	4.72	1.42	0.070	0.040	0.070	0.040	623.00	1994.23
0.002039	30.	30.	30.	2	0	0	0.0	30.19	2024.42

CCHV= 0.100 CEHV= 0.300

*SECNO 7.900

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	QLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST
7.90	5.40	629.60	0.0	0.0	629.90	0.30	1.46	0.02	627.30
300.	5.	289.	6.	4.	65.	6.	43.	15.	627.30
1.29	1.08	4.46	1.12	0.070	0.040	0.070	0.040	624.20	5836.25
0.002660	630.	630.	630.	2	0	0	0.0	20.63	5856.88

CCHV= 0.300 CEHV= 0.500

*SECNO 8.000

8.00	5.55	629.75	0.0	0.0	630.03	0.28	0.13	0.01	627.30
300.	5.	288.	7.	5.	67.	6.	43.	15.	627.30
1.29	1.07	4.32	1.11	0.070	0.040	0.070	0.040	624.20	5836.00
0.002395	50.	50.	50.	2	0	0	0.0	21.22	5857.21

SPECIAL BRIDGE

SB	XK	XKOR	COFQ	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
	0.0	4.17	3.00	0.0	7.20	0.0	22.80	0.0	624.90	624.20

*SECNO 8.100

3280 CROSS SECTION 8.10 EXTENDED 1.45 FEET

PRESSURE AND WEIR FLOW

EGPRS	EGLWC	H3	QWEIR	QPR	BAREA	TRAPEZOID AREA	ELLC	ELTRD
640.96	630.73	0.0	110.	191.	23.	24.	628.20	633.60

RIVERTOWN PARKWAY TWIN CMP CULVERT 140 FT LONG U/S

```
      8.10       9.35     634.25       0.0       0.0     634.29       0.04       4.26       0.0     628.00
     300.         33.      214.        53.       65.      112.        96.        44.        15.      628.00
      1.32       0.51       1.91      0.55     0.070     0.040     0.070     0.040     624.90    5800.00
 0.000233        140.       140.       140.         2         0         6       0.0     100.00    5900.00

 *SECNO 8.200
 3280 CROSS SECTION      8.20 EXTENDED      1.46 FEET

      8.20       9.36     634.26       0.0       0.0     634.30       0.04       0.01       0.00     628.00
     300.         34.      213.        53.       66.      112.        96.        44.        15.      628.00
      1.33       0.51       1.90      0.55     0.070     0.040     0.070     0.040     624.90    5800.00
 0.000231        50.        50.        50.         2         0         0       0.0     100.00    5900.00

 CCHV=    0.100 CEHV=    0.300
 *SECNO 5.700
      5.70       5.58     634.58       0.0       0.0     634.72       0.15       0.39       0.03     632.40
     300.          6.      284.        10.        8.       90.        12.        48.        16.      631.90
      1.41       0.75       3.17      0.86     0.070     0.040     0.070     0.040     629.00    2033.98
 0.001179        883.       883.       883.         2         0         0       0.0      37.93    2071.92

 CCHV=    0.300 CEHV=    0.500
 *SECNO 5.800
    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS     BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA     LEFT/RIGHT
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN       SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IOC        ICONT      CORAR      TOPWID      ENDST

 3470 ENCROACHMENT STATIONS=     1970.0     2112.0  TYPE=      1  TARGET=      142.000
      5.80       5.61     634.61       0.0       0.0     634.76       0.15       0.03       0.00     632.40
     300.          6.      284.        10.        8.       90.        12.        48.        16.      631.90
      1.41       0.74       3.14      0.85     0.070     0.040     0.070     0.040     629.00    2033.89
 0.001148        30.        30.        30.         1         0         0       0.0      38.13    2072.02

 SPECIAL BRIDGE

 SB   XK          XKOR       COFQ       RDLEN      BWC        BWP        BAREA      SS         ELCHU      ELCHD
       0.0        1.77       3.00         0.0      3.53        0.0       15.90       0.0      629.50     629.50

 *SECNO 6.000
 PRESSURE AND WEIR FLOW

  EGPRS      EGLWC      H3         QWEIR      QPR        BAREA      TRAPEZOID AREA      ELLC       ELTRD
  644.39     637.76       0.0        174.       126.        16.        16.       634.00     635.70

 3470 ENCROACHMENT STATIONS=     1982.0     2100.0  TYPE=      1  TARGET=      118.000
          WILSON AVE U/S  (G)
      6.00       6.78     636.28       0.0       0.0     636.33       0.05       1.57       0.0     635.70
     300.          6.       77.       217.       10.       28.       165.        48.        17.      633.40
      1.42       0.60       2.72      1.31     0.070     0.040     0.070     0.040     629.50    1982.00
 0.001854        50.        50.        50.         2         0         6       0.0     118.00    2100.00

 *SECNO 6.200
      6.20       6.48     636.38       0.0       0.0     636.52       0.14       0.14       0.05     636.80
```

SEE REVISED FLOODPLAIN INFO

300.	0.	292.	8.	0.	95.	9.	49.	17.	633.40
1.43	0.0	3.07	0.87	0.070	0.040	0.070	0.040	629.90	2031.66
0.001143	100.	100.	100.	2	0	0	0.0	32.77	2064.43

CCHV= 0.100 CEHV= 0.300
*SECNO 6.300

CITY LIMITS (H)

6.30	2.77	637.77	0.0	0.0	637.81	0.03	1.28	0.01	637.00
140.	7.	108.	24.	26.	64.	84.	53.	22.	637.00
1.70	0.29	1.70	0.29	0.070	0.040	0.070	0.040	635.00	192.20
0.000663	1350.	1350.	1360.	2	0	0	0.0	305.93	498.13

MOORE Business Forms Inc.

1) COUNTY: KENT

2) STUDY NAME: GRANDVILLE, CITY OF

3) WATERCOURSE: HUIZENGA DRAIN

4) DOCUMENT TYPE: REPORT

HYDRAULIC ANALYSIS REPORT

HUIZENGA DRAIN (INCLUDING BRANCH NO. 3)

AT GRANDVILLE

KENT COUNTY, MICHIGAN

Prepared by

COMMONWEALTH ASSOCIATES INC.
209 EAST WASHINGTON AVENUE
JACKSON, MICHIGAN 49201

SEPTEMBER, 1980

RECEIVED
SEP 24 1980
WATER MANAGEMENT

INTRODUCTION

Hydraulic calculations were performed for the Huizenga drain within the entire corporate boundaries of Grandville. Field cross section data were surveyed by Commonwealth Associates in April, 1980. The flood flows for 10-, 50-, 100-, and 500-year recurrence intervals were approved by the Michigan DNR. A 5-foot contour map (scale 1 inch = 400 feet) prepared by Abrams Aerial Survey Corporation was utilized. This study was performed by Commonwealth Associates Inc., Jackson, Michigan. The Project Manager was V. Danushkodi, P.E.

METHOD OF ANALYSIS

The HEC-2 computer program was used in the entire hydraulic analysis.

VARIABLES AND COEFFICIENTS

Manning's Roughness Coefficient

For channel	0.04
For overbanks	0.07

Coefficients for floodway

Contraction	0.10
Expansion	0.30

Coefficients for Bridges

Contraction	0.30
Expansion	0.50

Ratios

Contraction	1:1
Expansion	1:4

HIGH-WATER MARKS

None

STARTING CONDITIONS

Hydraulic analysis was performed separately from Kenowa Lake up to Kenowa Avenue to determine starting water surface elevations at Kenowa Avenue, the corporate boundary.

A mean lake level of 604.3, taken from Williams and Works report prepared in 1979, was used. However, the HEC-2 model assumed critical depth conditions at Kenowa Lake inlet location.

SPECIAL PROBLEMS

None

REFERENCES

1. Huizenga Drain Flood Study by Williams & Works, Inc., September, 1977, Amended August, 1979.

CROSS SECTION REFERENCE

Cross Section ID in Profile/Table	Sec. No. in HEC-2 Program	Description
-	1.8	Surveyed Bridge Sections at Kenowa Avenue
A	2.0	
-	2.2	
-	2.7	Surveyed Valley Section
-	2.8	Surveyed Bridge Sections at I-96 culvert
B	3.0	
-	3.2	
-	3.7	Surveyed Valley Section
-	3.8	Surveyed Bridge Sections at Canal Avenue
C	4.0	
-	4.2	
D	4.5	Surveyed Valley Section
E	4.6	Surveyed Valley Section at confluence Branch No. 3
-	4.62	Repeated Sections. Same as 4.6 raised suitably
-	4.65	
-	4.7	Repeated Section. Same as 4.8 lowered by 1.2 feet
-	4.8	Surveyed Bridge Sections at 44th Street
F	5.0	
-	5.2	
-	5.7	Surveyed Valley Section
-	5.8	Surveyed Bridge Sections at Wilson Avenue
G	6.0	
-	6.2	
H	6.3	Repeated Valley Section. Same as 6.2 raised 5 feet

CROSS SECTION REFERENCE

Huizenga Drain Branch No. 3 Sections

Cross Section ID in Profile/Table	Sec. No. in HEC-2 Program	Description
A	6.7	Surveyed Valley Section
-	6.8	Surveyed Bridge Sections at Wilson Avenue
-	7.0	
B	7.2	
C	7.5	Surveyed Valley Section
D	7.7	Repeated Valley Section. Same as 7.5 raised by 1.4 feet

BRIDGE NOTES AND SKETCHES

CLIENT/OWNER	FILING CODE / JOB NO.
CALC. BY/DATE (SIGNATURE) 6-24-80	SUBJECT Huizenga Drain; Special Bridge Calculations.
CHECKED BY/DATE (SIGNATURE)	SHEET OF / BOOK NO.

Ravenswood Drive Crossing (XSEC 1.0)

9'9" X 6'7" CMP Arch Culvert
Length 50'
From Tables: Area = 51 ft²
R = 1.93 ft

$XKOR = 1 + K_e + K_f$

$K_f = \frac{29.1\, n^2 L}{R^{4/3}}$ $n = 0.024$

$= \frac{29.1 \times .024^2 \times 50}{1.93^{4/3}} = 0.349$

$K_e = 0.7$

$XKOR = 1.0 + 0.7 + 0.349 = 2.049$

C for Weir Flow (Paved Road) : 3.0

Bottom width of Channel $= \frac{51}{6.583} = 7.75'$

Side Slope = 0

Elev. of channel U/S : 606
D/S : 606

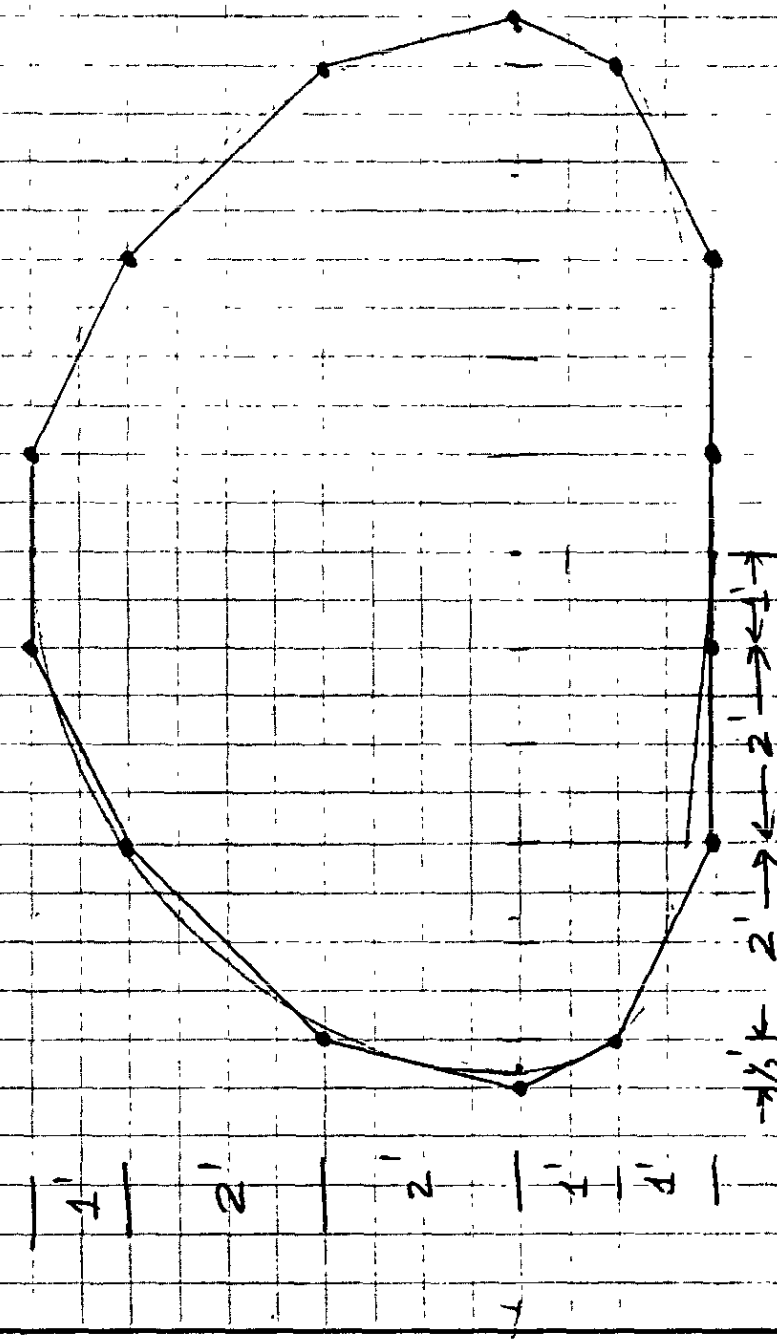
Gilbert/Commonwealth
200 E. Washington Avenue, Jackson, MI 49201

CALCULATION SHEET

REV.

CLIENT/OWNER	FILING CODE / JOB NO.
CALC. BY/DATE (SIGNATURE)	SUBJECT: 10'8" x 6'11" CMP
CHECKED BY/DATE (SIGNATURE)	SHEET OF / BOOK NO.

SECTION 2.0



Kenowa Ave (XSEC 2.0)

10'8" x 6'11" CMP 43' long (n = 0.024)

Area = 57 ft²

R = 2.01 ft

$$K_f = \frac{29.1\, n^2 L}{R^{4/3}} = 0.284$$

ΣK_{OR} = 1.0 + 0.7 + 0.284 = 1.984

C for weir flow = 3.0

Bottom width of Channel = $\frac{57}{6.92}$ = 8.24 ft

Side Slope = 0

Elev of Channel U/S : 609.9 (610.8)

D/S : 610.3 (611.2)

Gilbert/Commonwealth
209 E. Washington Avenue, Jackson, MI 49201

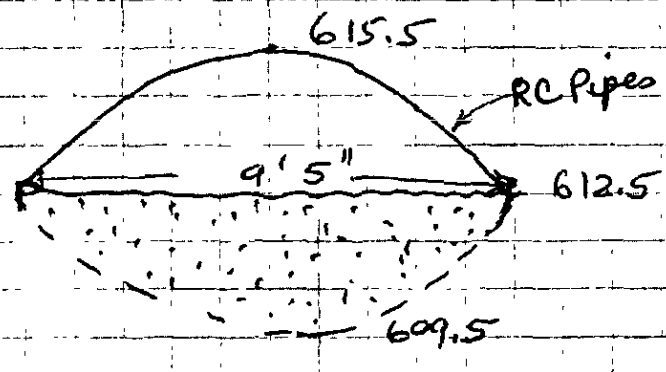
CALCULATION SHEET

REV.

CLIENT/OWNER		FILING CODE
		JOB NO.
CALC. BY/DATE (SIGNATURE) DWD 12-22-80	SUBJECT	SHEET OF
CHECKED BY/DATE (SIGNATURE)	Special Bridge Calcs.	BOOK NO.

RECEIVED
JAN 5 1981
WATER MANAGEMENT

I-196 Crossing (XSEC 3) Revised analysis to consider silted conditions.



Two Pipes

Area for one Pipe (full) = 46.1 ft^2
Area for one Pipe for silted Condition = 23.05 ft^2
P for silted condition = $\pi\sqrt{\frac{a^2+b^2}{2}} + 9.4 = 21.8$ ft
$(a = 4.71;\ b = 3.0)$

$$R = \frac{A}{P} = 1.057$$

length of Pipes = 270 ft

Silted bottom and Concrete sides $n \approx 0.02$

$$K_f = 29.1\, n^2 L / R^{4/3} = \cancel{6.667}\ 2.92$$

$$XKOR = 1.0 + 0.5 + 2.92 = 4.42$$

C for weir flow $\simeq 3.0$

Effective Area for 2 silted pipes = 46.1 ft^2

I-196 Crossing (XSEC 3.0)

Two 72"x113" R.C. Pipes
270' long each
$n = 0.015$

Area (from Tables) for 2 Pipes : 92.2 ft^2
R : 1.545 ft

$K_f = \frac{29.1\, n^2 L}{R^{4/3}} = 0.781$

K_e = 0.5

$XKOR = 1.0 + 0.5 + 0.781 = 2.281$

C for weir flow = 3.0

Bottom width of Channel = $\frac{92.2}{6} = 15.4 + 2$ (Piers) $= 17.4$

Pier width = 2'

Pier loss Coefficient = 1.25

Side slope = 0

Elev of Channel U/S : 609.5
D/S : 609.0

Gilbert/Commonwealth
209 E. Washington Avenue, Jackson, MI 49201

CALCULATION SHEET

REV.

CLIENT/OWNER	FILING CODE / JOB NO.
CALC. BY/DATE (SIGNATURE) / CHECKED BY/DATE (SIGNATURE)	SUBJECT: 113" x 72" RCP
	SHEET OF / BOOK NO.

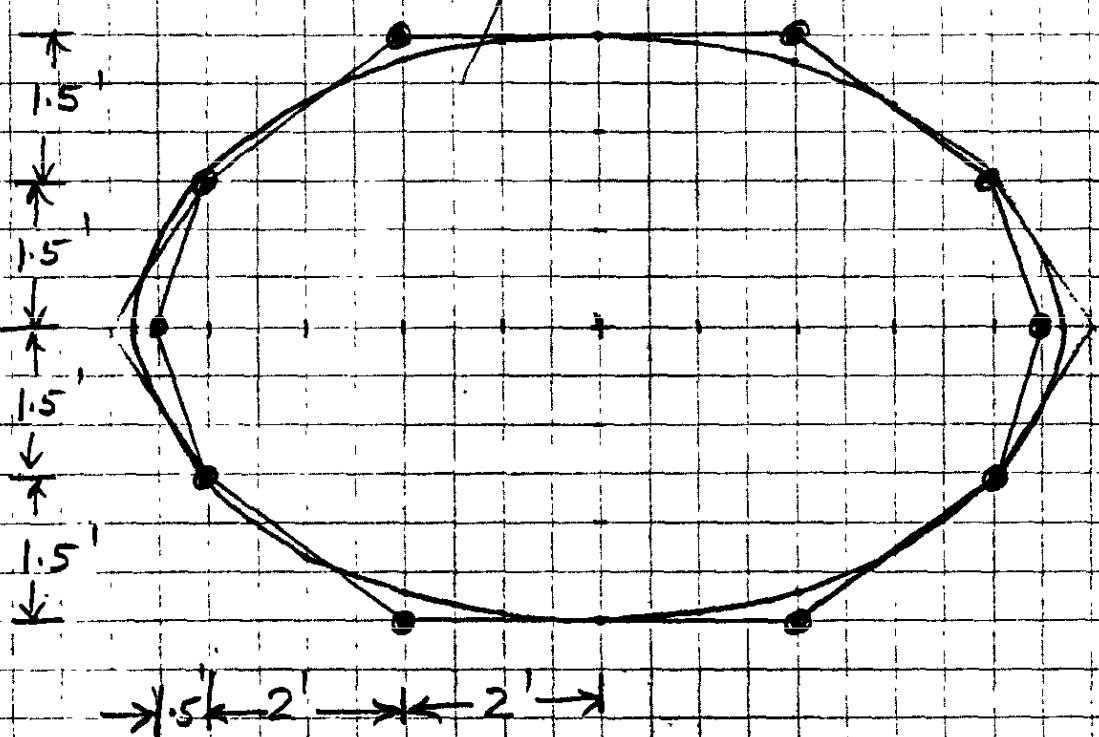
SECTION 3.0

$$y = \pm b\sqrt{1-(x/a)^2}$$

$a = 4.71$
$b = 3.0$

$$y = \pm 3\sqrt{1-(x/4.71)^2}$$

X	Y
0	± 3
1	± 2.93
2	± 2.72
3	± 2.31
4	± 1.58
4.71	0



Canal Ave Crossing (XSEC 4.0)

Two 44"x72" RC. Pipes
36 ft long Pipes ($n = 0.015$)

Area for two Pipes $= 35.4\ ft^2$
R $= 1.13\ ft$

$$K_f = \frac{29.1\, n^2 L}{R^{4/3}} = 0.20$$

XKOR $= 1.0 + 0.5 + 0.2 = \underline{1.7}$

C for weir flow $= 3.0$

Bottom width of Channel $= \frac{35.4}{3.67} = 9.65$
$+2$
$11.65\ ft$

width of Pier $= 2.0\ ft$
pier loss coeff $= 1.25$

Elev of Channel U/S : 614.2
D/S : ~~613.8~~ 614.2

Gilbert/Commonwealth
209 E. Washington Avenue, Jackson, MI 49201

CALCULATION SHEET

REV.

CLIENT/OWNER	FILING CODE / JOB NO.
CALC. BY/DATE (SIGNATURE) / CHECKED BY/DATE (SIGNATURE)	SUBJECT: Canal Ave. — Twin 44"×72" RCP
	SHEET OF / BOOK NO.

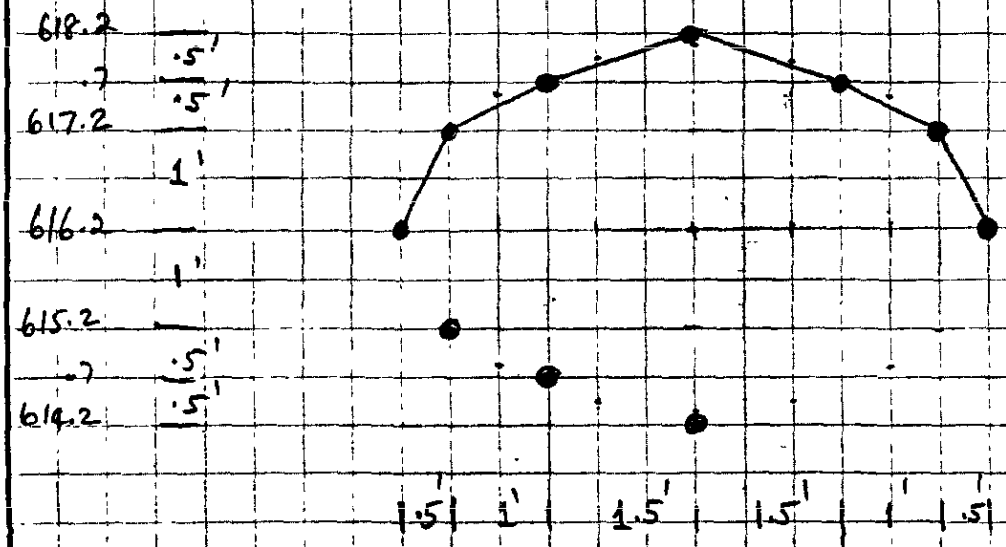
Elliptical Pipe $y = \pm b\sqrt{1-(x/a)^2}$

SECTION 4.0 $2a = 6.0$; $2b = 3.67$

$a = 3.0$; $b = 1.84$

$$y = \pm 1.84\sqrt{1-(x/3.0)^2}$$

X	Y
0	±1.84
1	±1.73
2	±1.37
2.5	±1.02
2.8	±0.66
3	0



Gilbert/Commonwealth
209 E. Washington Avenue, Jackson, MI 49201

CALCULATION SHEET

REV.

CLIENT/OWNER		FILING CODE / JOB NO.
CALC. BY/DATE DLD (SIGNATURE) 6-24-80	SUBJECT	SHEET OF
CHECKED BY/DATE (SIGNATURE)	Spec Bridge Calcs	BOOK NO.

44th Street Crossing (XSEC 5.0)

Two 36" x 54" RCP 40' long ($n = 0.015$)

21 (for 2 Pipes)

$A = \cancel{10.5}$ ft

$R = 1.9$ ft

$$K_f = \frac{29.1 n^2 L}{R^{4/3}} = 0.30$$

$XKOR = 1.0 + 0.5 + 0.3 = 1.8$

C for weir flow = 3.0

Bottom width of Channel = $\frac{21}{3} = 7$

$+2$

9 ft

Pier width	2 ft
Pier loss coeff	1.25
Side Slope	0.0

Elev of Channel U/S : 622.7

D/S : 622.7

Gilbert/Commonwealth
209 E. Washington Avenue, Jackson, MI 49201

CALCULATION SHEET

REV.

CLIENT/OWNER	FILING CODE
	JOB NO.
CALC. BY/DATE (SIGNATURE)	SUBJECT: 44th St
CHECKED BY/DATE (SIGNATURE)	Twin 36"×54" RCP
SHEET OF	BOOK NO.

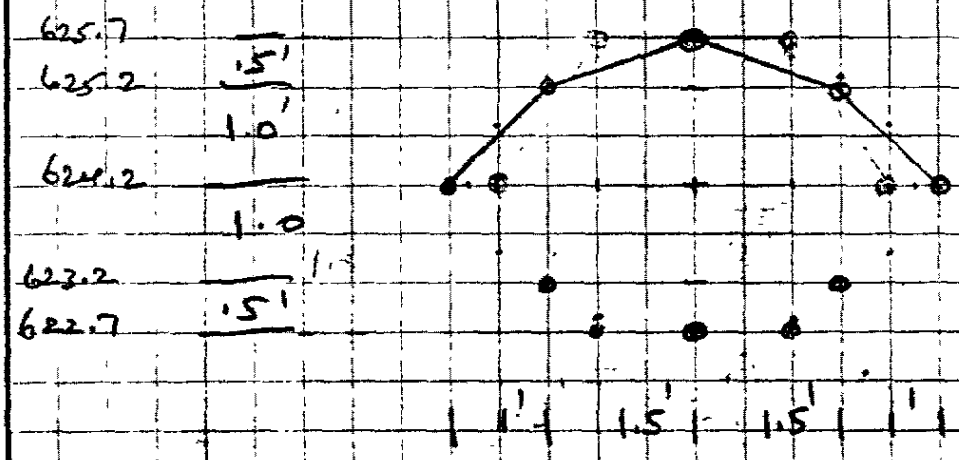
Elliptical Pipe $y = \pm b\sqrt{1-(x/a)^2}$

$2a = 54/12 = 4.5'$; $2b = 3.0'$

$a = 2.25$; $b = 1.5$

SECTION 5.0 $y = \pm 1.5\sqrt{1-(x/2.25)^2}$

x	y
0	±1.50
1	±1.34
1.5	±1.12
2	±.69
2.25	0



Wilson Ave Crossing (XSEC 6.0)

54" ϕ R.C. Pipe 48' long

Area = 15.9 ft²

R = 1.125 ft

n = 0.015

$$K_f = \frac{29.1\, n^2 L}{R^{4/3}} = 0.269$$

XKOR = 1.0 + 0.5 + 0.269 = 1.769

C for weir flow = 3.0

Bottom width of Channel = 3.53 ft

Side Slope = 0

Elev of Channel U/S : 629.5

D/S : 629.5

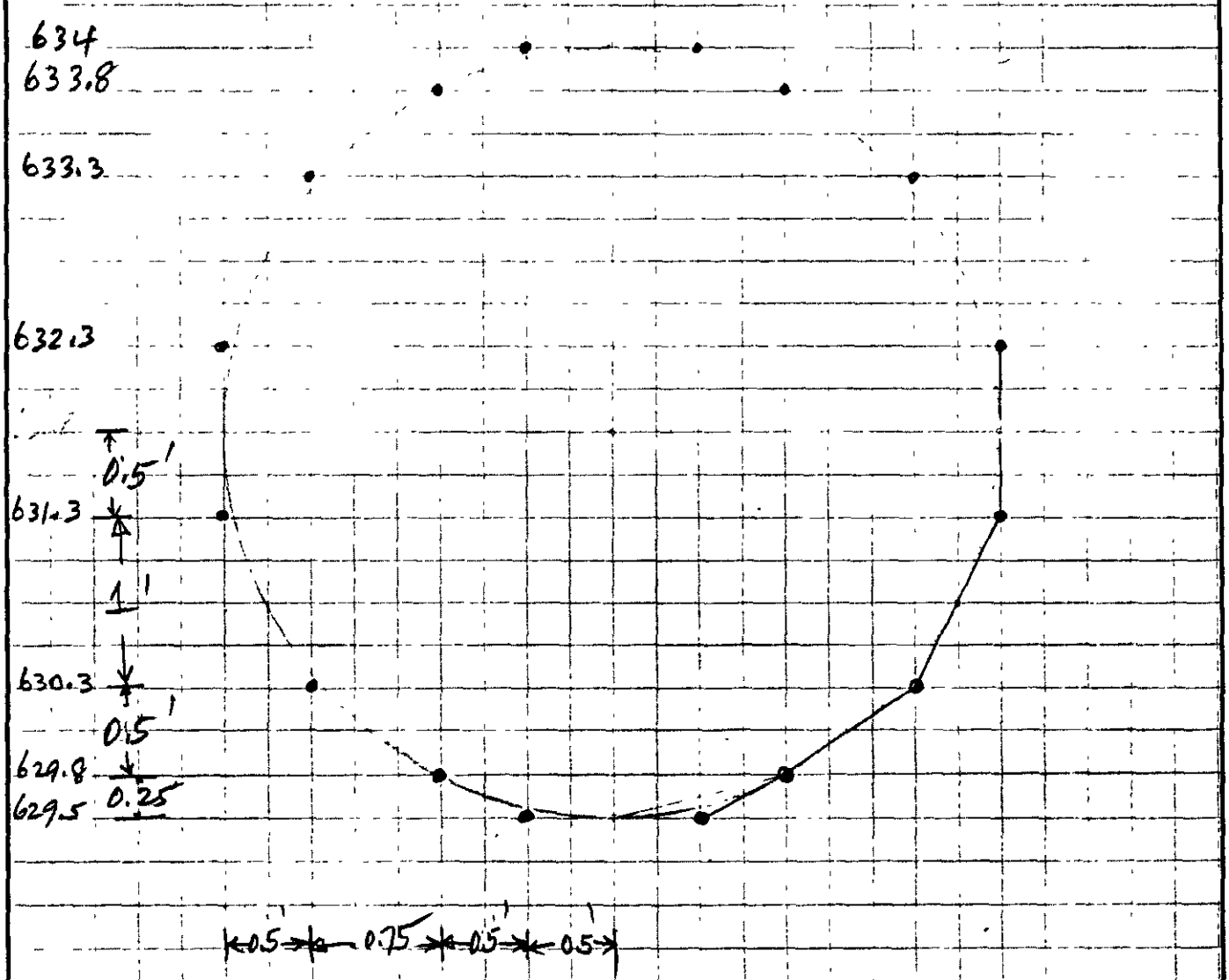
Gilbert/Commonwealth
209 E. Washington Avenue, Jackson, MI 49201

CALCULATION SHEET

REV.

CLIENT/OWNER	FILING CODE
	JOB NO.
CALC. BY/DATE (SIGNATURE)	SUBJECT: 54" ϕ
CHECKED BY/DATE (SIGNATURE)	SHEET OF / BOOK NO.

SECTION 6.0



Gilbert/Commonwealth
200 E. Washington Avenue, Jackson, MI 49201

CALCULATION SHEET REV.

CLIENT/OWNER	FILING CODE / JOB NO.
CALC BY/DATE DVD (SIGNATURE) 6-27-80	SUBJECT: Special Bridge Calcs.
CHECKED BY/DATE (SIGNATURE)	SHEET OF / BOOK NO.

Branch No. 3
Wilson Ave Crossing (XSEC 7)
48" ϕ CMP ~~80~~ 107 ft long

Area = 12.57 ft²
R = 1.0 ft
n = 0.024

$K_f = \frac{29.1\, n^2 L}{R^{4/3}} =$ ~~1.44~~ 1.79

$K_{ent} =$ 0.7

$\Sigma K_{OR} = 1.0 + 0.7 + $ ~~1.44~~ $1.79 =$ ~~3.14~~ 3.49

C for Weir flow = 3.0

Bottom width of Channel = 3.14 ft
Side Slope = 0

Elev of Channel U/S = 616.6
D/S = 615.3

THIS RUN EXECUTED 08/27/80

FIS City of Grandville
Kent Co., Michigan
Huizenga Drain
Starting WSEL Analysis
8/27/80

500,100,50,10

```
*****************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED  AUG1977
  ERROR CORR -  01,02
  MODIFICATION -  50,51,52,53
*****************************************************

T1      FIS GRANDVILLE, KENT CO.
T2      STARTING WATER SURFACE ELEVATIONS
T3      HUIZENGA DRAIN

J1  ICHECK    INQ      NINV     IDIR     STRT     METRIC   HVINS    Q        WSEL     FQ
      0.        2.       0.       0.   0.0        0.0      0.0      0.     604.300   0.0
J2  NPROF     IPLOT    PRFVS    XSECV    XSECH    FN       ALLDC    IBW      CHNIM    ITRACE
     1.000     0.0     -1.000    0.0      0.0      0.0      0.0      0.0      0.0      0.0

NC      0.070     0.070     0.040     0.100     0.300     0.0       0.0       0.0       0.0       0.0
DT      5.000   215.000   340.000   385.000   605.000   385.000     0.0       0.0       0.0       0.0 from Raverswood
                                                                                                       to Kirowa Ave
X1      0.0       8.000  2010.000  2055.000  4200.000  4200.000  4200.000     0.0       0.0       0.0
GR    615.000  2000.000   612.800  2010.000   609.200  2020.000   606.300  2028.000   606.200  2034.000
GR    606.400  2037.000   609.000  2043.000   613.100  2055.000     0.0       0.0       0.0       0.0

X1      0.700     0.0       0.0       0.0     125.000   125.000   125.000     0.0       0.0       0.0
NC      0.0       0.0       0.0       0.300     0.500     0.0       0.0       0.0       0.0       0.0

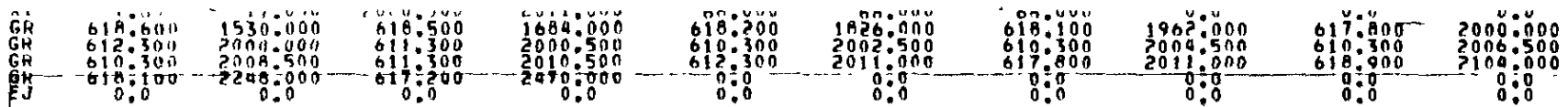
X1      0.800    11.000  2090.100  2099.900    30.000    30.000    30.000     0.0       0.0       0.0
GR    615.300  2000.000   614.300  2064.000   612.900  2090.100   607.000  2090.100   606.000  2092.000
GR    606.000  2095.000   606.000  2098.000   607.000  2099.900   612.900  2099.900   612.900  2138.000
GR    613.100  2234.000     0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
SB      0.0       2.049     3.000     0.0       7.750     0.0      51.000     0.0     606.000   606.000

X1      1.000     0.0       0.0       0.0      50.000    50.000    50.000     0.0       0.0       0.0
X2      0.0       0.0       1.000   612.500   612.900     0.0       0.0       0.0       0.0       0.0
BT     11.000  2000.000   615.300   615.300  2064.000   614.300   614.300  2090.100   612.900   612.900
BT   2090.100   612.900   609.000  2092.000   612.900   612.000  2095.000   612.900   612.500  2098.000
BT    612.900   612.000  2099.900   612.900   609.000  2099.900   612.900   612.900  2138.000   612.900
BT    612.900  2234.000   613.100   613.100     0.0       0.0       0.0       0.0       0.0       0.0

X1      1.200     8.000  2010.000  2055.000    30.000    30.000    30.000     0.0       0.500     0.0
GR    615.100  2000.000   612.800  2010.000   609.200  2020.000   606.300  2028.000   606.200  2034.000
GR    606.400  2037.000   609.000  2043.000   613.100  2055.000     0.0       0.0       0.0       0.0
NC      0.0       0.0       0.0       0.100     0.300     0.0       0.0       0.0       0.0       0.0

X1      1.700     8.000  2136.000  2165.000  1425.000  1425.000  1425.000     0.0       0.0       0.0
GR    616.600  2000.000   616.400  2136.000   610.900  2142.000   610.300  2147.000   611.000  2157.000
GR    616.400  2165.000   618.700  2196.000   621.300  2280.000     0.0       0.0       0.0       0.0
NC      0.0       0.0       0.0       0.300     0.500     0.0       0.0       0.0       0.0       0.0

X1      [illegible]
```


GR 618.600 1530.000 618.500 1684.000 618.200 1826.000 618.100 1962.000 617.800 2000.000
GR 612.300 2004.000 611.300 2000.500 610.300 2002.500 610.300 2004.500 610.300 2006.500
GR 610.300 2008.500 611.300 2010.500 612.300 2011.000 617.800 2011.000 618.900 2104.000
GR 618.100 2248.000 617.200 2470.000 0.0 0.0 0.0 0.0 0.0 0.0
EJ 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0

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*PROF 1

CEHV=   0.100 CEHV=   0.300
*SECNO  .0
   SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS    BANK ELEV
     Q        ALOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA    LEFT/RIGHT
    TIME      VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
   SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST

3720 CRITICAL DEPTH ASSUMED
     0.0        2.22     608.42     608.42     604.30     609.20       0.78       0.0        0.0      612.80
     215.        0.        215.        0.         0.         30.        0.         0.         0.       613.10
     0.0        0.0        7.10       0.0        0.070      0.040      0.070      0.0      606.20     2022.15
 0.021456       4200.      4200.      4200.         0         18          0        0.0       19.51     2041.66

*SECNO  .700

3301 HV CHANGED MORE THAN HVINS

     0.70       3.65     609.85       0.0        0.0      610.03       0.18       0.76       0.06      612.80
     215.        0.        215.        0.         0.         64.        0.         0.         0.       613.10
     0.01       0.0        3.37       0.0        0.070      0.040      0.070      0.040    606.20     2018.18
 0.002839       125.       125.       125.          3          0          0        0.0       27.32     2045.50

CCHV=   0.300 CEHV=   0.500
*SELNO  .800
     0.80       3.79     609.79       0.0        0.0      610.37       0.58       0.14       0.20      612.90
     215.        0.        215.        0.         0.         35.        0.         0.         0.       612.90
     0.01       0.0        6.08       0.0        0.070      0.040      0.070      0.039    606.00     2090.10
 0.009274        30.        30.        30.          2          0          0        0.0        9.80     2099.90

SPECIAL BRIDGE

SH   XK         XKOR       CDEN       RDLEN      BWP        BWP        BAREA      SS         ELCHU      ELCHD
     0.0        2.05       3.00       0.0        7.75       0.0        51.00      0.0      606.00     606.00

*SECNO 1.000

6070,LOW FLOW BY NORMAL BRIDGE

EGPRS=     0.0     EGLWC=   610.368  ELLC=   612.500  PCWSE=   609.791  ELTRD=   612.900

3370 NORMAL BRIDGE,NRD= 11 MIN ELTRD=  612.90 MAX FLLC=  612.50

     1.00       4.36     610.36       0.0        0.0      610.85       0.49       0.46       0.03      612.90
     215.        0.        215.        0.         0.         38.        0.         0.         0.       612.90
     0.01       0.1        5.62       0.0        0.070      0.040      0.070      0.039    606.00     2090.10
 0.008964        50.        50.        50.          3          0          0       -2.58       9.80     2099.90

*SELNO 1.200
   SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS    BANK ELEV
     Q        ALOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA    LEFT/RIGHT
    TIME      VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
   SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST
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     [illegible]      [illegible]      [illegible]      [illegible]      [illegible]      [illegible]      [illegible]      [illegible]      [illegible]      [illegible]
     215.        0.      215.        0.        0.       81.        0.        0.        0.      613.60
     0.02       0.0      2.66       0.0     0.070     0.040     0.070     0.039    606.70    2016.54
 0.001501       30.       30.       30.         2         0         0       0.0     30.69    2047.23

CCHV=   0.100 CEHV=   0.300
*SECNO 1.700
     1.70       3.53    613.83       0.0       0.0    614.04      0.21      2.95      0.03    616.40
     215.        0.      215.        0.        0.       59.        0.        3.        1.      616.40
     0.13       0.0      3.67       0.0     0.070     0.040     0.070     0.040    610.30    2138.80
 0.003045      1425.     1425.     1425.         4         0         0       0.0     22.39    2161.19

CCHV=   0.300 CEHV=   0.500
*SECNO 1.800
     1.80       3.69    613.99       0.0       0.0    614.51      0.52      0.32      0.16    617.80
     215.        0.      215.        0.        0.       37.        0.        3.        1.      617.80
     0.13       0.0      5.81       0.0     0.070     0.040     0.070     0.040    610.30    2000.00
 0.008049        68.       68.       68.         0         0         0       0.0     11.00    2011.00
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THIS RUN EXECUTED 08/27/80

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*****************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED  AUG1977
  ERROR CORR -  01,02
  MODIFICATION -  50,51,52,53
*****************************************************

T1      FIS GRANDVILLE, KENT CO.
T2      STARTING WATER SURFACE ELEVATIONS
T3      HUIZENGA DRAIN

J1  ICHECK     INQ      NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ
    -10.        3.        0.        0.   0.0          0.0       0.0       0.     604.300    0.0
J2  NPROF      IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE
     2.000      0.0      -1.000     0.0       0.0       0.0       0.0       0.0       0.0       0.0

*PROF 2

CCHV=   0.100 CEHV=   0.300
*SECNO .0
   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     BANK ELEV
   Q         CLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       LEFT/RIGHT
   TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN      SSTA
   SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID     ENDST

3720 CRITICAL DEPTH ASSUMED
     0.0       2.82    609.02    609.02    604.30    609.99      0.97      0.0       0.0     612.80
    340.        0.      340.        0.        0.       43.        0.        0.        0.     613.10
     0.0       0.0      7.91      0.0     0.070     0.040     0.070      0.0     606.20   2020.48
 0.020393    4200.     4200.     4200.         0        14         0       0.0      22.59   2043.07

*SECNO .700

3301 HV CHANGED MORE THAN HVINS

     0.70      4.45    610.63      0.0       0.0    610.87      0.24      0.80      0.07     612.80
    340.        0.      340.        0.        0.       87.        0.        0.        0.     613.10
     0.01      0.0      3.92      0.0     0.070     0.040     0.070     0.040    606.20   2016.02
 0.003109     125.      125.      125.         3         0         0       0.0     31.77   2047.78

CCHV=   0.300 CEHV=   0.500
*SECNO .800

3301 HV CHANGED MORE THAN HVINS

     0.80      4.40    610.40      0.0       0.0    611.46      1.06      0.18      0.41     612.90
    340.        0.      340.        0.        0.       41.        0.        0.        0.     612.90
     0.01      0.0      8.24      0.0     0.070     0.040     0.070     0.039    606.00   2090.10
 0.015222      30.       30.       30.         3         0         0       0.0      9.80   2099.90

SPECIAL NOTES
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SB  XK          XKOR        CUFQ        ROUFN       BWC         BWP         BARFA       SS          ELCHU       ELCHD
      0.0         2.05        3.00        0.0         7.75        0.0         51.00       0.0         606.00      606.00

*SECNO 1.000
6070,LOW FLOW BY NORMAL BRIDGE
EGPRS=     0.0    EGIWC=   611.457   ELLC=   612.500   PCWSE=   610.402   ELTRD=   612.900
3370 NORMAL BRIDGE,NRD= 11 MIN ELTRD=  612.90 MAX ELLC=  612.50

     1.00        5.41      611.41        0.0         0.0       612.24        0.83        0.71        0.07      612.90
      340.         0.        340.         0.          0.          47.          0.          0.          0.      612.90
     0.01         0.0        7.30         0.0       0.070       0.040       0.070       0.039      606.00     2090.10
 0.013353          50.         50.         50.           3           0           0       -0.59        9.80     2099.90

*SECNO 1.200
3301 HV CHANGED MORE THAN HVINS

   SECNO       DEPTH       CWSEL       CRIWS       WSELK       EG          HV          WL          QLOSS     BANK ELEV
   N           QLOB        QCH         QROB        ALOB        ACH         AROB        VOL         TWA       LEFT/RIGHT
   TIME        VLOB        VCH         VROB        XNL         XNCH        XNR         WTN         ELMIN       SSTA
   SLOPE       XLOBL       XLCH        XLOBR       ITRIAL      IDC         ICONT       CORAR       TOPWID      ENDST

     1.20        5.73      612.43        0.0         0.0       612.53        0.10        0.07        0.22      615.30
      340.         0.        340.         0.          0.         133.          0.          0.          0.      615.60
     0.02         0.0        2.56         0.0       0.070       0.040       0.070       0.039      606.70     2012.42
 0.000499          30.         30.         30.           2           0           0         0.0       39.16     2051.58

CCHV=    0.100 CEHV=    0.300
*SECNO 1.700
     1.70        4.37      614.67        0.0         0.0       614.96        0.29        2.38        0.06      616.40
      340.         0.        340.         0.          0.          78.          0.          4.          1.      616.40
     0.11         0.0        4.34         0.0       0.070       0.040       0.070       0.040      610.30     2137.89
 0.003354        1425.       1425.       1425.           4           0           0         0.0       24.55     2162.44

CCHV=    0.300 CEHV=    0.500
*SECNO 1.800
3301 HV CHANGED MORE THAN HVINS

     1.80        4.47      614.77        0.0         0.0       615.63        0.86        0.38        0.28      617.80
      340.         0.        340.         0.          0.          46.          0.          4.          1.      617.80
     0.11         0.0        7.45         0.0       0.070       0.040       0.070       0.040      610.30     2000.00
 0.011320          68.         68.         68.           2           0           0         0.0       11.00     2011.00
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THIS RUN EXECUTED 08/27/80

100-year starting elev.

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*****************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED  AUG1977
  ERROR CORR =  01,02
  MODIFICATION =  50,51,52,53
*****************************************************

T1      FIS GRANDVILLE, KENT CO.
T2      STARTING WATER SURFACE ELEVATIONS
T3      HUIZENGA DRAIN

J1  ICHECK    INQ      NINV     IDIR     STRT     METRIC   HVINS    Q        WSEL     FQ
    -10.       4.       0.       0.   0.0          0.0      0.0      0.    604.300   0.0

J2  NPROF     IPLOT    PRFVS    XSECV    XSECH    FN       ALLOC    IBW      CHNIM    ITRACE
     3.000     0.0     -1.000    0.0      0.0      0.0      0.0      0.0      0.0      0.0

*PROF 3

CCHV=   0.100 CEHV=   0.300
*SECNO .0
   SECNO     DEPTH    CWSEL    CRIWS    WSELK    EG       HV       HL       OLOSS    BANK ELEV
   Q         QLOB     QCH      QROB     ALOB     ACH      AROB     VOL      TWA      LEFT/RIGHT
   TIME      VLOB     VCH      VROB     XNL      XNCH     XNR      WTN      ELMIN     SSTA
   SLOPE     XLOBL    XLCH     XLOBR    ITRIAL   IDC      ICONT    CORAR    TOPWID    ENDST

3720 CRITICAL DEPTH ASSUMED.
     0.0      3.03    609.23   609.23   604.30   610.24    1.01     0.0      0.0     612.80
     385.       0.      385.      0.       0.      48.      0.       0.       0.      613.10
     0.0      0.0      8.06     0.0     0.070    0.040    0.070    0.0     606.20   2019.92
 0.019745    4200.    4200.    4200.       0        8        0      0.0     23.75    2043.67

*SECNO .700

3301 HV CHANGED MORE THAN HVINS

     0.70     4.67    610.87    0.0      0.0     611.13    0.26     0.81     0.08     612.80
     385.       0.      385.      0.       0.      94.      0.       0.       0.      613.10
     0.01     0.0      4.08     0.0     0.070    0.040    0.070    0.040    606.20   2015.37
 0.003191     125.     125.     125.       3        0        0      0.0     33.09    2048.46

CCHV=   0.300 CEHV=   0.500
*SECNO .800

3301 HV CHANGED MORE THAN HVINS

     0.80     4.55    610.55    0.0      0.0     611.81    1.26     0.19     0.50     612.90
     385.       0.      385.      0.       0.      43.      0.       0.       0.      612.90
     0.01     0.0      9.01     0.0     0.070    0.040    0.070    0.039    606.00   2090.10
 0.017746      30.      30.      30.       3        0        0      0.0      9.80    2099.90

SPECIAL NOTICE
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SB  XK          XKOR        CDFO        ROLEN       BWC         BWP         BAREA       SS          ELCHU       ELCHD
      0.0         2.05        3.00        0.0         7.75        0.0         51.00       0.0         606.00      606.00

*SECNO 1.000
6070,LOW FLOW BY NORMAL BRIDGE
EGPRS=     0.0    EGLWC=   611.815   ELLC=   612.500   PCWSE=   610.594   ELTRD=   612.900
3370 NORMAL BRIDGE,NRD= 11 MIN ELTRD=  612.90 MAX ELLC=  612.50
     1.00        5.77      611.77        0.0         0.0       612.72      0.98        0.81        0.10      612.90
      385.         0.        385.         0.          0.         49.         0.          0.          0.        612.90
     0.01         0.0        7.79        0.0        0.070      0.040       0.070       0.039     606.00    2090.10
 0.014726          50.        50.         50.          4          0           0       -5.27       9.80    2099.90

*SECNO 1.200
3301 HV CHANGED MORE THAN HVINS
   SECNO       DEPTH       CWSEL       CRTWS       WSELK       EG          HV          HL          QLOSS     BANK ELEV
     0         QLOB        QCH         VROB        ALOB        ACH         AROB        VOL         TWA     LEFT/RIGHT
    TIME       VLOB        VCH         VROB        XNL         XNCH        XNR         WTN         ELMIN       SSTA
   SLOPE       XLOBL       XLCH        XLOBR       ITRIAL      IDC         ICONT       CORAR       TOPWID      ENDST

     1.20        6.24      612.94        0.0         0.0       613.04      0.10        0.07        0.25      613.30
      385.         0.        385.         0.          0.        154.         0.          0.          0.        613.60
     0.01         0.0        2.51        0.0        0.070      0.040       0.070       0.039     606.70    2010.49
 0.000868          30.        30.         30.          2          0           0         0.0       42.09    2053.08

CCHV=    0.100 CEHV=    0.300
*SECNO 1.700
     1.70        4.66      614.96        0.0         0.0       615.27      0.32        2.17        0.07      616.40
      385.         0.        385.         0.          0.         85.         0.          4.          1.        616.40
     0.10         0.0        4.51        0.0        0.070      0.040       0.070       0.040     610.30    2137.67
 0.003344         1425.      1425.       1425.          4          0           0         0.0       25.29    2162.86

CCHV=    0.300 CEHV=    0.500
*SECNO 1.800
3301 HV CHANGED MORE THAN HVINS
     1.80        4.72      615.02        0.0         0.0       616.00      0.98        0.39        0.33      617.80
      385.         0.        385.         0.          0.         48.         0.          4.          1.        617.80
     0.10         0.0        7.95        0.0        0.070      0.040       0.070       0.040     610.30    2000.00
 0.012392          68.        68.         68.          2          0           0         0.0       11.00    2011.00
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THIS RUN EXECUTED 08/27/80

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*****************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED  AUG1977
  ERROR CORR -  01,02
  MODIFICATION -  50,51,52,53
*****************************************************

T1      FIS GRANDVILLE, KENT CO.
T2      STARTING WATER SURFACE ELEVATIONS
T3      HUTZENGA DRAIN

J1  ICHECK     INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ
    -10.        5.        0.        0.   0.0          0.0       0.0       0.     604.300     0.0
J2  NPROF      IPLOT     PREVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE
    15.000      0.0      -1.000     0.0       0.0       0.0       0.0       0.0       0.0       0.0

*PROF 4

CCHV=   0.100 CEHV=   0.300
*SECNO .0
   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS    BANK ELEV
   Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA    LEFT/RIGHT
   TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN      SSTA
   SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    TDC       ICCNT     CORAR     TOPWID     ENDST

3720 CRITICAL DEPTH ASSUMED
     0.0       3.81    610.01    610.01    604.30    611.24      1.23      0.0       0.0     612.80
     605.        0.      605.        0.        0.       68.        0.        0.        0.     613.10
     0.0       0.0       8.90      0.0     0.070     0.040     0.070      0.0     606.20    2017.76
 0.018904     4200.     4200.     4200.         0        14         0      0.0      28.20    2045.95

*SECNO .700

3301 HV CHANGED MORE THAN HVINS

     0.70      5.63    611.83      0.0       0.0    612.17      0.34      0.85      0.09     612.80
     605.        0.      605.        0.        0.      124.        0.        0.        0.     613.10
     0.01      0.0       4.71      0.0     0.070     0.040     0.070     0.040    606.20    2012.72
 0.003446      125.      125.      125.         2         0         0      0.0      38.54    2051.26

CCHV=   0.300 CEHV=   0.500
*SECNO .800

3301 HV CHANGED MORE THAN HVINS

   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS    BANK ELEV
   Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA    LEFT/RIGHT
   TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN      SSTA
   SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    TDC       ICCNT     CORAR     TOPWID     ENDST

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
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     0.00      5.09    611.09    611.09      0.0    613.56      2.47      0.24      1.06    612.90
     605.        0.      605.        0.        0.      48.        0.        0.        0.    612.90
     0.01       0.0     12.62       0.0     0.070     0.040     0.070     0.039    606.00   2090.10
 0.032336       30.       30.       30.         4        11         0       0.0      9.80   2099.90

SPECIAL BRIDGE

SB  XK        XKOR      COFN      RDLEN     BWC       BWP       BAREA     SS        FLCHU     ELCHD
     0.0       2.05      3.00       0.0      7.75      0.0      51.00      0.0      606.00    606.00

*SECNO 1.000
6870 D.S. ENERGY OF  613.56 HIGHER THAN COMPUTED ENERGY OF  613.49
PRESSURE AND WEIR FLOW

 EGPRS      FGLWC      H3        QWEIR     QPR       BAREA   TRAPEZOID      ELLC      ELTRD
                                                                AREA
  615.56    613.56      0.0       167.      443.       51.       50.      612.50    612.90

     1.00      5.22    611.22      0.0       0.0    613.56      2.34      0.0       0.0    612.90
     605.        0.      605.        0.        0.      49.        0.        0.        0.    612.90
     0.01       0.0     12.27       0.0     0.070     0.040     0.070     0.039    606.00   2090.10
 0.030032       50.       50.       50.         7         0         4       0.0      9.80   2099.90

*SECNO 1.200
3280 CROSS SECTION      1.20 EXTENDED      0.56 FEET

3301 HV CHANGED MORE THAN HVINS

   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS    BANK ELEV
   Q         GLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA      LEFT/RIGHT
   TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN      SSTA
   SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID     ENDST

     1.20      7.46    614.16      0.0       0.0    614.30      0.13      0.08      0.66    613.30
     605.        1.      604.        0.        2.      208.        0.        0.        0.    613.60
     0.01       0.35      2.91       0.0     0.070     0.040     0.070     0.039    606.70   2006.07
 0.000869       30.       30.       30.         3         0         0       0.0     48.93   2055.00

CCHV=    0.100 CEHV=    0.300
*SECNO 1.700
     1.70      5.85    616.15      0.0       0.0    616.56      0.41      2.18      0.08    616.40
     605.        0.      605.        0.        0.      118.        0.        6.        1.    616.40
     0.09       0.0      5.15       0.0     0.070     0.040     0.070     0.040    610.30   2136.27
 0.003396     1425.     1425.     1425.         5         0         0       0.0     28.36   2164.63

CCHV=    0.300 CEHV=    0.500
*SECNO 1.800

3301 HV CHANGED MORE THAN HVINS

     1.80      5.70    616.00      0.0       0.0    617.62      1.62      0.45      0.61    617.80
     605.        0.      605.        0.        0.      59.        0.        6.        1.    617.80
     0.09       0.0     10.22       0.0     0.070     0.040     0.070     0.040    610.30   2000.00
 0.017938       68.       68.       68.         2         0         0       0.0     11.00   2011.00
```

THIS RUN EXECUTED 08/27/80

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**********************************************
  HEC2 RELEASE DATED NOV 76 UPDATED  AUG1977
  ERROR CORR =  01,02
  MODIFICATION =  50;51,52,53
**********************************************
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NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

HUIZENGA DRAIN

SUMMARY PRINTOUT TABLE 150

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10K*S	VCH	AREA	.01K
*	0.0	4200.00	0.0	0.0	606.20	215.00	608.42	608.42	609.20	214.58	7.10	30.27	14.68
*	0.0	4200.00	0.0	0.0	606.20	340.00	609.02	609.02	609.99	203.93	7.91	43.01	23.81
*	0.0	4200.00	0.0	0.0	606.20	385.00	609.23	609.23	610.24	197.45	8.06	47.74	27.40
*	0.0	4200.00	0.0	0.0	606.20	605.00	610.01	610.01	611.24	189.04	8.90	67.98	44.00
	0.700	125.00	0.0	0.0	606.20	215.00	609.85	0.0	610.03	28.39	3.37	63.72	40.35
	0.700	125.00	0.0	0.0	606.20	340.00	610.63	0.0	610.87	31.09	3.92	86.76	60.98
	0.700	125.00	0.0	0.0	606.20	385.00	610.87	0.0	611.13	31.91	4.08	94.30	68.16
	0.700	125.00	0.0	0.0	606.20	605.00	611.83	0.0	612.17	34.46	4.71	128.52	103.06
	0.800	30.00	0.0	0.0	606.00	215.00	609.79	0.0	610.37	92.74	6.09	35.29	22.33
	0.800	30.00	0.0	0.0	606.00	340.00	610.40	0.0	611.46	152.22	8.24	41.24	27.56
	0.800	30.00	0.0	0.0	606.00	385.00	610.55	0.0	611.81	177.46	9.01	42.74	28.90
*	0.800	30.00	0.0	0.0	606.00	605.00	611.09	611.09	613.56	323.36	12.62	47.94	33.64
	1.000	50.00	612.90	612.50	606.00	215.00	610.36	0.0	610.85	89.64	5.62	38.23	22.71
	1.000	50.00	612.90	612.50	606.00	340.00	611.41	0.0	612.24	133.53	7.30	46.60	29.42
	1.000	50.00	612.90	612.50	606.00	385.00	611.77	0.0	612.72	147.26	7.79	49.40	31.73
	1.000	50.00	612.90	612.50	606.00	605.00	611.22	0.0	613.56	300.32	12.27	49.31	34.91
	1.200	30.00	0.0	0.0	606.70	215.00	610.94	0.0	611.05	15.01	2.66	80.86	55.49
	1.200	30.00	0.0	0.0	606.70	340.00	612.43	0.0	612.53	9.99	2.56	132.73	107.59
	1.200	30.00	0.0	0.0	606.70	385.00	612.94	0.0	613.04	8.68	2.51	153.55	130.69
	1.200	30.00	0.0	0.0	606.70	605.00	614.16	0.0	614.30	8.69	2.91	209.37	205.26
	1.700	1425.00	0.0	0.0	610.30	215.00	613.83	0.0	614.04	30.45	3.67	58.58	38.96
	1.700	1425.00	0.0	0.0	610.30	340.00	614.67	0.0	614.96	33.34	4.34	78.32	58.88
	1.700	1425.00	0.0	0.0	610.30	385.00	614.96	0.0	615.27	33.44	4.51	85.45	66.58
	1.700	1425.00	0.0	0.0	610.30	605.00	616.15	0.0	616.56	33.96	5.15	117.51	103.82
	1.800	68.00	0.0	0.0	610.30	215.00	613.99	0.0	614.51	80.49	5.81	37.00	23.96
	1.800	68.00	0.0	0.0	610.30	340.00	614.77	0.0	615.63	113.20	7.45	45.64	31.96
	1.800	68.00	0.0	0.0	610.30	385.00	615.02	0.0	616.00	123.92	7.95	48.40	34.59
	1.800	68.00	0.0	0.0	610.30	605.00	616.00	0.0	617.62	179.38	10.22	59.19	45.17

HUIZENGA DRAIN

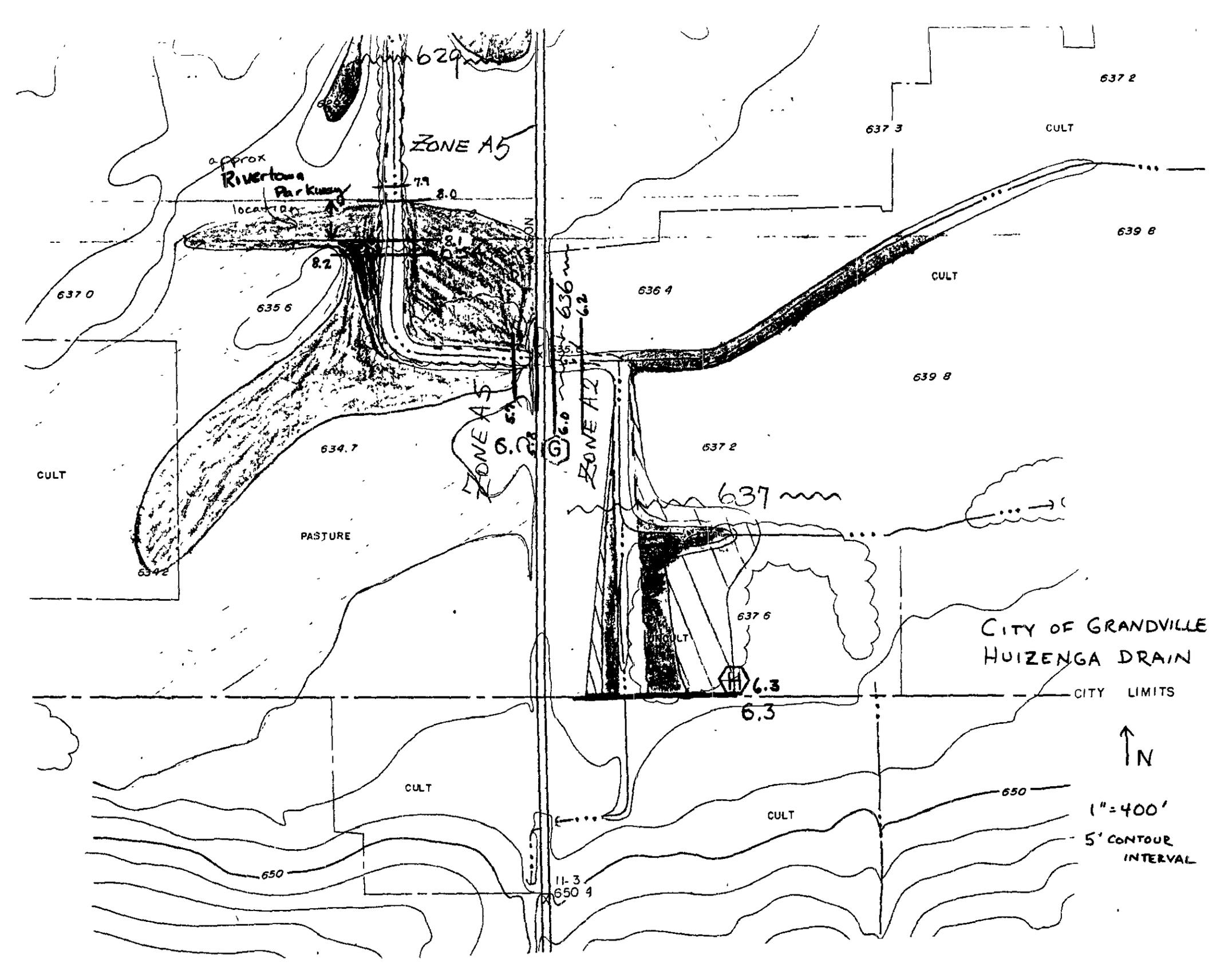
SUMMARY PRINTOUT TABLE 150

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	0.0	215.00	608.42	0.0	0.0	4.12	19.51	4200.00
*	0.0	340.00	609.02	0.61	0.0	4.72	22.59	4200.00
*	0.0	385.00	609.23	0.20	0.0	4.93	23.75	4200.00
*	0.0	605.00	610.01	0.78	0.0	5.71	28.20	4200.00
	0.700	215.00	609.85	0.0	1.43	0.0	27.32	125.00
	0.700	340.00	610.63	0.78	1.61	0.0	31.77	125.00
	0.700	385.00	610.87	0.23	1.64	0.0	33.09	125.00
	0.700	605.00	611.83	0.96	1.82	0.0	38.54	125.00
	0.800	215.00	609.79	0.0	-0.06	0.0	9.80	30.00
	0.800	340.00	610.40	0.61	-0.23	0.0	9.80	30.00
	0.800	385.00	610.55	0.15	-0.31	0.0	9.80	30.00
*	0.800	605.00	611.09	0.53	-0.74	0.0	9.80	30.00
	1.000	215.00	610.36	0.0	0.57	0.0	9.80	50.00
	1.000	340.00	611.41	1.05	1.01	0.0	9.80	50.00
	1.000	385.00	611.77	0.36	1.22	0.0	9.80	50.00
	1.000	605.00	611.22	-0.55	0.14	0.0	9.80	50.00
	1.200	215.00	610.94	0.0	0.59	0.0	30.69	30.00
	1.200	340.00	612.43	1.48	1.02	0.0	39.16	30.00
	1.200	385.00	612.94	0.51	1.17	0.0	42.09	30.00
	1.200	605.00	614.16	1.23	2.94	0.0	48.93	30.00
	1.700	215.00	613.83	0.0	2.88	0.0	22.39	1425.00
	1.700	340.00	614.67	0.84	2.24	0.0	24.55	1425.00
	1.700	385.00	614.96	0.29	2.02	0.0	25.29	1425.00
	1.700	605.00	616.15	1.19	1.99	0.0	28.36	1425.00
	1.800	215.00	613.99	0.0	0.16	0.0	11.00	68.00
	1.800	340.00	614.77	0.78	0.10	0.0	11.00	68.00
	1.800	385.00	615.02	0.25	0.06	0.0	11.00	68.00
	1.800	605.00	616.00	0.98	-0.16	0.0	11.00	68.00

SUMMARY OF ERRORS

CAUTION SECNO= 0.0 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 0.0 PROFILE= 2 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 0.0 PROFILE= 3 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 0.0 PROFILE= 4 CRITICAL DEPTH ASSUMED

CAUTION SECNO= 0.800 PROFILE= 4 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 0.800 PROFILE= 4 MINIMUM SPECIFIC ENERGY



629
ZONE A5
approx
Rivertown
Parkway
location
7.9
8.0
8.1
8.2
637 0
635 6
636 4
637 3
637 2
CULT
639 8
CULT
639 8
636
6.2
ZONE A5
ZONE A2
6.0
6.0
G
634.7
637 2
CULT
PASTURE
634 2
637
637 6
UNCULT
H
6.3
6.3
CITY OF GRANDVILLE
HUIZENGA DRAIN
CITY LIMITS
N
CULT
CULT
650
650
11-3
650 4
1" = 400'
5' CONTOUR
INTERVAL

```
**************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED MAY  1984
  ERROR CORR -  01,02,03,04,05,06
  MODIFICATION -  50,51,52,53,54,55,56
**************************************************

T1REANALYSIS OF F I S  U/S OF RIVERTOWN PARKWAY
T2 CITY OF GRANOVILLE, KENT CO   INAPPROPRIATE WEIR USED IN F I S
T3   HUIZENGA DRAIN [redacted]85
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NOTE: D.A. OF HUIZENGA DRAIN < 2 MI² U/S OF RIVERTOWN PKWAY

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
	0	4	0	0	0.000000	0.00	0.0	300	629.600	0.000

J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	0.000	0.000	-1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

NC	0.070	0.070	0.040	0.100	0.300	0.000	0.000	0.000	0.000	0.000
X1	7.900	8.000	5840.000	5852.000	0.000	0.000	0.000	0.000	0.700	0.000
GR	633.400	5800.000	632.900	5832.000	628.000	5840.000	624.900	5840.000	624.900	5852.000
GR	628.000	5852.000	632.900	5862.000	632.800	5900.000	0.000	0.000	0.000	0.000
NC	0.000	0.000	0.000	0.300	0.500	0.000	0.000	0.000	0.000	0.000
X1	8.000	0.000	0.000	0.000	50.000	50.000	50.000	0.000	0.000	0.000
SB	0.000	4.170	3.000	0.000	7.200	0.000	22.800	0.000	624.900	624.200
X1	8.100	0.000	0.000	0.000	140.000	140.000	140.000	0.000	0.700	0.000
X2	0.000	0.000	1.000	628.200	633.600	0.000	0.000	0.000	0.000	0.000
BT	20.000	5260.000	632.800	0.000	5300.000	632.400	0.000	5350.000	632.000	0.000
BT	5450.000	631.600	0.000	5500.000	631.700	0.000	5550.000	632.000	0.000	5650.000
BT	632.800	0.000	5700.000	633.200	0.000	5750.000	633.600	0.000	5800.000	633.900
BT	0.000	5850.000	633.900	0.000	5900.000	633.800	0.000	5950.000	633.400	0.000
BT	6000.000	632.900	0.000	6050.000	632.400	0.000	6100.000	632.100	0.000	6150.000
BT	631.900	0.000	6200.000	632.000	0.000	6250.000	632.400	0.000	6300.000	632.800
BT	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
X1	8.200	0.000	0.000	0.000	50.000	50.000	50.000	0.000	0.000	0.000
NC	0.000	0.000	0.000	0.100	0.300	0.000	0.000	0.000	0.000	0.000
X1	5.700	8.000	2041.000	2063.000	883.000	883.000	883.000	0.000	0.000	0.000
GR	635.500	2031.000	632.400	2041.000	629.400	2051.000	629.000	2053.000	629.400	2055.000
GR	631.900	2063.000	635.200	2074.000	635.400	2098.000	0.000	0.000	0.000	0.000
NC	0.000	0.000	0.000	0.300	0.500	0.000	0.000	0.000	0.000	0.000
X1	5.800	0.000	0.000	0.000	30.000	30.000	30.000	0.000	0.000	0.000
X3	0.000	0.000	0.000	1970.000	0.000	2112.000	0.000	0.000	0.000	0.000

SB	0 000	1 769	3 000	0 000	3 530	0 000	15 900	0 000	629 500	629 500
X1	6 000	15 000	2000 000	2004 500	50 000	50 000	50 000	0 000	0 000	0 000
X2	0 000	0 000	1 000	634 000	635 700	0 000	0 000	0 000	0 000	0 000
X3	10 000	0 000	0 000	1982 000	0 000	2100 000	0 000	635 700	635 700	0 000
BT	16 000	1982 000	637 700	637 700	1982 000	635 800	635 800	1982 000	635 800	635 800
BT	2000.000	735 700	635 700	2000 000	635 700	632 300	2000 500	635 700	633 300	2001 300
BT	635.700	633 800	2001 800	635 700	634 000	2002 800	635 700	634 000	2003 300	635 700
BT	633 800	2004 000	635 700	633 300	2004 000	635 700	632 300	2004 500	635 700	635 700
BT	2022 000	635 700	635 700	2100 000	635 700	635 700	2100 000	638.000	638 000	0 000
GR	637 800	1570 000	636 500	1808 000	635 800	1970 000	635 700	2000 000	631 300	2000.000
GR	630 300	2000 500	629 800	2001.300	629 500	2001 800	629 500	2002 800	629 800	2003 300
GR	630 300	2004 000	631 300	2004 500	633 400	2004 500	635 700	2100 000	638 000	2100 000
X1	6 200	10 000	2031 000	2054 000	100 000	100 000	100 000	0 000	0 000	0 000
GR	637 500	2015 000	637 500	2015 000	636 800	2031 000	633 700	2036 000	630 200	2041 000
GR	629 900	2043.000	630 200	2045 000	633 400	2054 000	636 300	2060 000	636 900	2094.000
QT	4 000	65 000	120 000	140 000	225 000	0 000	0 000	0 000	0 000	0 000
NC	0 000	0 000	0 000	0 100	0 300	0 000	0 000	0 000	0 000	0 000
X1	6 300	6 000	259 000	282 000	1350 000	1350 000	1350 000	0 000	0 000	0 000
GR	640 000	0 000	637 000	259.000	635 000	259 000	635 000	282 000	637 000	282 000
GR	640 000	1120 000	0 000	0 000	0 000	0 000	0 000	0 000	0 000	0 000
EJ	0 000	0 000	0 000	0 000	0 000	0 000	0 000	0 000	0 000	0 000

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*PROF 1

CCHV= 0 100 CEHV= 0 300
*SECNO 7 900

7 90	4 00	629 60	0 00	629 60	630 20	0 60	0 00	0 00	628 70
300	1	299	1	1	48	1	0	0	628 70
0.00	0 98	6 22	1 02	0 070	0 040	0 070	0 000	625 60	5838 53
0 007690	0	0	0	0	0	0	0 00	15 31	5853 84

CCHV= 0 300 CEHV= 0 500
*SECNO 8 000

8 00	4 49	630 09	0 00	0 00	630 55	0 46	0 31	0 01	628 70
300	2	296	2	2	54	2	0	0	628 70
0 00	1 07	5 50	1 11	0 070	0 010	0 070	0 000	625 60	5837 74
0 005164	50	50	50	2	0	0	0 00	17 09	5854.83

SPECIAL BRIDGE

SB	XK	XKOR	COFQ	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
	0 00	4 17	3 00	0 00	7 20	0 00	22 80	0 00	624 90	624 20

*SECNO 8 100
PRESSURE AND WEIR FLOW

EGPRS	EGLWC	H3	OWEIR	QFR	BAREA	TRAPEZOID AREA	ELLC	ELTRD
641 30	630 40	0 00	171	129	23	24	628 20	633 60

8 10	5 58	631 88	0 00	0 00	632 16	0 28	1 61	0 00	629 40
300	5	288	7	5	67	6	0	0	629 40
0 01	1 07	4 29	1 11	0 070	0 040	0 070	0 000	626 30	5835 95
0 002350	140	140	140	2	0	9	0 00	21 12	5857 07

*SECNO 8 200

8 20	5 71	632 01	0 00	0 00	632 27	0 26	0 11	0 00	629 40
300	6	286.	8	6	69	7	0	0	629 40
0 02	1 06	4.18	1.10	0 070	0 040	0 070	0 000	626 30	5835 73
0 002155	50	50	50	2	0	0	0 00	21 61	5857 34

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAP	TOPWID	ENDST

CCHV= 0 100 CEHV= 0 300
*SECNO 5 700

5 70	4 95	633 95	0 00	0 00	631 17	0 22	1 89	0 00	632 40
300	3	290	7	4	76	7	2	1	631 90
0 08	0 80	3 81	0 97	0 070	0 040	0 070	0 000	629 00	2035 97
0 002124	883	883	883	1	0	0	0 00	33 89	2069 86

CCHV= 0 300 CEHV= 0 500
*SECNO 5 800

3470 ENCROACHMENT STATIONS= 1970 0 2112 0 TYPE= 1 TARGET= 142 000

5 80	5 02	634 02	0 00	0 00	634 23	0 21	0 06	0 00	632 40
300	3	290	7	4	77	7	2	1	631 90
0 08	0 80	3 75	0 96	0 070	0 010	0 070	0 000	629 00	2035 80
0 002008	30	30	30	0	0	0	0 00	34 25	2070 04

SPECIAL BRIDGE

SB	XK	XKOR	COFQ	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
	0 00	1 77	3 00	0 00	3 53	0 00	15 90	0 00	629 50	629 50

*SECNO 6 000
PRESSURE AND WEIR FLOW

EGPRS	EGLWC	H3	QWEIR	QTP	BAREA	TRAPEZOID AREA	ELLC	ELTRD
643 80	637 91	0 00	154	146	16	16	634 00	635 70

3470 ENCROACHMENT STATIONS= 1982 0 2100 0 TYPE= 1 TARGET= 118 000

6 00	6 79	636 29	0 00	0 00	636 34	0 05	2 11	0 00	635 70
300	6	76	217	10	28	166	2	1	633 40
0 09	0 61	2 70	1 31	0 070	0 040	0 070	0 000	629 50	1982 00
0 001821	50	50	50	2	0	6	0 00	118 00	2100 00

*SECNO 6 200

6 20	6 49	636 39	0 00	0 00	636 53	0 14	0 14	0 05	636 80
300	0	292	8	0	95	9	3	1	633 40
0 10	0 00	3 08	0 88	0 000	0 040	0 070	0 000	629 90	2031 66
0 001154	100	100	100	2	0	0	0 00	33 32	2064 99

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

CCHV= 0 100 CEHV= 0 300

*SECNO 6 300

6 30	2 78	637 78	0 00	0 00	637 82	0 03	1 27	0 01	637 00
140	8	108	25	26	64	85	7	6	637 00
0 38	0 29	1 68	0 29	0 070	0 040	0 070	0 000	635 00	191 46
0 000649	1350	1350	1350	2	0	0	0 00	309 05	500 52

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**********************************************
 HEC2 RELEASE DATED NOV 76 UPDATED MAY  1984
 ERROR CORR -  01,02,03,04,05,06
 MODIFICATION -  50,51,52,53,54,55,56
**********************************************

T1   10 YEAR FLOOD
T2
T3

J1  ICHECK     INQ       NINV      IDIR      STRT      METRIC    HVINS     0         WSEL      FQ
     -10         2         0         0    0 000000     0 00      0 0      140     627 950     0 000
J2  NPROF      IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE
      2 000     0 000    -1 000     0 000     0 000     0 000     0 000     0 000     0 000     0 000
```

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*PROF 2

CCHV= 0 100 CEHV= 0 300
*SECNO 7 900

7 90	2 35	627 95	0 00	627 95	628 33	0 38	0 00	0 00	628 70
140	0	140	0	0	28	0	0	0	628 70
0 00	0 00	4 96	0 00	0 000	0 040	0 000	0 000	625 60	5840 00
0 008881	0	0	0	0	0	0	0 00	12 00	5852 00

CCHV= 0 300 CEHV= 0 500
*SECNO 8 000

8 00	2 84	628 44	0 00	0 00	628 70	0 26	0 33	0 04	628 70
140	0	140	0	0	34	0	0	0	628 70
0 00	0 00	4 11	0 00	0 000	0 040	0 000	0 000	625 60	5840 00
0 005114	50	50	50	2	0	0	0 00	12 00	5852 00

SPECIAL BRIDGE

SB	XK	XKOR	COFQ	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
	0 00	4 17	3 00	0 00	7 20	0 00	22 80	0 00	624 90	624 20

*SECNO 8 100
PRESSURE FLOW

EGPRS	EGLWC	H3	QWEIR	QPR	BAREA	TRAPEZOID AREA	ELLC	ELTRD
630.88	628 76	0 00	0	140	23	24	628 20	633 60

8 10	4 48	630 78	0 00	0 00	630 88	0 10	2 18	0 00	629 40
140	1	138	1	2	54	2	0	0	629 40
0 02	0 50	2 57	0 52	0 070	0 040	0 070	0 000	626 30	5837 75
0 001133	140	140	140	2	0	0	0 00	17 06	5854 81

*SECNO 8 200

8 20	4 54	630 84	0 00	0 00	630 93	0 10	0 06	0 00	629 40
140	1	138	1	2	54	2	0	0	629 40
0 02	0 50	2 54	0 52	0 070	0 040	0 070	0 000	626 30	5837 66
0 001082	50	50	50	2	0	0	0 00	17 27	5854 93

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	ARDB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	YNL	YNCH	YNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

CCHV= 0 100 CEHV= 0 300
*SECNO 5 700

5 70	3 39	632 39	0 00	0 00	632 57	0 18	1 61	0 02	632 40
140	0	140	0	0	42	0	1	0	631 90
0 10	0 00	3 36	0 49	0 000	0 010	0 070	0 000	629 00	2041 03
0 003690	883	883	883	2	0	0	0 00	23 60	2064 63

CCHV= 0 300 CEHV= 0 500
*SECNO 5 800

3470 ENCROACHMENT STATIONS= 1970 0 2112 0 TYPE= 1 TARGET= 142 000

5 80	3 52	632 52	0 00	0 00	632 67	0 15	0 10	0 01	632 40
140	0	140	0	0	44	1	1	1	631 90
0 10	0 01	3 15	0 51	0 070	0 040	0 070	0 000	629 00	2040 62
0 002968	30	30	30	2	0	0	0 00	24 44	2065 06

SPECIAL BRIDGE

SB	XK	XKOR	COFQ	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
	0 00	1 77	3 00	0 00	3 53	0 00	15 90	0 00	629 50	629 50

*SECNO 6 000

6070.LOW FLOW BY NORMAL BRIDGE

EGPRS= 634 647 EGLWC= 634 674 ELLC= 634 000 PCWSE= 632 518 ELTRD= 635 700

3301 HV CHANGED MORE THAN HVINS

3370 NORMAL BRIDGE,NRD= 16 MIN ELTRD= 635 70 MAX ELLC= 634 00

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 1982 0 2100 0 TYPE= 1 TARGET= 118 000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA= 635 70 ELREA= 635 70

6 00	3 53	633 03	633 03	0 00	634 72	1 68	0 41	0 76	635 70
140	0	140	0	0	13	0	1	1	633 40
0 10	0 00	10 41	0 00	0 000	0 040	0 000	0 000	629 50	2000 00
0 067195	50	50	50	20	12	0	-0 17	4 50	2004 50

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 6 200

3301 HV CHANGED MORE THAN HVINS

6 20	5 44	635 34	0 00	0 00	635 39	0 06	0 19	0 49	636 80
140	0	138	2	0	72	4	1	1	633 40
0 12	0 00	1 91	0 46	0 000	0 010	0 070	0 000	629 90	2033 35
0 000571	100	100	100	3	0	0	0 00	24 68	2058 02

CCHV= 0 100 CEHV= 0 300
*SECNO 6 300

6 30	1 41	636 41	0 00	0 00	636 17	0 06	1 08	0 00	637 00
65	0	65	0	0	32	0	3	1	637 00
0 30	0 00	2 00	0 00	0 000	0 010	0 000	0 000	635 00	259 00
0 002146	1350	1350	1350	6	0	0	0 00	23 00	282 00

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*****************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED MAY  1984
  ERROR CORR -  01,02,03,04,05,06
  MODIFICATION -  50,51,52,53,54,55,56
*****************************************************

T1   50 YEAR FLOOD
T2
T3

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

     -10        3         0         0   0 000000      0 00       0 0      255    629 220     0 000

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

      3 000     0 000    -1 000     0 000     0 000     0 000     0 000     0 000     0 000     0 000
```

SECND	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*PROF 3

CCHV= 0 100 CEHV= 0 300
*SECNO 7 900

7 90	3 62	629 22	0 00	629 22	629 75	0 53	0 00	0 00	628 70
255	0.	255	0	0	43	0	0	0	628 70
0 00	0 69	5 86	0 71	0 070	0 040	0 070	0 000	625 60	5839.15
0 007806	0	0	0	0	0	0	0 00	13 91	5853 06

CCHV= 0 300 CEHV= 0 500
*SECNO 8 000

8 00	4 09	629 69	0 00	0 00	630 10	0 41	0 31	0 04	628 70
255	1	253	1	1	49	1	0	0	628 70
0 00	0 86	5 16	0 89	0 070	0 040	0 070	0 000	625 60	5838 38
0 005139	50	50	50	2	0	0	0 00	15 64	5851 02

SPECIAL BRIDGE

SB	XK	XKOR	COFQ	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
	0 00	4 17	3 00	0 00	7 20	0 00	22 80	0 00	621 90	621 20

*SECNO 8 100
PRESSURE AND WEIR FLOW

EGPRS	EGLWC	H3	QWEIR	QPR	BAREA	TRAPEZOID AREA	ELLC	ELTRD
637 79	629 96	0 00	117	139	23	24	628 20	633 60

8 10	5 58	631 88	0 00	0 00	632 08	0 20	1 98	0 00	629 40
255	5	244	6	5	67	6	0	0	629 40
0 01	0 91	3 65	0 94	0 070	0 040	0 070	0 000	626 30	5835 94
0 001696	140	140	140	2	0	9	0 00	21 13	5857 07

*SECNO 8 200

8 20	5 68	631 98	0 00	0 00	632 17	0 19	0 08	0 00	629 40
255	5	244	6	5	68	7	0	0	629 40
0 02	0 90	3 58	0 93	0 070	0 040	0 070	0 000	626 30	5835 79
0 001596	50	50	50	2	0	0	0 00	21 47	5857 26

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

CCHV= 0 100 CEHV= 0 300
*SECNO 5 700

5 70	4 62	633 62	0 00	0 00	633 82	0 20	1 65	0 00	632 40
255	2	249	4	2	69	5	2	1	631 90
0 09	0 70	3 63	0 88	0 070	0 040	0 070	0 000	629 00	2037 07
0 002212	883	883	883	2	0	0	0 00	31 65	2068 73

CCHV= 0 300 CEHV= 0 500
*SECNO 5 800

3470 ENCROACHMENT STATIONS= 1970 0 2112 0 TYPE= 1 TARGET= 142 000

5 80	4 70	633 70	0 00	0 00	633 89	0 19	0 06	0 00	632 40
255	2	248	5	3	70	5	2	1	631 90
0 09	0 69	3 53	0 86	0 070	0 010	0 070	0 000	629 00	2036 82
0 002027	30	30	30	2	0	0	0 00	32 17	2068 99

SPECIAL BRIDGE

SB	XK	XKOR	COFQ	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
	0 00	1 77	3 00	0 00	3 53	0 00	15 90	0 00	629 50	629 50

*SECNO 6 000
PRESSURE AND WEIR FLOW

EGPRS	EGLWC	H3	QWEIR	QPR	BAREA	TRAPEZOID AREA	ELLC	ELTRD
640 76	637 04	0 00	105	152	16	16	634 00	635 70

3470 ENCROACHMENT STATIONS= 1982 0 2100 0 TYPE= 1 TARGET= 118 000

6 00	6 65	636 15	0 00	0 00	636 20	0 04	2 31	0 00	635 70
255	4	70	181	8	28	153	2	1	633 40
0 10	0 48	2 55	1 18	0 070	0 040	0 070	0 000	629 50	1982 00
0 001666	50	50	50	2	0	5	0 00	118 00	2100 00

*SECNO 6 200

6 20	6 34	636 24	0 00	0 00	636 35	0 11	0 12	0 03	636 80
255	0	249	6	0	91	8	2	1	633 10
0 11	0 00	2 72	0 76	0 000	0 040	0 070	0 000	629 90	2031 90
0 000929	100	100	100	2	0	0	0 00	27 97	2059 87

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

CCHV= 0 100 CEHV= 0 300
*SECNO 6 300

6 30	2 54	637 54	0 00	0 00	637 58	0 05	1 22	0 01	637 00
120	3	106	10	12	58	40	6	5	637 00
0 34	0 26	1 82	0 26	0 070	0 040	0 070	0 000	635 00	212 59
0 000860	1350	1350	1350	2	0	0	0 00	219 57	432 16

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**************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED MAY  1984
  ERROR CORR -  01,02,03,04,05,06
  MODIFICATION -  50,51,52,53,54,55,56
**************************************************

T1  500 YEAR FLOOD
T2
T3

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

     -10        5         0         0    0 000000     0 00      0 0       480     630 820     0 000

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

     15 000    0 000    -1 000     0 000     0 000     0 000     0 000     0 000     0 000     0 000
```

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*PROF 4

CCHV= 0 100 CEHV= 0 300
*SECNO 7 900

7 90	5 22	630 82	0 00	630 82	631 65	0 83	0 00	0 00	628 70
480	6	465	8	4	63	5	0	0	628 70
0 00	1 74	7 43	1 80	0 070	0 040	0 070	0 000	625 60	5836 54
0 007695	0	0	0	0	0	0	0 00	19 79	5856 33

CCHV= 0 300 CEHV= 0 500
*SECNO 8.000

8 00	5 78	631 38	0 00	0 00	632 02	0 64	0 32	0 06	628 70
480	10	457	13	6	69	7	0	0	628 70
0 00	1 69	6 59	1 75	0 070	0 010	0 070	0 000	625 60	5835 62
0 005285	50	50	50	2	0	0	0 00	21 85	5857 47

SPECIAL BRIDGE

SB	XK	XKDR	COFQ	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
	0 00	4 17	3 00	0 00	7 20	0 00	22 80	0 00	624 90	624 20

*SECNO 8 100
PRESSURE AND WEIR FLOW

EGPRS	EGLWC	H3	QWEIR	QPR	BAREA	TRAPEZOID AREA	ELLC	ELTRD
660 08	631 93	0 00	394	89	23	24	628 20	633 60

8 10	5 25	631 55	0 00	0 00	632 37	0 82	0 35	0 00	629 40
480	7	465	9	4	63	5	0	0	629 40
0 01	1 74	7 37	1 80	0 070	0 040	0 070	0 000	626 30	5836 48
0 007509	140	140	140	3	0	9	0 00	19 92	5856 40

*SECNO 8 200

8 20	5 80	632 10	0 00	0 00	632 74	0 64	0 31	0 05	629 40
480	10	457	13	6	70	7	0	0	629 40
0 01	1 69	6 57	1 74	0 070	0 010	0 070	0 000	626 30	5835 59
0 005226	50	50	50	2	0	0	0 00	21 92	5857 51

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

CCHV= 0 100 CEHV= 0 300
*SECNO 5 700

5 70	6 12	635 12	0 00	0 00	635 10	0 28	2 62	0 04	632 40
480	13	445	21	12	102	17	3	1	631 90
0 07	1 10	4 39	1 24	0 070	0 040	0 070	0 000	629 00	2032 24
0 001913	883	883	883	4	0	0	0 00	11 18	2073 72

CCHV= 0 300 CEHV= 0 500
*SECNO 5 800

3470 ENCROACHMENT STATIONS= 1970 0 2112 0 TYPE= 1 TARGET= 142 000

5 80	6 19	635 19	0 00	0 00	635 45	0 27	0 06	0 00	632 40
480	14	444	22	13	103	18	3	1	631 90
0 07	1 09	4 31	1 22	0 070	0 040	0 070	0 000	629 00	2032 02
0 001812	30	30	30	2	0	0	0 00	41 94	2073 95

SPECIAL BRIDGE

SB	XK	XKOR	COFQ	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
	0 00	1 77	3 00	0 00	3 53	0 00	15 90	0 00	629 50	629 50

*SECNO 6 000
PRESSURE AND WEIR FLOW

EGPRS	EGLWC	H3	QWEIR	QPR	BAREA	TRAPEZOID AREA	ELLC	ELTRD
660 22	641 16	0 00	359	123	16	16	634 00	635 70

3470 ENCROACHMENT STATIONS= 1982 0 2100 0 TYPE= 1 TARGET= 118 000

6 00	7 26	636 76	0 00	0 00	636 83	0 07	1 37	0 00	635 70
480	19	97	364	19	30	211	3	1	633 40
0 08	1 01	3 21	1 72	0 070	0 040	0 070	0 000	629 50	1982 00
0 002328	50	50	50	2	0	6	0 00	118 00	2100 00

*SECNO 6 200

6 20	6 97	636 87	0 00	0 00	637 15	0 28	0 22	0 11	636 80
480	0	459	21	0	106	21	3	1	633 10
0 08	0 01	4 34	1 00	0 070	0 040	0 070	0 000	629 90	2029 36
0 002061	100	100	100	2	0	0	0 00	63 06	2092 41

SECND	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLDB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IOC	ICONT	CORAR	TOPWID	ENDST

CCHV= 0 100 CEHV= 0 300
*SECNO 6 300

6 30	3 43	638 43	0 00	0 00	638 44	0 01	1 26	0 03	637 00
225	27	109	89	89	79	289	12	11	637 00
0 54	0 31	1 37	0 31	0 070	0 040	0 070	0 000	635 00	134 82
0 000326	1350	1350	1350	3	0	0	0 00	518 96	683 78

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**************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED MAY  1984
  ERROR CORR -  01,02,03,04,05,06
  MODIFICATION -  50,51,52,53,54,55,56
**************************************************
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NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

ZENGA DRAIN LESS

SUMMARY PRINTOUT TABLE 150

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	IOK'S	VCH	AREA	O1K
	7 900	0 00	0 00	0 00	625 60	300 00	629 60	0 00	630 20	76 90	6 22	49 49	34 21
	7.900	0 00	0 00	0 00	625 60	140 00	627 95	0 00	628 33	88 81	4 96	28 20	14 86
	7 900	0 00	0 00	0 00	625 60	255 00	629 22	0 00	629 75	78 06	5 86	43 94	28.86
	7 900	0 00	0 00	0 00	625 60	480 00	630 82	0 00	631 65	76 95	7 43	70 90	54 72
	8 000	50 00	0 00	0 00	625 60	300 00	630 09	0 00	630 55	51 64	5 50	57 36	41 75
	8 000	50 00	0 00	0 00	625 60	140 00	628 44	0 00	628 70	51 14	4 11	34 04	19 58
	8 000	50.00	0 00	0 00	625 60	255 00	629 69	0 00	630 10	51 39	5 16	50 91	35 57
	8 000	50 00	0 00	0 00	625 60	480 00	631 38	0 00	632 02	52 85	6 59	82 59	66 02
	8 100	140 00	633 60	628 20	626 30	300 00	631 88	0 00	632 16	23 50	4 29	78 32	61 89
	8 100	140 00	633.60	628 20	626 30	140 00	630 78	0 00	630 88	11 33	2 57	57 20	41 59
	8 100	140 00	633 60	628 20	626 30	255 00	631 88	0 00	632 08	16 96	3 65	78 35	61 92
	8.100	140 00	633 60	628 20	626 30	480 00	631 55	0 00	632 37	75 09	7 37	71 59	55 39
	8 200	50 00	0 00	0 00	626 30	300 00	632 01	0 00	632 27	21 55	4 18	81 14	64 62
	8 200	50 00	0 00	0 00	626 30	140 00	630 84	0 00	630 93	10 82	2 54	58 22	42 57
	8 200	50 00	0 00	0 00	626 30	255 00	631 98	0 00	632 17	15 96	3 58	80 32	63 82
	8 200	50 00	0 00	0 00	626 30	480 00	632 10	0 00	632 74	52 26	6 57	82 97	66 40
	5 700	883 00	0 00	0 00	629 00	300 00	633 95	0 00	634 17	21 24	3 81	87 05	65 09
	5 700	883 00	0 00	0 00	629 00	140 00	632 39	0 00	632 57	36 90	3 36	41.98	23 05
	5 700	883 00	0 00	0 00	629 00	255 00	633 62	0 00	633 82	22 12	3 63	75 90	54 22
	5 700	883 00	0 00	0 00	629 00	480 00	635 12	0 00	635 40	19 13	4 39	130 71	109 74
	5 800	30 00	0 00	0 00	629 00	300 00	634 02	0 00	634 23	20 08	3 75	88 94	66 95
	5 800	30 00	0 00	0 00	629 00	140 00	632 52	0 00	632 67	29 68	3 15	45 05	25 70
	5 800	30 00	0 00	0 00	629 00	255 00	633 70	0 00	633 89	20 27	3 53	78 40	56 64
	5 800	30 00	0 00	0 00	629 00	480 00	635 19	0 00	635 45	18 12	4 31	133 58	112 77
	6 000	50 00	635 70	634 00	629 50	300 00	636 29	0 00	636 34	18 21	2 70	204 86	70 31
*	6 000	50 00	635 70	634 00	629 50	140 00	633 03	633 03	634 72	671 95	10 41	13 45	5 40
	6 000	50 00	635 70	634 00	629 50	255 00	636 15	0 00	636 20	16 66	2 55	188 24	62 47
	6 000	50 00	635 70	634 00	629 50	480 00	636 76	0 00	636 83	23 28	3 21	259 92	99 48

SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10K'S	VCH	AREA	O1K
6 200	100 00	0 00	0 00	629 90	300 00	636 39	0 00	636 53	11 54	3 08	104 11	88 33
6 200	100 00	0 00	0 00	629 90	140 00	635 34	0 00	635 39	5 71	1 91	76 14	58 61
6 200	100 00	0 00	0 00	629 90	255 00	636 21	0 00	636 35	9 29	2 72	99 69	83 65
6 200	100 00	0 00	0 00	629 90	480 00	636 87	0 00	637 15	20 61	4 34	127 12	105.73
6 300	1350 00	0 00	0 00	635 00	140 00	637 78	0 00	637 82	6 49	1 68	175.88	54 96
6 300	1350 00	0 00	0 00	635 00	65 00	636 41	0 00	636 47	21 46	2 00	32 44	14 03
6 300	1350 00	0 00	0 00	635 00	120 00	637 54	0 00	637 58	8 60	1 82	111 20	40 92
6 300	1350 00	0 00	0 00	635 00	225 00	638 43	0 00	638 44	3 26	1 37	457 34	124 60

ZENGA DRAIN LESS

SUMMARY PRINTOUT TABLE 150

	SECNO	Q	CWSEL	DIFWSP	DIFWSx	DIFKWS	TOPWID	xLCH
	7 900	300 00	629 60	0 00	0 00	0 00	15 31	0 00
	7 900	140 00	627 95	-1 65	0 00	0 00	12 00	0 00
	7 900	255 00	629 22	1 27	0 00	0 00	13 91	0 00
	7 900	480 00	630 82	1 60	0 00	0 00	19 79	0 00
	8 000	300 00	630 09	0 00	0 49	0 00	17 09	50 00
	8 000	140.00	628.44	-1 65	0 49	0 00	12 00	50 00
	8 000	255 00	629 69	1 25	0 47	0 00	15 64	50 00
	8 000	480 00	631 38	1 69	0 56	0 00	21 85	50 00
	8 100	300 00	631 88	0 00	1 80	0 00	21 12	140 00
	8 100	140 00	630 78	-1 11	2 34	0 00	17 06	140 00
	8 100	255 00	631 88	1 11	2 19	0 00	21 13	140 00
	8 100	480 00	631 55	-0 33	0 17	0 00	19 92	140 00
	8 200	300 00	632 01	0 00	0 13	0 00	21 61	50 00
	8 200	140 00	630 84	-1 18	0 06	0 00	17 27	50 00
	8 200	255 00	631 98	1 14	0 09	0 00	21 47	50 00
	8 200	480 00	632 10	0 12	0 54	0 00	21 92	50 00
	5 700	300 00	633 95	0 00	1 93	0 00	33 89	883 00
	5 700	140 00	632 39	-1 56	1 55	0 00	23 60	883 00
	5.700	255 00	633 62	1 23	1 64	0 00	31 65	883 00
	5 700	480 00	635 12	1 50	3 02	0 00	41 48	883 00
	5.800	300 00	634 02	0 00	0 07	0 00	34 25	30 00
	5 800	140 00	632 52	-1 50	0 13	0 00	24 44	30 00
	5 800	255 00	633 70	1 18	0 08	0 00	32 17	30 00
	5 800	480 00	635 19	1 49	0 07	0 00	41 94	30 00
	6 000	300 00	636 29	0 00	2 27	0 00	118 00	50 00
*	6 000	140 00	633 03	-3 26	0 51	0 00	4 50	50 00
	6 000	255 00	636 15	3 12	2 46	0 00	118 00	50 00
	6 000	480 00	636 76	0 61	1 57	0 00	118 00	50 00
	6 200	300 00	636 39	0 00	0 10	0 00	33 32	100 00
	6 200	140 00	635 34	-1 05	2 31	0 00	24 68	100 00
	6 200	255 00	636 24	0 90	0 09	0 00	27 97	100 00
	6 200	480 00	636 87	0 63	0 11	0 00	63 06	100 00
	6 300	140 00	637 78	0 00	1 39	0 00	309 05	1350 00
	6 300	65 00	636 41	-1 37	1 07	0 00	23 00	1350 00
	6 300	120 00	637 54	1 13	1 30	0 00	219 57	1350 00
	6 300	225 00	638 43	0 89	1 56	0 00	548 96	1350 00

1) COUNTY: KENT

2) STUDY NAME: GRANDVILLE, CITY OF

3) WATERCOURSE: HUIZENGA DRAIN

4) DOCUMENT TYPE: WEIR ANALYSIS

```
1**************************************************
 *  WATER SURFACE PROFILES                        *
 *  VERSION OF NOVEMBER 1976                      *
 *  UPDATED MAY 1984                              *
 *                                                *
 * RUN DATE           TIME                       *
 **************************************************
```


```
****************************************
*  U.S. ARMY CORPS OF ENGINEERS        *
*  THE HYDROLOGIC ENGINEERING CENTER   *
*  609 SECOND STREET, SUITE D          *
*  DAVIS, CALIFORNIA 95616             *
*  (916) 440-2105 (FTS) 448-2105       *
****************************************
```


```
X     X  XXXXXXX   XXXXX              XXXXX
X     X  X        X     X            X     X
X     X  X        X                        X
XXXXXXX  XXXX     X          XXXXX    XXXXX
X     X  X        X                   X
X     X  X        X     X             X
X     X  XXXXXXX   XXXXX              XXXXXXX
1
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FOR F.I.S. FILE

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 ***************************************************
   HEC2 RELEASE DATED NOV 76 UPDATED MAY  1984
   ERROR CORR -  01,02,03,04,05,06
   MODIFICATION -  50,51,52,53,54,55,56
 ***************************************************

 T1REANALYSIS OF F.I.S. -INCORRECT WEIR USED
 T2 CITY OF GRANDVILLE, KENT CO.  INAPPROPRIATE WEIR USED IN F.I.S
 T3   HUIZENGA DRAIN          LESS THAN 2 SQ MILES  S.E.  2-20-85

 J1  ICHECK     INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

       0.        4.        0.        0.  0.000000      0.00      0.0      300.    631.880    0.000

 J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

     1.000     0.000    -1.000     0.000     0.000     0.000     0.000     0.000     0.000     0.000

 NC      0.070     0.070     0.040     0.100     0.300     0.000     0.000     0.000     0.000     0.000
 ET      0.000     0.000     0.000     0.000     0.000     1.410     0.000     0.000     0.000     0.000
 X1      8.100     8.000  5840.000  5852.000     0.000     0.000     0.000     0.000     1.400     0.000
 GR    633.400  5800.000   632.900  5832.000   628.000  5840.000   624.900  5840.000   624.900  5852.000
 GR    628.000  5852.000   632.900  5862.000   632.800  5900.000     0.000     0.000     0.000     0.000

 X1      8.200     0.000     0.000     0.000    50.000    50.000    50.000     0.000     0.000     0.000
```

NC	0.000	0.000	0.000	0.100	0.300	0.000	0.000	0.000	0.000	0.000
ET	0.000	0.000	0.000	0.000	0.000	1.510	0.000	0.000	0.000	0.000
X1	5.700	8.000	2041.000	2063.000	883.000	883.000	883.000	0.000	0.000	0.000
GR	635.500	2031.000	632.400	2041.000	629.400	2051.000	629.000	2053.000	629.400	2055.000
GR	631.900	2063.000	635.200	2074.000	635.400	2098.000	0.000	0.000	0.000	0.000
NC	0.000	0.000	0.000	0.300	0.500	0.000	0.000	0.000	0.000	0.000
ET	2039.000	2070.000	0.000	0.000	0.000	1.100	0.000	0.000	0.000	0.000
X1	5.800	0.000	0.000	0.000	30.000	30.000	30.000	0.000	0.000	0.000
SB	0.000	1.769	3.000	0.000	3.530	0.000	15.900	0.000	629.500	629.500
ET	1990.000	2040.000	0.000	0.000	0.000	1.100	0.000	0.000	0.000	0.000
X1	6.000	15.000	2000.000	2004.500	50.000	50.000	50.000	0.000	0.000	0.000
X2	0.000	0.000	1.000	634.000	635.700	0.000	0.000	0.000	0.000	0.000
X3	0.000	0.000	0.000	1980.000	0.000	0.000	0.000	0.000	0.000	0.000
BT	16.000	1982.000	637.700	637.700	1982.000	635.800	635.800	1982.000	635.800	635.800
BT	2000.000	635.700	635.700	2000.000	635.700	632.300	2000.500	635.700	633.300	2001.300
BT	635.700	633.800	2001.800	635.700	634.000	2002.800	635.700	634.000	2003.300	635.700
BT	633.800	2004.000	635.700	633.300	2004.000	635.700	632.300	2004.500	635.700	635.700
BT	2022.000	635.700	635.700	2100.000	635.700	635.700	2100.000	638.000	638.000	0.000
GR	637.800	1570.000	636.500	1808.000	635.800	1970.000	635.700	2000.000	631.300	2000.000
GR	630.300	2000.500	629.800	2001.300	629.500	2001.800	629.500	2002.800	629.800	2003.300
GR	630.300	2004.000	631.300	2004.500	633.400	2004.500	635.700	2100.000	638.000	2100.000

1

ET	0.000	0.000	0.000	0.000	0.000	1.410	0.000	0.000	0.000	0.000
X1	6.200	10.000	2031.000	2054.000	100.000	100.000	100.000	0.000	0.000	0.000
GR	637.500	2015.000	637.500	2015.000	636.800	2031.000	633.700	2036.000	630.200	2041.000
GR	629.900	2043.000	630.200	2045.000	633.400	2054.000	636.300	2060.000	636.900	2094.000
QT	5.000	65.000	120.000	140.000	225.000	140.000	0.000	0.000	0.000	0.000
NC	0.000	0.000	0.000	0.100	0.300	0.000	0.000	0.000	0.000	0.000
ET	0.000	0.000	0.000	0.000	0.000	1.410	0.000	0.000	0.000	0.000
X1	6.300	6.000	259.000	282.000	1350.000	1350.000	1350.000	0.000	0.000	0.000
GR	640.000	0.000	637.000	259.000	635.000	259.000	635.000	282.000	637.000	282.000
GR	640.000	1120.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
EJ	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

1

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*PROF 1

CCHV= 0.100 CEHV= 0.300

*SECNO 8.100

8.10	5.58	631.88	0.00	631.88	632.16	0.28	0.00	0.00	629.40

```
      300.       5.     288.       7.       5.      67.       6.       0.       0.    629.40
      0.00     1.07     4.30     1.11    0.070    0.040    0.070    0.000   626.30  5835.95
  0.002355       0.       0.       0.        0        0        0     0.00    21.11  5857.06
0
 *SECNO 8.200
      8.20     5.71   632.01     0.00     0.00   632.27     0.26     0.11     0.00   629.40
      300.       6.     287.       8.       6.      68.       7.       0.       0.    629.40
      0.00     1.06     4.19     1.10    0.070    0.040    0.070    0.000   626.30  5835.75
  0.002172      50.      50.      50.        1        0        0     0.00    21.56  5857.31
0
 CCHV=   0.100 CEHV=   0.300
 *SECNO 5.700
      5.70     4.95   633.95     0.00     0.00   634.17     0.22     1.90     0.00   632.40
      300.       3.     290.       7.       4.      76.       7.       2.       1.    631.90
      0.07     0.80     3.81     0.97    0.070    0.040    0.070    0.000   629.00  2035.97
  0.002121     883.     883.     883.        1        0        0     0.00    33.90  2069.86
0
 CCHV=   0.300 CEHV=   0.500
 *SECNO 5.800
      5.80     5.02   634.02     0.00     0.00   634.23     0.21     0.06     0.00   632.40
      300.       3.     289.       7.       4.      77.       7.       2.       1.    631.90
      0.07     0.80     3.74     0.96    0.070    0.040    0.070    0.000   629.00  2035.79
  0.002004      30.      30.      30.        0        0        0     0.00    34.26  2070.05
0

 SPECIAL BRIDGE

 SB  XK        XKOR      COFQ      RDLEN     BWC       BWP       BAREA     SS        ELCHU     ELCHD
      0.00      1.77      3.00      0.00      3.53      0.00     15.90      0.00    629.50    629.50

 *SECNO 6.000
 PRESSURE AND WEIR FLOW

1
                                                                                                PAGE    4

   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS    BANK ELEV
   Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA    LEFT/RIGHT
   TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN      SSTA
   SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID     ENDST


 EGPRS      EGLWC       H3       QWEIR      QPR       BAREA   TRAPEZOID      ELLC      ELTRD
                                                                 AREA
   643.80    635.95      0.00      156.      144.       16.       16.      634.00    635.70


3470 ENCROACHMENT STATIONS=    1980.0    2100.0  TYPE=      1  TARGET=   -1980.000
      6.00     6.73   636.23     0.00     0.00   636.29     0.05     2.05     0.00   635.70
      300.       6.      79.     215.      10.      28.     161.       2.       1.    633.40
      0.08     0.59     2.82     1.34    0.070    0.040    0.070    0.000   629.50  1980.00
  0.002000      50.      50.      50.        2        0        6     0.00   120.00  2100.00
```

```
0
 *SECNO 6.200
      6.20      6.44    636.34      0.00      0.00    636.49      0.15      0.15      0.05    636.80
      300.       0.       292.       8.        0.      94.       9.        2.        1.      633.40
      0.09      0.00      3.12      0.89     0.000     0.040     0.070     0.000    629.90   2031.75
  0.001197      100.      100.      100.         2         0         0      0.00     30.39   2062.13
0
 CCHV=   0.100 CEHV=   0.300
 *SECNO 6.300
      6.30      2.77    637.77      0.00      0.00    637.81      0.03      1.31      0.01    637.00
      140.       8.       108.       24.       26.      64.       84.       7.        6.      637.00
      0.36      0.29      1.69      0.29     0.070     0.040     0.070     0.000    635.00   192.12
  0.000661     1350.     1350.     1350.         2         0         0      0.00     306.27   498.39
0
1
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 **************************************************
   HEC2 RELEASE DATED NOV 76 UPDATED MAY  1984
   ERROR CORR -  01,02,03,04,05,06
   MODIFICATION -  50,51,52,53,54,55,56
 **************************************************

 T1   REANALYSIS OF F.I.S. - FLOODWAY RUN
 T2
 T3
 J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ
       0.        6.        0.        0.  0.000000      0.00      0.0       300.    631.980     0.000
 J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE
     15.000     0.000     0.000     0.000     0.000     0.000     0.000     0.000     0.000     0.000
1
```



```
    SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS   BANK ELEV
    Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA   LEFT/RIGHT
    TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN      SSTA
    SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID     ENDST

 *PROF 2

 CCHV=   0.100 CEHV=   0.300
 *SECNO 8.100
  2800 NAT Q1=      61.82  WSEL=    631.88  ENC Q1=      61.82  WSEL=    631.98  RATIO=  0.0000
  NAT Q1=     64.  RATIOS LOB,CH,ROB=  0.0193  0.9559  0.0249  WSEL=    631.98
```

```
 3470 ENCROACHMENT STATIONS=    5839.6    5853.0  TYPE=     4  TARGET=       0.032
      8.10     5.68   631.98     0.00   631.88   632.27     0.29     0.00     0.00   629.40
      300.       0.     298.       2.       1.       68.      2.       0.       0.   629.40
      0.00     0.48     4.37     0.83    0.070    0.040    0.070    0.000   626.30  5839.63
  0.002376       0.       0.       0.        0        0        0     0.00    13.35  5852.98
0
 *SECNO 8.200
  2800 NAT Q1=      64.37  WSEL=    632.01  ENC Q1=      64.37  WSEL=    632.11  RATIO=  0.0000
  NAT Q1=      67.  RATIOS LOB,CH,ROB=  0.0210  0.9518  0.0272  WSEL=    632.11

 3470 ENCROACHMENT STATIONS=    5839.5    5853.1  TYPE=     4  TARGET=       0.034
      8.20     5.81   632.11     0.00   632.01   632.39     0.28     0.11     0.00   629.40
      300.       1.     297.       2.       1.       70.      3.       0.       0.   629.40
      0.00     0.55     4.26     0.86    0.070    0.040    0.070    0.000   626.30  5839.52
  0.002193      50.      50.      50.        2        0        0     0.00    13.61  5853.13
0
 CCHV=   0.100 CEHV=   0.300
 *SECNO 5.700

 3470 ENCROACHMENT STATIONS=    2040.9    2065.0  TYPE=     5  TARGET=       0.020
      5.70     5.04   634.04     0.00   633.95   634.27     0.22     1.87     0.01   632.40
      300.       0.     296.       3.       0.       78.      4.       2.       0.   631.90
      0.07     0.16     3.81     0.97    0.070    0.040    0.070    0.000   629.00  2040.93
  0.002053     883.     883.     883.        1        0       11     0.00    24.03  2064.96
0
 CCHV=   0.300 CEHV=   0.500
 *SECNO 5.800

 3470 ENCROACHMENT STATIONS=    2039.0    2070.0  TYPE=     1  TARGET=      31.000
      5.80     5.14   634.14     0.00   634.02   634.33     0.20     0.06     0.01   632.40
      300.       2.     290.       8.       3.       80.      8.       2.       0.   631.90
      0.07     0.83     3.62     0.97    0.070    0.040    0.070    0.000   629.00  2039.00
  0.001793      30.      30.      30.        2        0        0     0.00    31.00  2070.00
0
1
```



```
   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS    BANK ELEV
   Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA    LEFT/RIGHT
   TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTH       ELMIN      SSTA
   SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID     ENDST


 SPECIAL BRIDGE

 SB  XK         XKOR       COFQ       RDLEN      BNC        BWP        BAREA      SS         ELCHU      ELCHD
      0.00       1.77       3.00       0.00       3.53       0.00      15.90       0.00     629.50     629.50

 *SECNO 6.000
 PRESSURE AND WEIR FLOW
```

```
 EGPRS      EGLWC      H3       QWEIR      QPR       BAREA   TRAPEZOID      ELLC     ELTRD
                                                                AREA
   643.91    635.78     0.00      159.      141.       16.       16.      634.00    635.70


 3470 ENCROACHMENT STATIONS=    1980.0    2100.0  TYPE=     1  TARGET=   -1980.000
      6.00     6.74   636.24     0.00   636.23   636.29     0.05     1.96     0.00   635.70
      300.       6.      78.     215.      10.      28.     162.       2.       1.   633.40
      0.08     0.59     2.80     1.33    0.070    0.040    0.070    0.000   629.50  1980.00
  0.001970      50.      50.      50.        2        0        6     0.00   120.00  2100.00
0
 *SECNO 6.200
  2800 NAT Q1=     86.72  WSEL=    636.34  ENC Q1=     87.36  WSEL=    636.44  RATIO= -0.0074
  NAT Q1=     90.  RATIOS LOB,CH,ROB=  0.0000  0.9713  0.0287  WSEL=    636.44

 3470 ENCROACHMENT STATIONS=    2031.0    2054.0  TYPE=     4  TARGET=       0.029
      6.20     6.46   636.36     0.00   636.34   636.52     0.16     0.17     0.05   636.80
      300.       0.     300.       0.       0.      94.       0.       2.       1.   633.40
      0.09     0.00     3.19     0.00    0.000    0.040    0.000    0.000   629.90  2031.71
  0.001449     100.     100.     100.        2        0        0     0.00    22.29  2054.00
0
 CCHV=   0.100 CEHV=   0.300
 *SECNO 6.300
  2800 NAT Q1=     54.45  WSEL=    637.77  ENC Q1=     54.45  WSEL=    637.87  RATIO=  0.0000
  NAT Q1=     62.  RATIOS LOB,CH,ROB=  0.0652  0.7237  0.2111  WSEL=    637.87

 3470 ENCROACHMENT STATIONS=     256.1     358.1  TYPE=     4  TARGET=       0.116
      6.30     2.91   637.91     0.00   637.77   637.95     0.04     1.42     0.01   637.00
      140.       1.     113.      26.       3.      67.      59.       6.       3.   637.00
      0.35     0.41     1.68     0.44    0.070    0.040    0.070    0.000   635.00   256.08
  0.000607    1350.    1350.    1350.        1        0        0     0.00   102.05   358.13
0
1
 PROFILE FOR STREAM


 PLOTTED POINTS (BY PRIORITY)-E-ENERGY,W-WATER SURFACE,I-INVERT,C-CRITICAL W.S.,L-LEFT BANK,R-RIGHT BANK,M-LOWER END STA

 ELEVATION   626.      628.      630.      632.      634.      636.      638.      640.      642.      644.
    SECNO   CUMDIS

     8.10     0.  C I       .      L  .         WE        .M        .         .         .         .         .         .
     8.20    50.  C I       .      L  .         .WE       .M        .         .         .         .         .         .
             100.  C I       .       L .         .WE       .M        .         .         .         .         .         .
             150.  C  I      .       RL.         . WE      . M       .         .         .         .         .         .
             200.  C   I     .        RL         . W E     . M       .         .         .         .         .         .
             250.  C    I    .         L         .  WE     . M       .         .         .         .         .         .
             300.  C    I    .         .L        .  W E    .  M      .         .         .         .         .         .
             350.  C     I   .         .RL       .   WE    .  M      .         .         .         .         .         .
             400.  C      I  .         . RL      .   W E   .  M      .         .         .         .         .         .
             450.  C       I .         .  RL     .    WE   .   M     .         .         .         .         .         .
             500.  C       I .         .  R L    .    W E  .   M     .         .         .         .         .         .
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ZENGA DRAIN LESS

SUMMARY PRINTOUT TABLE 150

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      SECNO     XLCH      ELTRD     ELLC      ELMIN      Q        CNSEL     CRIWS     EG       10K*S     VCH      AREA      .0
0IFY212I VCOMH : FORMATTED I/O, END OF RECORD, FILE FT06F001
         VCOMH : LAST EXECUTED FORTRAN STATEMENT IN PROGRAM SUMPO AT ISN 324 (OFFSET 002B88).
0*** START OF BUFFER CONTENTS ***
         0IFY212I VCOMH : FORMATTED I/O, END OF RECORD, FILE FT06F001

0*** END OF BUFFER CONTENTS ***
0TRACEBACK OF CALLING ROUTINES; MODULE ENTRY ADDRESS = 020000.
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  IFYVCOMH (0874D0) CALLED BY VFSXF# (08BC8A) FROM LOCATION 08BCE2.
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  VFSXF# (08BC8A) CALLED BY SUMPO (060480) AT ISN 324 AT OFFSET 002B88.
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  SUMPO (060480) CALLED BY MAIN (020000) AT ISN 8 AT OFFSET 00022A.
   NO ARGUMENTS PASSED TO SUBROUTINE.
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  MAIN (020000) CALLED BY OPERATING SYSTEM.
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0STANDARD CORRECTIVE ACTION TAKEN. EXECUTION CONTINUING.
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8.100	0.00	0.00	0.00	626.30	300.00	631.88	0.00	632.16	23.55	4.30	78.26	61.82
8.100	0.00	0.00	0.00	626.30	300.00	631.98	0.00	632.27	23.76	4.37	71.36	61.55
8.200	50.00	0.00	0.00	626.30	300.00	632.01	0.00	632.27	21.72	4.19	80.88	64.37
8.200	50.00	0.00	0.00	626.30	300.00	632.11	0.00	632.39	21.93	4.26	73.71	64.07
5.700	883.00	0.00	0.00	629.00	300.00	633.95	0.00	634.17	21.21	3.81	87.10	65.14
5.700	883.00	0.00	0.00	629.00	300.00	634.04	0.00	634.27	20.53	3.81	81.62	66.22
5.800	30.00	0.00	0.00	629.00	300.00	634.02	0.00	634.23	20.04	3.74	88.99	67.01
5.800	30.00	0.00	0.00	629.00	300.00	634.14	0.00	634.33	17.93	3.62	91.13	70.86
6.000	50.00	635.70	634.00	629.50	300.00	636.23	0.00	636.29	20.00	2.82	198.84	67.09
6.000	50.00	635.70	634.00	629.50	300.00	636.24	0.00	636.29	19.70	2.80	199.90	67.59
6.200	100.00	0.00	0.00	629.90	300.00	636.34	0.00	636.49	11.97	3.12	102.51	86.72
6.200	100.00	0.00	0.00	629.90	300.00	636.36	0.00	636.52	14.49	3.19	93.97	78.82
6.300	1350.00	0.00	0.00	635.00	140.00	637.77	0.00	637.81	6.61	1.69	173.57	54.45
6.300	1350.00	0.00	0.00	635.00	140.00	637.91	0.00	637.95	6.07	1.68	129.24	56.84

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ZENGA DRAIN LESS

SUMMARY PRINTOUT TABLE 150

SECNO	Q	CWSEL	DIFWSP	DIFWSI	DIFKWS	TOPWID	XLCH
8.100	300.00	631.88	0.00	0.00	0.00	21.11	0.00
8.100	300.00	631.98	0.10	0.00	0.10	13.35	0.00
8.200	300.00	632.01	0.00	0.13	0.00	21.56	50.00
8.200	300.00	632.11	0.10	0.13	0.10	13.61	50.00
5.700	300.00	633.95	0.00	1.94	0.00	33.90	883.00
5.700	300.00	634.04	0.09	1.93	0.09	24.03	883.00
5.800	300.00	634.02	0.00	0.07	0.00	34.26	30.00
5.800	300.00	634.14	0.11	0.09	0.11	31.00	30.00
6.000	300.00	636.23	0.00	2.21	0.00	120.00	50.00
6.000	300.00	636.24	0.01	2.11	0.01	120.00	50.00
6.200	300.00	636.34	0.00	0.10	0.00	30.39	100.00
6.200	300.00	636.36	0.02	0.11	0.02	22.29	100.00
6.300	140.00	637.77	0.00	1.44	0.00	306.27	1350.00
6.300	140.00	637.91	0.14	1.55	0.14	102.05	1350.00

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SUMMARY OF ERRORS AND SPECIAL NOTES

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HEC2 RELEASE DATED NOV 76 UPDATED MAY 1984
ERROR CORR - 01,02,03,04,05,06
MODIFICATION - 50,51,52,53,54,55,56
****

0 MESSAGE SUMMARY: MESSAGE NUMBER - COUNT
0 212 1



1) COUNTY: KENT

2) STUDY NAME: GRANDVICCE, WALKER TWP

3) WATERCOURSE: GRAND RIVER

4) DOCUMENT TYPE: 10-50-100-500 YEAR
INPUT & SUMMARIES



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  HEC2 RELEASE DATED NOV 76 UPDATED  AUG1977
  ERROR CORR -  01.02
  MODIFICATION -  50,51,52,53
*****************************************************
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o Cd c of E report? No base on d/s evaluation which started at Yc

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C
T1      GRAND RIVER,KENT COUNTY,MICHIGAN.
T2      GRANDVILLE AND WALKER TOWNSHIP. HUD1 62-0104-006,007.
T3       10-YEAR FLOOD

J1  ICHECK    INQ      NINV     IDIR     STRT     METRIC    HVINS     Q        WSEL      FQ
       0.       2.       0.       0.   0.0        0.0       0.0       0.    599.600    0.0
J2  NPROF     IPLOT    PRFVS    XSECV    XSECH     FN      ALLDC     IBW      CHNIM     ITRACE
     1.000     0.0     -1.000    0.0      0.0      0.0      0.0      0.0      0.0       0.0
NC     0.120     0.120     0.040     0.100     0.300     0.0       0.0       0.0       0.0       0.0
QT     4.000  33500.000  48700.000  55800.000  75100.000     0.0       0.0       0.0       0.0       0.0

      AT OTTAWA COUNTY- KENT COUNTY LINE (COE FPI STUDY,1972 X-SECTION C)

X1     0.0      52.000   800.000   1090.000     0.0       0.0       0.0       0.0       0.0       0.0
GR   600.000  -700.000   600.000   -700.000   600.000  -700.000   500.000  -700.000   600.000  -700.000
GR   590.200   100.000   588.500    300.000   590.000   350.000   590.800   400.000   587.400   450.000
GR   587.000   500.000   591.000    540.000   586.900   550.000   586.500   581.000   584.000   583.000
GR   583.400   590.000   584.000    600.000   583.400   611.000   584.500   620.000   589.000   650.000
GR   583.000   680.000   587.000    700.000   586.500   730.000   588.000   750.000   588.100   780.000
GR   589.300   800.000   583.000    820.000   583.000   830.000   580.000   860.000   576.000   900.000
GR   575.500   920.000   575.800    935.000   575.300   950.000   576.000   960.000   575.100   970.000
GR   577.000  1000.000   580.500   1020.000   580.800  1030.000   588.000  1045.000   592.200  1090.000
GR   591.500  1110.000   588.200   1120.000   588.700  1160.000   591.500  1175.000   593.000  1200.000
GR   592.600  1325.000   590.000   1450.000   589.000  1500.000   589.000  1550.000   591.000  1750.000
GR   600.000  2440.000   610.000   2990.000     0.0       0.0       0.0       0.0       0.0       0.0
NC     0.0       0.150     0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0

      ABOUT 2000 FT D/S OF M-11 BRIDGE (COE FPI STUDY,1972 X-SECTION D)

X1     0.500    39.000   500.000    830.000  2750.000  1600.000  2300.000     0.0       0.0       0.0
GR   607.000   120.000   589.500    160.000   587.800   200.000   590.000   270.000   591.500   350.000
GR   591.100   400.000   588.000    420.000   588.500   450.000   591.500   475.000   590.800   500.000
GR   583.000   520.000   578.000    530.000   577.000   540.000   576.800   560.000   577.000   570.000
GR   576.400   580.000   576.800    630.000   577.800   650.000   578.000   680.000   578.200   700.000
GR   579.000   750.000   579.800    780.000   584.000   782.000   588.000   810.000   594.500   830.000
GR   591.500   850.000   595.200    875.000   593.000   900.000   594.500  1000.000   594.000  1020.000
GR   589.000  1030.000   588.000   1050.000   587.000  1100.000   586.500  1150.000   586.700  1200.000
GR   586.000  1300.000   586.500   1400.000   600.000  2180.000   610.000  2190.000     0.0       0.0
NC     0.0       0.0       0.0       0.300     0.500     0.0       0.0       0.0       0.0       0.0

      1 FT D/S OF M-11 BRIDGE (COE FPI STUDY, 1972 X-SECTION 1)

X1     1.000    65.000   370.000    920.000  2600.000  2100.000  1990.000     0.0       0.0       0.0
X3    10.000     0.0       0.0       0.0       0.0       0.0       0.0     610.300   610.300     0.0
GR   610.000   100.000   611.000    250.000   612.100   370.000   593.500   370.000   593.400   390.000
GR   593.100   410.000   590.900    415.000   586.800   420.000   587.000   425.000   587.000   430.000
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GR	586.900	460.000	587.400	474.000	585.000	495.000	584.500	590.000	580.700	539.000
GR	580.900	545.000	578.900	564.000	579.300	570.000	579.700	575.000	579.700	579.000
GR	579.900	590.600	580.400	618.000	581.800	624.000	580.900	634.000	581.000	645.000
GR	581.000	650.000	580.900	660.000	578.900	708.000	576.000	720.000	575.000	725.000
GR	574.600	738.000	576.300	775.000	575.900	785.000	576.500	795.000	576.000	800.000
GR	574.500	815.000	575.900	820.000	576.300	839.000	581.300	855.000	592.100	864.000
GR	592.000	870.000	592.000	875.000	590.900	885.000	593.900	920.000	612.100	920.000
GR	612.100	950.000	610.300	975.000	611.000	1000.000	610.800	1050.000	610.500	1100.000
GR	610.000	1200.000	609.900	1300.000	608.900	1500.000	608.000	1700.000	606.800	1704.000
GR	605.000	1750.000	597.800	1800.000	596.800	1850.000	593.000	1900.000	591.900	1950.000
GR	591.600	2000.000	589.400	2050.000	590.000	2100.000	590.400	2150.000	605.000	2248.000
NC	0.012	0.013	0.013	0.0	0.0	0.0	0.0	0.0	0.0	0.0

D/S FACE OF M-11 BRIDGE. PIERS WERE INCLUDED IN GR CARDS

X1	1.100	53.000	370.000	920.000	1.000	1.000	1.000	0.0	0.0	0.0
BT	9.000	100.000	610.000	610.000	370.000	612.100	612.100	370.000	612.100	610.300
BT	920.000	612.100	610.300	920.000	612.100	612.100	950.000	612.100	0.0	975.000
BT	610.500	0.0	1000.000	611.000	0.0	1100.000	610.500	0.0	0.0	0.0
GR	610.000	100.000	612.100	370.000	593.500	370.000	593.000	410.000	590.500	415.000
GR	586.500	420.000	610.300	420.000	610.300	425.000	586.500	425.000	587.500	480.000
GR	585.500	495.000	610.300	495.000	610.300	500.000	584.000	500.000	581.000	530.000
GR	581.000	545.000	579.000	565.000	579.500	570.000	610.300	570.000	610.300	575.000
GR	579.800	575.000	580.500	615.000	581.800	625.000	581.000	635.000	581.000	645.000
GR	610.300	645.000	610.300	650.000	581.000	650.000	579.000	705.000	576.000	720.000
GR	610.300	720.000	610.300	725.000	575.500	725.000	575.000	735.000	576.200	795.000
GR	610.300	795.000	610.300	800.000	796.000	800.000	574.600	810.000	576.200	840.000
GR	581.600	855.000	592.000	865.000	592.000	870.000	610.300	870.000	610.300	875.000
GR	592.000	875.000	591.000	890.000	594.000	920.000	612.100	920.000	612.100	950.000
GR	610.500	975.000	611.000	1000.000	610.500	1100.000	0.0	0.0	0.0	0.0

U/S FACE OF M-11 BR.-HIGH WATER MARKS(REF:TECH APPENDIX-COE FPI STUDY)

YEAR	PEAK FLOW AT GRAND RAPIDS GAGE	HIGH WATER ELEV AT BRIDGE
1948	42200	602.70
1947	38600	601.46
1960	31800	600.40
1950	27200	599.00
1933	11500	592.37

X1	1.200	0.0	0.0	0.0	56.000	56.000	56.000	0.0	0.0	0.0
X2	0.0	0.0	0.0	0.0	0.0	0.0	1.000	0.0	0.0	0.0
NC	0.120	0.120	0.035	0.0	0.0	0.0	0.0	0.0	0.0	0.0

1 FT U/S OF M-11 BRIDGE

X1	1.300	65.000	370.000	920.000	1.000	1.000	1.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	612.100	612.100	0.0
GR	610.000	100.000	611.000	250.000	612.100	370.000	593.500	370.000	593.400	390.000
GR	593.100	410.000	590.900	415.000	586.800	420.000	587.000	425.000	587.000	430.000
GR	586.900	460.000	587.400	474.000	585.000	495.000	584.500	590.000	580.700	539.000
GR	580.900	545.000	578.900	564.000	579.300	570.000	579.700	575.000	579.700	579.000
GR	579.900	590.600	580.400	618.000	581.800	624.000	580.900	634.000	581.000	645.000
GR	581.000	650.000	580.900	660.000	578.900	708.000	576.000	720.000	575.000	725.000
GR	574.600	738.000	576.300	775.000	575.900	785.000	576.500	795.000	576.000	800.000
GR	574.500	815.000	575.900	820.000	576.300	839.000	581.300	855.000	592.100	864.000
GR	592.000	870.000	592.000	875.000	590.900	885.000	593.900	920.000	612.100	920.000
GR	612.100	950.000	610.300	975.000	611.000	1000.000	610.800	1050.000	610.500	1100.000
GR	610.000	1200.000	609.900	1300.000	608.900	1500.000	608.000	1700.000	606.800	1704.000
GR	605.000	1750.000	597.800	1800.000	596.800	1850.000	593.000	1900.000	591.900	1950.000

GR	591.600	2000.000	589.400	2050.000	590.000	2100.000	590.400	2150.000	605.000	2248.000

550 FT U/S OF M-11 BRIDGE(COE X-S 2 MOVED U/S TO MODEL CONTRACTION)

X1	2.000	72.000	1060.000	1600.000	550.000	550.000	550.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	0.0	0.0	1800.000	607.400	0.0	0.0	0.0
GR	608.000	0.0	608.400	50.000	607.000	100.000	607.300	130.000	607.000	150.000
GR	606.800	190.000	600.000	220.000	596.800	285.000	586.400	300.000	587.000	350.000
GR	587.400	400.000	587.300	450.000	587.200	540.000	587.600	550.000	587.600	550.000
GR	588.000	630.000	588.000	650.000	586.800	655.000	594.700	675.000	594.000	700.000
GR	595.000	750.000	590.800	850.000	592.000	900.000	588.800	950.000	589.700	1003.000
GR	589.300	1007.000	593.000	1015.000	593.700	1050.000	595.000	1060.000	595.000	1090.000
GR	588.700	1108.000	588.700	1140.000	589.000	1150.000	589.500	1190.000	585.000	1190.000
GR	584.000	1193.000	579.800	1200.000	579.800	1270.000	581.000	1300.000	581.000	1320.000
GR	581.600	1330.000	581.600	1360.000	579.000	1380.000	577.300	1410.000	577.100	1420.000
GR	577.500	1450.000	577.000	1460.000	577.600	1485.000	578.500	1497.000	578.500	1520.000
GR	585.000	1535.000	595.200	1575.000	596.000	1600.000	596.000	1700.000	605.000	1750.000
GR	607.200	1770.000	607.400	1800.000	594.700	1855.000	591.000	1900.000	590.800	1930.000
GR	590.300	1940.000	590.300	2000.000	588.000	2100.000	588.000	2260.000	591.700	2396.000
GR	591.700	2445.000	590.000	2500.000	591.600	2650.000	595.000	2700.000	600.600	2790.000
GR	603.000	2860.000	608.900	2940.000	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.0	0.0	0.0	0.100	0.300	0.0	0.0	0.0	0.0	0.0

(COE FPI STUDY,1972 X-SECTION 3)

X1	3.000	60.000	1420.000	1900.000	4395.000	4695.000	4555.000	0.0	0.0	0.0
GR	610.000	-1100.000	600.000	-1080.000	590.000	-780.000	590.000	-780.000	590.000	-780.000
GR	589.500	100.000	589.000	200.000	590.000	250.000	589.000	289.000	588.800	350.000
GR	589.000	420.000	589.000	450.000	588.600	550.000	592.000	600.000	592.300	650.000
GR	589.000	700.000	589.000	750.000	592.000	850.000	592.000	870.000	593.500	950.000
GR	592.500	1000.000	591.000	1050.000	590.500	1100.000	590.000	1150.000	589.700	1170.000
GR	589.000	1200.000	590.000	1245.000	594.300	1300.000	590.500	1350.000	589.500	1375.000
GR	598.200	1390.000	598.800	1400.000	598.500	1415.000	600.000	1420.000	598.000	1440.000
GR	597.000	1441.000	588.500	1480.000	588.000	1490.000	585.000	1490.000	582.200	1515.000
GR	580.000	1550.000	579.700	1570.000	580.000	1587.000	579.000	1600.000	579.000	1620.000
GR	578.000	1635.000	578.000	1650.000	576.700	1665.000	576.000	1695.000	575.000	1701.000
GR	575.000	1718.000	577.000	1735.000	580.000	1743.000	588.000	1780.000	590.000	1780.000
GR	590.600	1790.000	595.000	1850.000	591.000	1860.000	615.000	1900.000	616.000	1960.000

(COE FPI STUDY, 1972 X-SECTION 4)

X1	4.000	47.000	1270.000	1500.000	6000.000	6550.000	6510.000	0.0	0.0	0.0
GR	594.500	0.0	595.700	50.000	592.700	100.000	592.000	150.000	591.700	200.000
GR	592.000	250.000	591.400	290.000	591.400	700.000	594.000	750.000	594.400	800.000
GR	593.400	850.000	593.400	900.000	597.400	1000.000	597.700	1050.000	599.500	1100.000
GR	599.000	1110.000	600.300	1135.000	589.800	1155.000	587.900	1180.000	586.500	1200.000
GR	586.900	1225.000	593.200	1270.000	583.000	1310.000	576.300	1335.000	576.800	1360.000
GR	575.700	1368.000	576.000	1395.000	577.500	1410.000	577.500	1435.000	580.000	1460.000
GR	591.500	1500.000	589.900	1550.000	589.900	1565.000	595.600	1635.000	595.600	1650.000
GR	588.600	1715.000	587.700	1750.000	593.300	1800.000	596.700	1850.000	599.500	1870.000
GR	599.800	1900.000	596.800	1930.000	596.800	1970.000	598.600	2100.000	600.000	2130.000
GR	613.000	2150.000	614.500	2200.000	0.0	0.0	0.0	0.0	0.0	0.0
QI	4.000	33000.000	48000.000	55000.000	74000.000	0.0	0.0	0.0	0.0	0.0

(COE FPI STUDY, 1972 X-SECTION 5) USGS FIS CITY OF GRAND RAPIDS X-S A

REC INT	FLOW(CFS)	ELEV	(DATA FROM FIS REPORT BY USGS)
10-YEAR	33000	602.8	
50-YEAR	48000	605.0	
100-YEAR	55000	605.8	

500-YEAR 74000 607.7

X1	5.000	64.000	501.000	785.000	5100.000	5200.000	5200.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	398.000	606.500	2800.000	606.000	0.0	0.0	0.0
GR	607.000	0.0	606.500	30.000	594.000	62.000	592.600	150.000	592.500	200.000
GR	592.000	250.000	595.600	300.000	606.500	350.000	606.500	398.000	606.500	398.000
GR	592.500	470.000	590.700	500.000	585.000	520.000	579.000	530.000	573.500	550.000
GR	572.500	560.000	573.500	570.000	572.600	580.000	572.700	590.000	578.000	600.000
GR	579.800	620.000	578.000	630.000	573.700	650.000	573.700	670.000	576.000	690.000
GR	583.000	700.000	580.000	710.000	580.000	720.000	582.200	730.000	581.700	740.000
GR	581.700	750.000	584.500	760.000	592.500	764.000	596.000	785.000	588.500	830.000
GR	589.000	850.000	588.500	867.000	585.500	875.000	588.500	900.000	588.500	960.000
GR	596.000	990.000	594.800	1000.000	595.000	1040.000	592.000	1100.000	591.000	1150.000
GR	593.500	1200.000	594.200	1250.000	594.000	1300.000	591.000	1500.000	592.000	1650.000
GR	591.000	1900.000	592.000	2070.000	591.700	2250.000	592.500	2400.000	591.000	2450.000
GR	591.300	2510.000	600.000	2530.000	602.500	2600.000	603.000	2650.000	606.000	2750.000
GR	606.000	2800.000	598.000	2800.000	597.500	2892.000	602.000	2900.000	0.0	0.0
EJ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

****
HEC2 RELEASE DATED NOV 76 UPDATED AUG1977
ERROR CORR - 01,02
MODIFICATION - 50,51,52,53
****

NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

10-YEAR FLOOD

SUMMARY PRINTOUT TABLE 150

SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10K*S	VCH	AREA	.01K
0.0	0.0	0.0	0.0	575.10	33500.00	599.60	0.0	599.72	1.83	3.54	25796.83	24762.91
0.0	0.0	0.0	0.0	575.10	48700.00	603.00	0.0	603.12	1.67	3.78	36707.37	37676.88
0.0	0.0	0.0	0.0	575.10	55800.00	604.20	0.0	604.32	1.69	3.93	40712.80	42939.94
0.0	0.0	0.0	0.0	575.10	75100.00	607.10	0.0	607.23	1.73	4.30	50720.48	57090.38
0.500	2300.00	0.0	0.0	576.40	33500.00	599.98	0.0	600.13	1.80	3.63	21628.75	24985.01
0.500	2300.00	0.0	0.0	576.40	48700.00	603.35	0.0	603.54	1.93	4.17	28549.30	35055.78
0.500	2300.00	0.0	0.0	576.40	55800.00	604.55	0.0	604.76	2.04	4.44	31024.14	39023.07
0.500	2300.00	0.0	0.0	576.40	75100.00	607.46	0.0	607.71	2.32	5.09	36991.93	49331.58
1.000	1990.00	0.0	0.0	574.50	33500.00	600.35	0.0	600.53	1.97	3.44	9732.12	23895.67
1.000	1990.00	0.0	0.0	574.50	48700.00	603.74	0.0	604.01	2.35	4.20	11601.37	31774.30
1.000	1990.00	0.0	0.0	574.50	55800.00	604.96	0.0	605.28	2.57	4.55	12271.82	34795.83
1.000	1990.00	0.0	0.0	574.50	75100.00	607.90	0.0	608.36	3.12	5.41	13889.86	42487.86
1.100	1.00	610.00	612.10	574.60	33500.00	600.33	0.0	600.55	0.43	3.77	8879.70	51301.38
1.100	1.00	610.00	612.10	574.60	48700.00	603.71	0.0	604.04	0.55	4.60	10587.49	65783.81
1.100	1.00	610.00	612.10	574.60	55800.00	604.93	0.0	605.31	0.61	4.98	11203.37	71183.50
1.100	1.00	610.00	612.10	574.60	75100.00	607.86	0.0	608.40	0.79	5.92	12686.20	84509.69
1.200	56.00	610.00	612.10	574.60	33500.00	600.33	0.0	600.55	0.43	3.77	8878.34	51290.30
1.200	56.00	610.00	612.10	574.60	48700.00	603.71	0.0	604.04	0.55	4.60	10591.33	65817.25
1.200	56.00	610.00	612.10	574.60	55800.00	604.93	0.0	605.32	0.61	4.98	11207.84	71223.00
1.200	56.00	610.00	612.10	574.60	75100.00	607.86	0.0	608.40	0.79	5.92	12691.78	84560.56
1.300	1.00	0.0	0.0	574.50	33500.00	600.38	0.0	600.56	1.50	3.44	9750.09	27391.31
1.300	1.00	0.0	0.0	574.50	48700.00	603.79	0.0	604.06	1.79	4.19	11623.52	36425.73
1.300	1.00	0.0	0.0	574.50	55800.00	605.02	0.0	605.34	1.95	4.54	12299.88	39913.68
1.300	1.00	0.0	0.0	574.50	75100.00	607.98	0.0	608.43	2.37	5.39	13930.67	48787.41
2.000	550.00	0.0	0.0	577.00	33500.00	600.54	0.0	600.66	1.23	3.05	17949.41	30250.86
2.000	550.00	0.0	0.0	577.00	48700.00	604.02	0.0	604.18	1.29	3.55	23258.68	42810.94
2.000	550.00	0.0	0.0	577.00	55800.00	605.29	0.0	605.47	1.36	3.79	25227.10	47870.05
2.000	550.00	0.0	0.0	577.00	75100.00	608.37	0.0	608.60	1.50	4.35	31322.86	61318.95
3.000	4555.00	0.0	0.0	575.00	33500.00	601.07	0.0	601.13	0.88	2.54	33119.55	35630.20
3.000	4555.00	0.0	0.0	575.00	48700.00	604.59	0.0	604.65	0.86	2.82	43546.82	52608.49
3.000	4555.00	0.0	0.0	575.00	55800.00	605.89	0.0	605.96	0.88	2.97	47420.69	59602.09
3.000	4555.00	0.0	0.0	575.00	75100.00	609.05	0.0	609.14	0.93	3.32	56841.86	78063.19

SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10K*S	VCH	AREA	.01K
4.000	6510.00	0.0	0.0	575.70	33500.00	601.77	0.0	601.97	1.95	4.46	20549.53	23995.46
4.000	6510.00	0.0	0.0	575.70	48700.00	605.26	0.0	605.49	1.96	4.96	28023.99	34786.03
4.000	6510.00	0.0	0.0	575.70	55800.00	606.58	0.0	606.82	2.02	5.20	30819.55	39307.38
4.000	6510.00	0.0	0.0	575.70	75100.00	609.76	0.0	610.04	2.14	5.79	37647.94	51380.22
5.000	5200.00	0.0	0.0	572.50	33000.00	602.56	0.0	602.67	0.97	3.28	25930.22	33567.62
5.000	5200.00	0.0	0.0	572.50	48000.00	606.09	0.0	606.23	1.06	3.77	34000.54	46658.28
5.000	5200.00	0.0	0.0	572.50	55000.00	607.44	0.0	607.58	1.11	3.98	37734.12	52312.01
5.000	5200.00	0.0	0.0	572.50	74000.00	610.69	0.0	610.86	1.19	4.46	47178.97	67724.56



1) COUNTY: KENT

2) STUDY NAME: GRANDVILLE, WALKER

3) WATERCOURSE: GRAND RIVER

4) DOCUMENT TYPE: 100-YEAR ENCROACHED



THIS RUN EXECUTED 02/19/81

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**************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED  AUG1977
  ERROR CORR -  01,02
  MODIFICATION -  50,51,52,53
**************************************************

T1
T2       100-YEAR ENCROACHED FLOODWAY
T3

J1  ICHECK     INQ        NINV       IDIR       STRT       METRIC     HVINS      Q          WSEL       FQ

     -10.        6.         0.         0.  0.0             0.0        0.0         0.    604.850      0.0

J2  NPROF      IPLOT      PRFVS      XSECV      XSECH      FN         ALLDC      IBW        CHNIM      ITRACE

     15.000      0.0       -1.000      0.0        0.0        0.0        0.0        0.0        0.0        0.0

*PROF 2

CCHV=   0.100 CEHV=   0.300
*SECNO .0
   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS    BANK ELEV
   Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA    LEFT/RIGHT
   TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN      SSTA
   SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID     ENDST

3470 ENCROACHMENT STATIONS=    10300.0    11930.0  TYPE=      1  TARGET=     1630.000

        CITY LIMITS  VALLEY SECTION A

     0.0      29.82    604.92     0.0      604.82   605.08     0.16       0.0        0.0      589.30
 55800.     21341.   29380.     5079.    15750.     7040.    4273.        0.         0.      592.30
     0.0       1.36     4.17      1.19     0.070     0.030    0.070      0.0      575.10   10300.00
0.000103  177800.  177800.   177800.        0          0        0        0.0     1623.43   11923.42

*SECNO .100
3470 ENCROACHMENT STATIONS=     1430.0     2500.0  TYPE=      1  TARGET=     1070.000
     0.10     29.29    604.89     0.0      604.79   605.27     0.38       0.13       0.07     588.90
 55800.     15780.   34707.     5312.     8214.     5680.    3106.        412.       25.      592.30
     0.05      1.92     6.11      1.71     0.070     0.030    0.070      0.032    575.60     1438.43
0.000228     780.     920.      750.          2         0        0        0.0     1055.03    2493.46

*SECNO .500
3470 ENCROACHMENT STATIONS=     2200.0     3280.0  TYPE=      1  TARGET=     1080.000

        VALLEY SECTION B

     0.50     28.86    605.26     0.0      605.16   605.51     0.25       0.23       0.01     590.80
 55800.      6290.    39431.    10079.     4393.     8359.    6918.        989.       58.      594.50
     0.15      1.43     4.72      1.46     0.070     0.030    0.070      0.031    576.40     2201.82
0.000125     1570.    1380.     1100.          2         0        0        0.0     1078.18    3280.00
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 CCHV=   0.300 CEHV=   0.500
 *SECNO 1.000

 3470 ENCROACHMENT STATIONS=     2370.0     2920.0  TYPE=     1  TARGET=     550.000
      1.00      30.94     605.54       0.0     605.45     605.85       0.30       0.31       0.03     612.10
     55800.        0.     55800.        0.        0.      12606.        0.       1869.       102.   100000.00
      0.31        0.0        4.43       0.0       0.070      0.030      0.070      0.031    574.60   2370.00
  0.000133     2700.     2450.     1950.          2          0          0        0.0      550.00   2920.00

 *SECNO 1.100

 3265 DIVIDED FLOW

    SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     BANK ELEV
    Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA     LEFT/RIGHT
    TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN       SSTA
    SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID      ENDST


 3370 NORMAL BRIDGE,NRD=   4 MIN ELTRD=   610.30 MAX ELLC=   612.10

      1.10      30.92     605.52       0.0     605.43     605.87       0.35       0.00       0.02     612.10
     55800.        0.     55800.        0.        0.      11781.        0.       1869.       102.     612.10
      0.31        0.0        4.74       0.0       0.070      0.030      0.070      0.031    574.60   2370.00
 0.000284          1.        1.         1.          2          0          0        0.0      515.00   2920.00

 *SECNO 1.200

 3265 DIVIDED FLOW

 3370 NORMAL BRIDGE,NRD=   4 MIN ELTRD=   610.30 MAX ELLC=   612.10

         BRIDGE SECTION C     M-11 BRIDGE U/S

      1.20      30.94     605.54       0.0     605.45     605.88       0.35       0.02       0.00     612.10
     55800.        0.     55800.        0.        0.      11787.        0.       1885.       103.     612.10
      0.31        0.0        4.73       0.0       0.070      0.030      0.070      0.031    574.60   2370.00
 0.000284         56.       56.        56.         0          0          0        0.0      515.00   2920.00

 *SECNO 1.300
      1.30      31.00     605.60       0.0     605.51     605.90       0.30       0.00       0.01     612.10
     55800.        0.     55800.        0.        0.      12636.        0.       1885.       103.     612.10
      0.31        0.0        4.42       0.0       0.070      0.030      0.070      0.031    574.60   2370.00
 0.000132          1.        1.         1.          2          0          0        0.0      550.00   2920.00

 *SECNO 2.000

 3470 ENCROACHMENT STATIONS=     3020.0     3750.0  TYPE=     1  TARGET=     730.000

         VALLEY SECTION D

      2.00      28.57     605.57       0.0     605.48     605.97       0.40       0.02       0.05     589.50
     55800.     3392.     50743.     1665.     2151.      9620.      1460.      1927.       105.     595.20
      0.32        1.58       5.28       1.14      0.070      0.030      0.070      0.031    577.00   3030.54
 0.000160         142.      142.       142.          2          0          0        0.0      719.46   3750.00

 *SECNO 2.100

 3470 ENCROACHMENT STATIONS=     2830.0     3720.0  TYPE=     1  TARGET=     890.000
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     2.10      28.85     605.85       0.0     605.76     606.14       0.29       0.14       0.03     589.50
    55800.     7832.     46700.     1267.      5347.      9963.     1194.      2269.       123.      595.20
      0.39      1.46       4.69      1.06     0.070      0.030     0.070      0.030     577.00    2835.47
 0.000127     1060.     1000.      850.          2          0         0        0.0      884.53    3720.00

CCHV=   0.100 CEHV=   0.300
*SECNO 3.000
 WATER EL=XS CARD=    606.340
   SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS     BANK ELEV
   Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA     LEFT/RIGHT
   TIME       VLOB       VCH        VRCB       XNL        XNCH       XNR        WTN        EL MIN       SSTA
   SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID       ENDST

3470 ENCROACHMENT STATIONS=      938.0     3850.0  TYPE=      1  TARGET=     2912.000

        VALLEY SECTION E

     3.00      31.34     606.34       0.0     606.24     606.39       0.05       0.21       0.02     588.50
    55800.     33403.    21853.      544.     39998.      8129.     812.      4686.       263.      590.60
     0.97       0.84       2.69      0.67     0.070      0.030     0.070      0.031     575.00     938.00
 0.000039     3140.     3400.      3350.          0          0         0        0.0     2912.00    3850.00

*SECNO 4.000
 WATER EL=XS CARD=    606.540

3470 ENCROACHMENT STATIONS=     3120.0     4106.0  TYPE=      1  TARGET=      986.000

        VALLEY SECTION F

     4.00      30.84     606.54       0.0     606.44     606.99       0.45       0.48       0.12     593.20
    55800.     4951.     38022.     12827.     2396.      5930.     7341.      8960.       519.      591.50
     1.32       2.07       6.41      1.75     0.070      0.030     0.070      0.031     575.70    3120.00
 0.000225     5300.     6500.      6900.          0          0         0        0.0      986.00    4106.00

*SECNO 4.100
 WATER EL=XS CARD=    606.600

3470 ENCROACHMENT STATIONS=     2565.0     4230.0  TYPE=      1  TARGET=     1665.000

        VALLEY SECTION G

     4.10      32.40     606.60       0.0     606.50     606.80       0.20       0.37       0.03     585.40
    55800.     12782.    32325.     10693.     9420.      7101.     8475.     10067.       591.      590.00
     1.53       1.36       4.55      1.26     0.070      0.030     0.070      0.031     574.20    2565.00
 0.000113     2500.     2400.      2250.          0          0         0        0.0     1665.00    4230.00

*SECNO 4.900
 WATER EL=XS CARD=    606.600

3470 ENCROACHMENT STATIONS=     2050.0     3300.0  TYPE=      1  TARGET=     1250.000

        VALLEY SECTION H  WALKER CITY LIMITS

     4.90      33.80     606.60       0.0     606.50     606.87       0.27       0.29       0.02     591.00
    55800.     6837.     38137.     10826.     5308.      7646.     7416.     11312.       671.      596.30
     1.70       1.29       4.99      1.46     0.070      0.030     0.070      0.031     572.80    2050.00
 0.000135     2100.     2350.      2700.          0          0         0        0.0     1250.00    3300.00

*SECNO 5.000
 WATER EL=XS CARD=    606.600
3280 CROSS SECTION        5.00 EXTENDED        4.60 FEET
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 3470 ENCROACHMENT STATIONS=    2200.0    3200.0  TYPE=      1  TARGET=     1000.000
        5.00     34.10    606.60      0.0    606.50    606.96      0.36      0.07      0.03    590.70
       55800.    3352.    42165.    10283.    2601.     7732.     6308.    11521.     684.     596.00
        1.73     1.29      5.45      1.63    0.070     0.030     0.070     0.031    572.50   2200.00
   0.000158      510.      510.      460.        0         0         0       0.0   1000.00   3200.00
```

1) COUNTY: KENT

2) STUDY NAME: GRANDVILLE, WALKER

3) WATERCOURSE: GRAND RIVER ~~100-yr~~

4) DOCUMENT TYPE: 100-YEAR NATURAL

00BREAK00

THIS RUN EXECUTED 02/19/81

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*****************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED  AUG1977
  ERROR CORR -  01,02
  MODIFICATION -  50,51,52,53
*****************************************************
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RECEIVED
FEB 23 1981
WATER MANAGEMENT

approved run

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C
T1      FIS GRANDVILLE & WALKER
T2      100-YEAR FLOOD
T3      GRAND RIVER

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ
       0.        4.        0.        0.   0.0          0.0       0.0        0.   604.820     0.0

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE
     1.000     0.0      -1.000     0.0       0.0       0.0       0.0       0.0       0.0       0.0

J3  VARIABLE CODES FOR SUMMARY PRINTOUT

    38.000     1.000    53.000    21.000    22.000    54.000     4.000    39.000   150.000   200.000

QT      5.000  33500.000  48700.000  55800.000  75100.000  55800.000      0.0       0.0       0.0       0.0
NC      0.070      0.070      0.030      0.100      0.300      0.0        0.0       0.0       0.0       0.0
ET      0.0        0.0        0.0        0.0        0.0        1.400      0.0       0.0       0.0       0.0

        CITY LIMITS  VALLEY SECTION A

X1      0.0       51.000  11300.000  11590.000 177800.000 177800.000 177800.000      0.0       0.0       0.0
X3      0.0        0.0        0.0    10300.000      0.0    11930.000      0.0       0.0       0.0       0.0
GR    610.000   6300.000    610.000   6300.000    610.000   6700.000    600.000   8900.000   590.000   9200.000
GR    590.000   9350.000    600.000   9500.000    600.000   9800.000    590.000  10600.000   588.200  10800.000
GR    590.700  10900.000    587.200  10950.000    586.800  11000.000    591.100  11040.000   586.500  11050.000
GR    586.200  11080.000    584.200  11082.000    583.700  11090.000    584.200  11100.000   583.700  11110.000
GR    584.400  11120.000    589.000  11150.000    583.200  11180.000    587.000  11200.000   586.500  11225.000
GR    587.800  11250.000    588.000  11275.000    589.300 LT 11300.000    582.800  11320.000   582.800  11330.000
GR    576.400  11400.000    575.400  11420.000    575.700  11430.000    575.600  11440.000   575.300  11450.000
GR    576.000  11460.000    575.100  11470.000    576.000  11480.000    576.800  11500.000   580.500  11520.000
GR    580.700  11530.000    587.500  11545.000    592.300 RT 11590.000    591.500  11610.000   588.500  11620.000
GR    588.500  11660.000    591.500  11675.000    593.000  11700.000    592.500  11800.000   592.500  11910.000
GR    611.000  11930.000      0.0        0.0        0.0        0.0        0.0       0.0       0.0       0.0

X1      0.100     26.000   2000.000   2240.000    780.000    750.000    920.000      0.0       0.0       0.0
X3      0.0        0.0        0.0     1430.000      0.0     2500.000      0.0       0.0       0.0       0.0
GR    615.000   1000.000    615.000   1040.000    615.000   1260.000    615.000   1300.000   615.000   1430.000
GR    591.000   1450.000    590.000   1790.000    588.900   2000.000    587.900   2013.000   582.800   2025.000
GR    581.200   2038.000    580.000   2051.000    578.700   2063.000    577.500   2076.000   576.400   2088.000
GR    575.600   2101.000    575.600   2139.000    576.800   2152.000    578.100   2164.000   580.100   2177.000
GR    583.900   2190.000    586.600   2202.000    589.500   2215.000    592.300   2240.000   592.300   2480.000
GR    611.000   2500.000      0.0        0.0        0.0        0.0        0.0       0.0       0.0       0.0

        VALLEY SECTION B

X1      0.500     38.000   2500.000   2830.000   1570.000   1100.000   1380.000      0.0       0.0       0.0
                                0.0    2200.000      0.0     3280.000      0.0       0.0       0.0       0.0
```

GR	607.000	2200.000	607.000	2200.000	587.800	2220.000	590.000	2270.000	591.500	2350.000
GR	591.100	2400.000	588.000	2420.000	588.500	2450.000	591.500	2475.000	590.800	2500.000 LT
GR	583.000	2520.000	578.000	2530.000	577.000	2540.000	576.800	2560.000	577.000	2570.000
GR	576.400	2580.000	576.800	2630.000	577.800	2650.000	578.000	2680.000	578.200	2700.000
GR	579.000	2750.000	579.800	2780.000	584.000	2782.000	588.000	2810.000	594.500	2830.000 RT.
GR	591.500	2850.000	595.200	2875.000	593.000	2900.000	594.500	3000.000	594.000	3020.000
GR	589.000	3030.000	588.000	3050.000	587.000	3100.000	586.500	3150.000	586.700	3200.000
GR	586.000	3300.000	586.500	3400.000	611.000	3500.000	0.0	0.0	0.0	0.0
NC	0.0	0.0	0.0	0.300	0.500	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	0.0	9.100	0.0	0.0	2370.000	2920.000
X1	1.000	49.000	2370.000	2920.000	2700.000	1950.000	2450.000	0.0	0.0	0.0
GR	612.100	2370.000	612.100	2370.000	593.500	2370.000	593.000	2410.000	590.500	2415.000
GR	586.500	2420.000	586.500	2420.000	586.500	2425.000	586.500	2425.000	587.500	2480.000
GR	585.500	2495.000	585.500	2495.000	584.000	2500.000	584.000	2500.000	581.000	2530.000
GR	581.000	2545.000	579.000	2565.000	579.500	2570.000	579.500	2570.000	579.800	2575.000
GR	579.800	2575.000	580.500	2615.000	581.800	2625.000	581.000	2635.000	581.000	2645.000
GR	581.000	2645.000	581.000	2650.000	581.000	2650.000	579.000	2705.000	576.000	2720.000
GR	576.000	2720.000	575.500	2725.000	575.500	2725.000	575.000	2735.000	576.200	2795.000
GR	576.200	2795.000	576.500	2800.000	576.500	2800.000	574.600	2810.000	576.200	2840.000
GR	581.000	2855.000	592.000	2865.000	592.000	2870.000	592.000	2870.000	592.000	2875.000
GR	592.000	2875.000	591.000	2890.000	594.000	2920.000	612.100	2920.000	0.0	0.0
X1	1.100	49.000	2370.000	2920.000	1.000	1.000	1.000	0.0	0.0	0.0
X2	0.0	0.0	0.0	612.100	610.300	0.0	0.0	0.0	0.0	0.0
BT	4.000	2370.000	612.100	612.100	2370.000	612.100	610.300	2920.000	612.100	610.300
BT	2920.000	612.100	612.100	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GR	612.100	2370.000	612.100	2370.000	593.500	2370.000	593.000	2410.000	590.500	2415.000
GR	586.500	2420.000	610.300	2420.000	610.300	2425.000	586.500	2425.000	587.500	2480.000
GR	585.500	2495.000	610.300	2495.000	610.300	2500.000	584.000	2500.000	581.000	2530.000
GR	581.000	2545.000	579.000	2565.000	579.500	2570.000	610.300	2570.000	610.300	2575.000
GR	579.800	2575.000	580.500	2615.000	581.800	2625.000	581.000	2635.000	581.000	2645.000
GR	610.300	2645.000	610.300	2650.000	581.000	2650.000	579.000	2705.000	576.000	2720.000
GR	610.300	2720.000	610.300	2725.000	575.500	2725.000	575.000	2735.000	576.200	2795.000
GR	610.300	2795.000	610.300	2800.000	576.500	2800.000	574.600	2810.000	576.200	2840.000
GR	581.000	2855.000	592.000	2865.000	592.000	2870.000	610.300	2870.000	610.300	2875.000
GR	592.000	2875.000	591.000	2890.000	594.000	2920.000	612.100	2920.000	0.0	0.0

BRIDGE SECTION C M-11 BRIDGE U/S

X1	1.200	0.0	0.0	0.0	56.000	56.000	56.000	0.0	0.0	0.0
X2	0.0	0.0	0.0	612.100	610.300	0.0	1.000	0.0	0.0	0.0
X1	1.300	49.000	2370.000	2920.000	1.000	1.000	1.000	0.0	0.0	0.0
GR	612.100	2370.000	612.100	2370.000	593.500	2370.000	593.000	2410.000	590.500	2415.000
GR	586.500	2420.000	586.500	2420.000	586.500	2425.000	586.500	2425.000	587.500	2480.000
GR	585.500	2495.000	585.500	2495.000	584.000	2500.000	584.000	2500.000	581.000	2530.000
GR	581.000	2545.000	579.000	2565.000	579.500	2570.000	579.500	2570.000	579.800	2575.000
GR	579.800	2575.000	580.500	2615.000	581.800	2625.000	581.000	2635.000	581.000	2645.000
GR	581.000	2645.000	581.000	2650.000	581.000	2650.000	579.000	2705.000	576.000	2720.000
GR	576.000	2720.000	575.500	2725.000	575.500	2725.000	575.000	2735.000	576.200	2795.000
GR	576.200	2795.000	576.500	2800.000	576.500	2800.000	574.600	2810.000	576.200	2840.000
GR	581.000	2855.000	592.000	2865.000	592.000	2870.000	592.000	2870.000	592.000	2875.000
GR	592.000	2875.000	591.000	2890.000	594.000	2920.000	612.100	2920.000	0.0	0.0

VALLEY SECTION D

X1	2.000	47.000	3190.000	3575.000	142.000	142.000	142.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	3020.000	0.0	3750.000	0.0	0.0	0.0	0.0
GR	612.000	3020.000	612.000	3020.000	593.700	3050.000	595.000	3060.000	595.000	3090.000
GR	588.700	3108.000	588.700	3140.000	589.000	3150.000	589.500	3190.000	585.000	3190.000
GR	584.000	3193.000	579.800	3200.000	579.800	3270.000	581.000	3300.000	581.000	3320.000
			581.600	3360.000	579.000	3380.000	577.300	3410.000	577.100	3420.000

GR	577.500	3450.000	577.000	3460.000	577.600	3485.000	578.500	3497.000	578.500	3520.000
GR	585.000	3535.000	595.200	3575.000	596.000	3600.000	596.000	3700.000	605.000	3750.000
GR	607.200	3770.000	607.400	3800.000	594.700	3855.000	591.000	3900.000	590.800	3930.000
GR	590.300	3940.000	590.300	4000.000	588.000	4100.000	588.000	4260.000	591.700	4396.000
GR	591.700	4445.000	590.000	4500.000	591.600	4650.000	595.000	4700.000	600.600	4790.000
GR	603.000	4860.000	608.900	4940.000	0.0	0.0	0.0	0.0	0.0	0.0
X1	2.100	49.000	3190.000	3590.000	1060.000	850.000	1000.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	2830.000	0.0	3720.000	0.0	0.0	0.0	0.0
GR	612.000	2830.000	612.000	2830.000	589.500	2850.000	589.500	3000.000	595.000	3020.000
GR	595.000	3020.000	595.000	3050.000	595.000	3050.000	589.500	3070.000	595.000	3090.000
GR	588.700	3108.000	588.700	3140.000	589.000	3150.000	589.500	3190.000	585.000	3190.000
GR	584.000	3193.000	579.800	3200.000	579.800	3270.000	581.000	3300.000	581.000	3320.000
GR	581.600	3330.000	581.600	3360.000	579.000	3380.000	577.300	3410.000	577.100	3420.000
GR	577.500	3450.000	577.000	3460.000	577.600	3485.000	578.500	3497.000	578.500	3520.000
GR	585.000	3535.000	595.200	3590.000	596.000	3600.000	596.000	3700.000	605.000	3720.000
GR	607.200	3740.000	607.400	3770.000	594.700	3855.000	591.000	3900.000	590.800	3930.000
GR	590.300	3940.000	590.300	4000.000	588.000	4100.000	588.000	4260.000	591.700	4396.000
GR	591.700	4445.000	590.000	4500.000	600.000	4600.000	610.000	4720.000	0.0	0.0
NC	0.0	0.0	0.0	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	0.0	9.100	0.0	0.0	938.000	3850.000

VALLEY SECTION E

X1	3.000	60.000	3480.000	3790.000	3140.000	3350.000	3400.000	0.0	0.0	0.0
X5	5.000	600.980	604.640	606.240	609.080	606.340	0.0	0.0	0.0	0.0
GR	610.000	900.000	595.000	920.000	590.000	1220.000	590.000	1220.000	590.000	1220.000
GR	589.500	2100.000	589.000	2200.000	590.000	2250.000	589.000	2289.000	588.800	2350.000
GR	589.000	2420.000	589.000	2450.000	588.600	2550.000	592.000	2600.000	592.300	2650.000
GR	589.000	2700.000	589.000	2750.000	592.000	2850.000	592.000	2870.000	593.500	2950.000
GR	592.500	3000.000	591.000	3050.000	590.500	3100.000	590.000	3150.000	589.700	3170.000
GR	589.000	3200.000	590.000	3245.000	594.300	3300.000	590.500	3350.000	589.500	3375.000
GR	598.200	3390.000	598.800	3400.000	598.500	3415.000	600.000	3420.000	598.000	3440.000
GR	597.000	3441.000	588.500	3480.000	588.000	3490.000	585.000	3490.000	582.200	3515.000
GR	580.000	3550.000	579.700	3570.000	580.000	3587.000	579.000	3600.000	579.000	3620.000
GR	578.000	3635.000	578.000	3650.000	576.700	3665.000	576.000	3695.000	575.000	3701.000
GR	575.000	3718.000	577.000	3735.000	580.000	3743.000	588.000	3780.000	590.000	3780.000
GR	590.600	3790.000	595.000	3850.000	591.000	3860.000	615.000	3900.000	616.000	3960.000
ET	0.0	0.0	0.0	0.0	0.0	9.100	0.0	0.0	3120.000	4106.000

VALLEY SECTION F

X1	4.000	37.000	3270.000	3500.000	5300.000	6900.000	6500.000	0.0	0.0	0.0
X5	5.000	601.560	605.020	606.440	609.100	606.540	0.0	0.0	0.0	0.0
GR	610.000	3080.000	610.000	3080.000	610.000	3080.000	610.000	3080.000	599.500	3100.000
GR	599.000	3110.000	600.300	3135.000	589.800	3155.000	587.900	3180.000	586.500	3200.000
GR	586.900	3225.000	593.200	3270.000	583.000	3310.000	576.300	3335.000	576.800	3360.000
GR	575.700	3368.000	576.000	3395.000	577.500	3410.000	577.500	3435.000	580.000	3460.000
GR	591.500	3500.000	589.900	3550.000	589.900	3565.000	595.600	3635.000	595.600	3650.000
GR	588.600	3715.000	587.700	3750.000	593.300	3800.000	596.700	3850.000	599.500	3870.000
GR	599.800	3900.000	596.800	3930.000	596.800	3970.000	598.600	4100.000	600.000	4130.000
GR	613.000	4150.000	614.500	4200.000	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	0.0	9.100	0.0	0.0	2565.000	4230.000

VALLEY SECTION G

X1	4.100	39.000	3225.000	3500.000	2500.000	2250.000	2400.000	0.0	-1.500	0.0
X5	5.000	602.200	605.200	606.500	609.260	606.600	0.0	0.0	0.0	0.0
GR	610.000	2550.000	591.400	2570.000	591.400	2700.000	594.000	2750.000	594.400	2800.000
GR	593.400	2850.000	593.400	2900.000	597.400	3000.000	597.700	3050.000	599.500	3100.000
GR	599.000	3110.000	600.300	3135.000	589.800	3155.000	587.900	3180.000	586.500	3200.000
GR	586.900	3225.000	593.200	3270.000	583.000	3310.000	576.300	3335.000	576.800	3360.000
GR	575.700	3368.000	576.000	3395.000	577.500	3410.000	577.500	3435.000	580.000	3460.000
			589.900	3550.000	589.900	3565.000	595.600	3635.000	595.600	3650.000

GR	588.000	3715.000	587.700	3750.000	593.300	3800.000	596.700	3850.000	599.500	3870.000
GR	599.800	3900.000	596.800	3930.000	600.000	3970.000	610.000	4730.000	0.0	0.0

VALLEY SECTION H WALKER CITY LIMITS

X1	4.900	58.000	2500.000	2785.000	2100.000	2700.000	2350.000	0.0	0.300	0.0
X3	0.0	0.0	0.0	2050.000	0.0	3300.000	0.0	0.0	0.0	0.0
X5	5.000	602.550	605.480	606.500	609.260	606.600	0.0	0.0	0.0	0.0
GR	610.000	1550.000	594.000	1580.000	594.000	2062.000	592.600	2150.000	592.500	2200.000
GR	592.000	2250.000	595.600	2300.000	599.000	2350.000	599.000	2398.000	599.000	2398.000
GR	592.500	2470.000	590.700	2500.000	585.000	2520.000	579.000	2530.000	573.500	2550.000
GR	572.500	2560.000	573.500	2570.000	572.600	2580.000	572.700	2590.000	578.000	2600.000
GR	579.800	2620.000	578.000	2630.000	573.700	2650.000	573.700	2670.000	576.000	2690.000
GR	583.000	2700.000	580.000	2710.000	580.000	2720.000	582.200	2730.000	581.700	2740.000
GR	581.700	2750.000	584.500	2760.000	592.500	2764.000	596.000	2785.000	588.500	2830.000
GR	589.000	2850.000	588.500	2867.000	585.500	2875.000	588.500	2900.000	588.500	2960.000
GR	596.000	2990.000	594.800	3000.000	595.000	3040.000	592.000	3100.000	591.000	3150.000
GR	593.500	3200.000	594.200	3250.000	594.000	3300.000	591.000	3500.000	592.000	3650.000
GR	591.000	3900.000	592.000	4070.000	591.700	4250.000	592.500	4400.000	591.000	4450.000
GR	591.300	4510.000	600.000	4800.000	610.000	5550.000	0.0	0.0	0.0	0.0

X1	5.000	64.000	2500.000	2785.000	510.000	460.000	510.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	2200.000	0.0	3200.000	0.0	0.0	0.0	0.0
X5	5.000	602.550	605.480	606.500	609.260	606.600	0.0	0.0	0.0	0.0
GR	607.000	2000.000	606.500	2030.000	594.000	2062.000	592.600	2150.000	592.500	2200.000
GR	592.000	2250.000	595.600	2300.000	606.500	2350.000	606.500	2398.000	606.500	2398.000
GR	592.500	2470.000	590.700	2500.000	585.000	2520.000	579.000	2530.000	573.500	2550.000
GR	572.500	2560.000	573.500	2570.000	572.600	2580.000	572.700	2590.000	578.000	2600.000
GR	579.800	2620.000	578.000	2630.000	573.700	2650.000	573.700	2670.000	576.000	2690.000
GR	583.000	2700.000	580.000	2710.000	580.000	2720.000	582.200	2730.000	581.700	2740.000
GR	581.700	2750.000	584.500	2760.000	592.500	2764.000	596.000	2785.000	588.500	2830.000
GR	589.000	2850.000	588.500	2867.000	585.500	2875.000	588.500	2900.000	588.500	2960.000
GR	596.000	2990.000	594.800	3000.000	595.000	3040.000	592.000	3100.000	591.000	3150.000
GR	593.500	3200.000	594.200	3250.000	594.000	3300.000	591.000	3500.000	592.000	3650.000
GR	591.000	3900.000	592.000	4070.000	591.700	4250.000	592.500	4400.000	591.000	4450.000
GR	591.300	4510.000	600.000	4530.000	602.500	4600.000	603.000	4650.000	606.000	4750.000
GR	606.000	4800.000	598.000	4800.000	597.500	4892.000	602.000	4900.000	0.0	0.0
EJ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

*PROF 1

CCHV= 0.100 CEHV= 0.300
*SECNO .0

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST
3470 ENCROACHMENT STATIONS=		10300.0	11930.0	TYPE=	1	TARGET=	1630.000		
CITY LIMITS VALLEY SECTION A									
0.0	29.72	604.82	0.0	604.82	604.98	0.16	0.0	0.0	589.30
55800.	21306.	29435.	5059.	15650.	7011.	4240.	0.	0.	592.30
0.0	1.36	4.20	1.19	0.070	0.030	0.070	0.0	575.10	10300.00
0.000104	177800.	177800.	177800.	0	0	0	0.0	1623.32	11923.31

*SECNO .100

3470 ENCROACHMENT STATIONS=		1430.0	2500.0	TYPE=	1	TARGET=	1070.000		
0.10	29.19	604.79	0.0	0.0	605.17	0.39	0.13	0.07	588.90
55800.	15741.	34770.	5288.	8158.	5656.	3080.	410.	25.	592.30
0.05	1.93	6.15	1.72	0.070	0.030	0.070	0.032	575.60	1438.51
0.000232	780.	920.	750.	2	0	0	0.0	1054.84	2493.35

*SECNO .500

3470 ENCROACHMENT STATIONS=		2200.0	3280.0	TYPE=	1	TARGET=	1080.000		
VALLEY SECTION B									
0.50	28.76	605.16	0.0	0.0	605.42	0.26	0.23	0.01	590.80
55800.	6270.	39475.	10054.	4365.	8328.	6875.	983.	58.	594.50
0.15	1.44	4.74	1.46	0.070	0.030	0.070	0.031	576.40	2201.91
0.000127	1570.	1380.	1100.	2	0	0	0.0	1078.08	3280.00

CCHV= 0.300 CEHV= 0.500
*SECNO 1.000

1.00	30.85	605.45	0.0	0.0	605.76	0.31	0.32	0.03	612.10
55800.	0.	55800.	0.	0.	12558.	0.	1859.	102.	612.10
0.31	0.0	4.44	0.0	0.070	0.030	0.070	0.031	574.60	2370.00
0.000135	2700.	2450.	1950.	2	0	0	0.0	550.00	2920.00

*SECNO 1.100

3265 DIVIDED FLOW

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3370 NORMAL BRIDGE.NRD= 4 MIN ELTRD= 610.30 MAX ELLC= 612.10

```
     1.10     30.83    605.43      0.0       0.0     605.78      0.35      0.00      0.02    612.10
   55800.        0.    55800.       0.        0.     11736.        0.     1860.      102.     612.10
     0.31      0.0      4.75      0.0     0.070      0.030     0.070     0.031    574.60   2370.00
 0.000287        1.        1.       1.         2          0         0       0.0    515.00   2920.00

*SECNO 1.200

3265 DIVIDED FLOW

3370 NORMAL BRIDGE,NRD=  4 MIN ELTRD=  610.30 MAX ELLC=  612.10

        BRIDGE SECTION C    M-11 BRIDGE U/S

     1.20     30.85    605.45      0.0       0.0     605.80      0.35      0.02      0.00    612.10
   55800.        0.    55800.       0.        0.     11741.        0.     1875.      103.     612.10
     0.31      0.0      4.75      0.0     0.070      0.030     0.070     0.031    574.60   2370.00
 0.000287       56.       56.      56.         0          0         0       0.0    515.00   2920.00

*SECNO 1.300
     1.30     30.91    605.51      0.0       0.0     605.81      0.31      0.00      0.01    612.10
   55800.        0.    55800.       0.        0.     12587.        0.     1875.      103.     612.10
     0.31      0.0      4.43      0.0     0.070      0.030     0.070     0.031    574.60   2370.00
 0.000134        1.        1.       1.         2          0         0       0.0    550.00   2920.00

*SECNO 2.000

3470 ENCROACHMENT STATIONS=    3020.0    3750.0  TYPE=     1  TARGET=     730.000

        VALLEY SECTION D

     2.00     28.48    605.48      0.0       0.0     605.88      0.40      0.02      0.05    589.50
   55800.     3379.    50773.     1648.     2137.      9585.     1444.     1917.      105.     595.20
     0.32      1.58      5.30      1.14     0.070      0.030     0.070     0.031    577.00   3030.69
 0.000162      142.      142.      142.         2          0         0       0.0    719.31   3750.00

*SECNO 2.100

3470 ENCROACHMENT STATIONS=    2830.0    3720.0  TYPE=     1  TARGET=     890.000
     2.10     28.76    605.76      0.0       0.0     606.06      0.29      0.14      0.03    589.50
   55800.     7810.    46733.     1257.     5316.      9929.     1183.     2257.      123.     595.20
     0.38      1.47      4.71      1.06     0.070      0.030     0.070     0.030    577.00   2835.54
 0.000128     1060.     1000.      850.         2          0         0       0.0    884.45   3720.00

CCHV=   0.100 CEHV=   0.300
*SECNO 3.000
 WATER EL=X5 CARD=   606.240
   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        QLOSS    BANK ELEV
   Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA    LEFT/RIGHT
   TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN       SSTA
   SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID      ENDST

        VALLEY SECTION E

     3.00     31.24    606.24      0.0       0.0     606.29      0.05      0.21      0.02    588.50
   55800.    33299.    21715.      786.    40033.      8098.     1132.     4084.      265.     590.60
     0.98      0.83      2.68      0.69     0.070      0.030     0.070     0.031    575.00    905.01
 0.000039     3140.     3400.     3350.         0          0         0       0.0   2980.38   3885.40
```

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 *SECNO 4.000
  WATER EL=X5 CARD=    606.440

          VALLEY SECTION F

      4.00      30.74     606.44       0.0        0.0     606.89       0.45       0.48       0.12     593.20
     55800.     5127.     37774.     12898.     2571.      5907.     7480.      9003.       531.      591.50
      1.32       1.99       6.40       1.72     0.070      0.030     0.070      0.031     575.70    3086.78
  0.000225      5300.      6500.      6900.         0          0         0        0.0    1053.13    4139.91


 *SECNO 4.100
  WATER EL=X5 CARD=    606.500

          VALLEY SECTION G

      4.10      32.30     606.50       0.0        0.0     606.70       0.20       0.37       0.02     585.40
     55800.    12773.     32277.     10750.     9431.      7073.     9199.     10136.       614.      590.00
      1.53       1.35       4.56       1.17     0.070      0.030     0.070      0.031     574.20    2552.15
  0.000114      2500.      2400.      2250.         0          0         0        0.0    2025.85    4578.00


 *SECNO 4.900
  WATER EL=X5 CARD=    606.500

 3470 ENCROACHMENT STATIONS=     2050.0     3300.0  TYPE=      1  TARGET=     1250.000

          VALLEY SECTION H  WALKER CITY LIMITS

      4.90      33.70     606.50       0.0        0.0     606.78       0.28       0.30       0.02     591.00
     55800.     6798.     38210.     10792.     5263.      7618.     7365.     11400.       706.      596.30
      1.70       1.29       5.02       1.47     0.070      0.030     0.070      0.031     572.80    2050.00
  0.000137      2100.      2350.      2700.         0          0         0        0.0    1250.00    3300.00


 *SECNO 5.000
  WATER EL=X5 CARD=    606.500

 3265 DIVIDED FLOW

 3280 CROSS SECTION       5.00 EXTENDED       4.50 FEET


 3470 ENCROACHMENT STATIONS=     2200.0     3200.0  TYPE=      1  TARGET=     1000.000
      5.00      34.00     606.50       0.0        0.0     606.86       0.36       0.07       0.03     590.70
     55800.     3328.     42222.     10250.     2571.      7703.     6266.     11607.       718.      596.00
      1.73       1.29       5.48       1.64     0.070      0.030     0.070      0.031     572.50    2200.00
  0.000161       510.       510.       460.         0          0         0        0.0     952.00    3200.00
```

00BREAK00

1) COUNTY: KENT

2) STUDY NAME: GRANDVILLE / WALKER TWP

3) WATERCOURSE: GRAND RIVER

4) DOCUMENT TYPE: CALIBRATION OF N VALUES RUN ~~TO~~
HWM. INFO.

00BREAK00

H A S P S Y S T E M L O G

```
$ 15.22.41 JOB 162 -- HUDI006  -- BEGINNING EXEC - INIT B - CLASS F
$*15.23.41 JOB 162 ESTIMATED TIME EXCEEDED
$ 15.28.02 JOB 162 END EXECUTION.

JOB STATS -      204 CARDS READ        4,315 LINES PRINTED        0 CARDS PUNCHED        0 PLOT BLOCKS      5.35 MINS EXEC TIME
```

HEC-2 Run from section 13 in Ottawa County upto M-11 Bridge in Kent County

Analysis of High Water Marks

"n" values — higher than normal

Result : Estimated elevations agree with high water marks at M-11 Bridge.

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**************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED  AUG1977
  ERROR CORR -  01,02
  MODIFICATION -  50,51,52,53
**************************************************
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how can it be convergent when all runs start by -1.

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C
T1      GRAND RIVER, KENT COUNTY, MICHIGAN, JOB NO. HUDI-62-010-007
T2      INITIAL WATER SURFACE ANALYSIS BY CONVERGENT METHOD
T3      GRANDVILLE AND WALKER TOWNSHIP
```

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
	0.	2.	0.	0.	-1.000000	0.0	0.0	0.	0.0	0.0
J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	1.000	0.0	-1.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0
QT	9.000	11500.000	27200.000	31800.000	38600.000	42200.000	33500.000	48700.000	55800.000	75100.000
NC	0.120	0.150	0.040	0.100	0.300	0.0	0.0	0.0	0.0	0.0

SECTION 13 OF COE FPI STUDY,OTTAWA COUNTY, 1974

X1	13.000	48.000	180.000	555.000	0.0	0.0	0.0	0.0	0.0	0.0
GR	604.000	49.000	599.000	102.000	596.500	145.000	596.000	180.000	590.000	190.000
GR	588.000	205.000	587.000	210.000	584.500	215.000	582.500	225.000	581.000	230.000
GR	580.000	243.000	579.500	255.000	577.500	265.000	577.000	275.000	576.800	280.000
GR	576.500	290.000	576.900	305.000	576.500	315.000	576.600	325.000	576.900	335.000
GR	576.000	345.000	576.500	355.000	576.000	365.000	575.000	375.000	574.000	385.000
GR	574.500	395.000	575.200	405.000	576.500	415.000	578.000	425.000	579.500	430.000
GR	580.000	445.000	581.000	455.000	581.000	485.000	582.200	495.000	583.500	505.000
GR	588.100	515.000	586.900	520.000	589.500	521.000	590.000	525.000	595.500	555.000
GR	595.000	575.000	590.000	590.000	589.000	615.000	588.000	650.000	590.000	740.000
GR	593.500	765.000	600.000	1355.000	610.000	1375.000	0.0	0.0	0.0	0.0
X1	13.001	0.0	0.0	0.0	10.000	10.000	10.000	0.0	0.0	0.0
X1	13.002	0.0	0.0	0.0	20.000	20.000	20.000	0.0	0.0	0.0
X1	13.010	0.0	0.0	0.0	70.000	70.000	70.000	0.0	0.0	0.0
X1	13.020	0.0	0.0	0.0	100.000	100.000	100.000	0.0	0.0	0.0
X1	13.030	0.0	0.0	0.0	100.000	100.000	100.000	0.0	0.0	0.0
X1	13.040	0.0	0.0	0.0	500.000	200.000	400.000	0.0	0.0	0.0
X1	13.050	0.0	0.0	0.0	500.000	200.000	400.000	0.0	0.0	0.0
NC	0.0	0.0	0.063	0.0	0.0	0.0	0.0	0.0	0.0	0.0

X1	13.100	0.0	0.0	0.0	600.000	200.000	400.000	0.0	0.0	0.0
X1	13.200	0.0	0.0	0.0	1700.000	1200.000	1400.000	0.0	0.0	0.0

SECTION 14 OF COE FPI STUDY, OTTAWA COUNTY, 1974

X1	14.000	55.000	270.000	625.000	1900.000	1600.000	1800.000	0.0	0.0	0.0
GR	610.000	-1980.000	600.000	-130.000	600.000	-130.000	600.000	-130.000	600.000	-130.000
GR	597.000	0.0	594.000	70.000	589.000	150.000	590.000	190.000	593.000	270.000
GR	595.300	274.000	594.000	278.000	589.500	290.000	588.000	300.000	585.000	310.000
GR	580.000	320.000	579.000	330.000	578.000	350.000	577.500	360.000	578.000	370.000
GR	578.000	377.000	577.500	400.000	577.000	420.000	576.000	450.000	575.100	460.000
GR	575.200	470.000	575.000	480.000	575.200	500.000	575.000	510.000	573.400	530.000
GR	573.600	540.000	576.000	550.000	576.500	560.000	580.500	570.000	580.500	578.000
GR	583.000	600.000	587.200	609.000	588.000	611.000	589.500	614.000	591.000	625.000
GR	591.200	649.000	591.500	666.000	590.500	695.000	595.700	724.000	595.500	727.000
GR	592.300	740.000	592.600	750.000	596.000	777.000	595.000	800.000	594.000	900.000
GR	590.000	960.000	590.000	1225.000	600.000	1325.000	600.000	2475.000	610.000	3225.000
NC	0.0	0.120	0.040	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X1	14.100	0.0	0.0	0.0	1000.000	900.000	1000.000	0.0	0.0	0.0
X1	14.200	0.0	0.0	0.0	1000.000	850.000	900.000	0.0	0.0	0.0
NC	0.0	0.0	0.046	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X1	14.300	0.0	0.0	0.0	2200.000	800.000	1700.000	0.0	0.0	0.0
NC	0.0	0.0	0.040	0.0	0.0	0.0	0.0	0.0	0.0	0.0

AT OTTAWA COUNTY- KENT COUNTY LINE (COE FPI STUDY,1972 X-SECTION C)

X1	0.0	52.000	800.000	1090.000	1800.000	1000.000	1000.000	0.0	0.0	0.0
GR	600.000	-700.000	600.000	-700.000	600.000	-700.000	600.000	-700.000	600.000	-700.000
GR	590.200	100.000	588.500	300.000	590.000	350.000	590.800	400.000	587.400	450.000
GR	587.000	500.000	591.000	540.000	586.900	550.000	586.500	581.000	584.000	583.000
GR	583.400	590.000	584.000	600.000	583.400	611.000	584.500	620.000	589.000	650.000
GR	583.000	680.000	587.000	700.000	586.500	730.000	588.000	750.000	588.100	780.000
GR	589.300	800.000	583.000	820.000	583.000	830.000	580.000	860.000	576.000	900.000
GR	575.500	920.000	575.800	935.000	575.300	950.000	576.000	960.000	575.100	970.000
GR	577.000	1000.000	580.500	1020.000	580.800	1030.000	588.000	1045.000	592.200	1090.000
GR	591.500	1110.000	588.200	1120.000	588.700	1160.000	591.500	1175.000	593.000	1200.000
GR	592.600	1325.000	590.000	1450.000	589.000	1500.000	589.000	1550.000	591.000	1750.000
GR	600.000	2440.000	610.000	2990.000	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.0	0.150	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

ABOUT 2000 FT D/S OF M-11 BRIDGE (COE FPI STUDY,1972 X-SECTION D)

X1	0.500	39.000	500.000	830.000	2750.000	1600.000	2300.000	0.0	0.0	0.0
GR	607.000	120.000	589.500	160.000	587.800	200.000	590.000	270.000	591.500	350.000
GR	591.100	400.000	588.000	420.000	588.500	450.000	591.500	475.000	590.800	500.000
GR	583.000	520.000	578.000	530.000	577.000	540.000	576.800	560.000	577.000	570.000
GR	576.400	580.000	576.800	630.000	577.800	650.000	578.000	680.000	578.200	700.000
GR	579.000	750.000	579.800	780.000	584.000	782.000	588.000	810.000	594.500	830.000
GR	591.500	850.000	595.200	875.000	593.000	900.000	594.500	1000.000	594.000	1020.000
GR	589.000	1030.000	588.000	1050.000	587.000	1100.000	586.500	1150.000	586.700	1200.000
GR	586.000	1300.000	586.500	1400.000	600.000	2180.000	610.000	2190.000	0.0	0.0
NC	0.0	0.0	0.0	0.300	0.500	0.0	0.0	0.0	0.0	0.0

1 FT D/S OF M-11 BRIDGE (COE FPI STUDY, 1972 X-SECTION 1)

X1	1.000	65.000	370.000	920.000	2600.000	2100.000	1990.000	0.0	0.0	0.0

X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	610.300	610.300	0.0
GR	610.000	100.000	611.000	250.000	612.100	370.000	593.500	370.000	593.400	390.000
GR	593.100	410.000	590.900	415.000	586.800	420.000	587.000	425.000	587.000	430.000
GR	586.900	460.000	587.400	474.000	585.000	495.000	584.500	500.000	580.700	530.000
GR	580.900	545.000	578.900	564.000	579.300	570.000	579.700	575.000	579.700	579.000
GR	579.900	590.600	580.400	618.000	581.800	624.000	580.900	634.000	581.000	645.000
GR	581.000	650.000	580.900	660.000	578.900	708.000	576.000	720.000	575.000	725.000
GR	574.600	738.000	576.300	775.000	575.900	785.000	576.500	795.000	576.000	800.000
GR	574.500	815.000	575.900	820.000	576.300	839.000	581.300	855.000	592.100	864.000
GR	592.000	870.000	592.000	875.000	590.900	885.000	593.900	920.000	612.100	920.000
GR	612.100	950.000	610.300	975.000	611.000	1000.000	610.800	1050.000	610.500	1100.000
GR	610.000	1200.000	609.900	1300.000	608.900	1500.000	608.000	1700.000	606.800	1704.000
GR	605.000	1750.000	597.800	1800.000	596.800	1850.000	593.000	1900.000	591.900	1950.000
GR	591.600	2000.000	589.400	2050.000	590.000	2100.000	590.400	2150.000	605.000	2248.000
NC	0.013	0.013	0.013	0.0	0.0	0.0	0.0	0.0	0.0	0.0

D/S FACE OF M-11 BRIDGE. PIERS WERE INCLUDED IN GR CARDS

X1	1.100	53.600	370.000	920.000	1.000	1.000	1.000	0.0	0.0	0.0
BT	9.000	100.000	610.000	610.000	370.000	612.100	612.100	370.000	612.100	610.300
BT	920.000	612.100	610.300	920.000	612.100	612.100	950.000	612.100	0.0	975.000
BT	610.500	0.0	1000.000	611.000	0.0	1100.000	610.500	0.0	0.0	0.0
GR	610.000	100.000	612.100	370.000	593.500	370.000	593.000	410.000	590.500	415.000
GR	586.500	420.000	610.300	420.000	610.300	425.000	586.500	425.000	587.500	480.000
GR	585.500	495.000	610.300	495.000	610.300	500.000	584.000	500.000	581.000	530.000
GR	581.000	545.000	579.000	565.000	579.500	570.000	610.300	570.000	610.300	575.000
GR	579.800	575.000	580.500	615.000	581.800	625.000	581.000	635.000	581.000	645.000
GR	610.300	645.000	610.300	650.000	581.000	650.000	579.000	705.000	576.000	720.000
GR	610.300	720.000	610.300	725.000	575.500	725.000	575.000	735.000	576.200	795.000
GR	610.300	795.000	610.300	800.000	796.000	800.000	574.600	810.000	576.200	840.000
GR	581.000	855.000	592.000	865.000	592.000	870.000	610.300	870.000	610.300	875.000
GR	592.000	875.000	591.000	890.000	594.000	920.000	612.100	920.000	612.100	950.000
GR	610.500	975.000	611.000	1000.000	610.500	1100.000	0.0	0.0	0.0	0.0

U/S FACE OF M-11 BR.-HIGH WATER MARKS(REF:TECH APPENDIX-COE FPI STUDY)

YEAR	PEAK FLOW AT GRAND RAPIDS GAGE	HIGH WATER ELEV AT BRIDGE
1948	42200	602.70
1947	38600	601.46
1960	31800	600.40
1950	27200	599.00
1933	11500	592.37

X1	1.200	0.0	0.0	0.0	56.000	56.000	56.000	0.0	0.0	0.0
X2	0.0	0.0	0.0	0.0	0.0	0.0	1.000	0.0	0.0	0.0
NC	0.120	0.120	0.035	0.0	0.0	0.0	0.0	0.0	0.0	0.0

X1	1.300	65.000	370.000	920.000	1.000	1.000	1.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	612.100	612.100	0.0
GR	610.000	100.000	611.000	250.000	612.100	370.000	593.500	370.000	593.400	390.000
GR	593.100	410.000	590.900	415.000	586.800	420.000	587.000	425.000	587.000	430.000
GR	586.900	460.000	587.400	474.000	585.000	495.000	584.500	500.000	580.700	530.000
GR	580.900	545.000	578.900	564.000	579.300	570.000	579.700	575.000	579.700	579.000
GR	579.900	590.600	580.400	618.000	581.800	624.000	580.900	634.000	581.000	645.000
GR	581.000	650.000	580.900	660.000	578.900	708.000	576.000	720.000	575.000	725.000
GR	574.600	738.000	576.300	775.000	575.900	785.000	576.500	795.000	576.000	800.000
GR	574.500	815.000	575.900	820.000	576.300	839.000	581.300	855.000	592.100	864.000
GR	592.000	870.000	592.000	875.000	590.900	885.000	593.900	920.000	612.100	920.000
GR	612.100	950.000	610.300	975.000	611.000	1000.000	610.800	1050.000	610.500	1100.000
GR	610.000	1200.000	609.900	1300.000	608.900	1500.000	608.000	1700.000	606.800	1704.000

GR	605.000	1750.000	597.800	1800.000	596.800	1850.000	593.000	1900.000	591.900	1950.000
GR	591.600	2000.000	589.400	2050.000	590.000	2100.000	590.400	2150.000	605.000	2248.000
EJ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

*PROF 1

CCHV= 0.100 CEHV= 0.300
*SECNO 13.000
2096 WSEL NOT GIVEN.AVG OF MAX.MIN USED

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST
13.00	7.66	581.66	581.66	0.0	583.61	1.95	0.0	0.0	596.00
11500.	0.	11500.	0.	0.	1026.	0.	0.	0.	595.50
0.0	0.0	11.21	0.0	0.120	0.040	0.150	0.0	574.00	227.81
0.014891	0.	0.	0.	0	7	0	0.0	262.65	490.46

*SECNO 13.001

3301 HV CHANGED MORE THAN HVINS

13.00	8.42	582.42	0.0	0.0	583.78	1.35	0.11	0.06	596.00
11500.	0.	11500.	0.	0.	1232.	0.	0.	0.	595.50
0.00	0.0	9.33	0.0	0.120	0.040	0.150	0.036	574.00	225.24
0.008452	10.	10.	10.	5	0	0	0.0	271.52	496.76

*SECNO 13.002

13.00	8.79	582.79	0.0	0.0	583.95	1.16	0.15	0.02	596.00
11500.	0.	11500.	0.	0.	1330.	0.	1.	0.	595.50
0.00	0.0	8.65	0.0	0.120	0.040	0.150	0.037	574.00	223.57
0.006693	20.	20.	20.	2	0	0	0.0	275.95	499.51

*SECNO 13.010

13.01	9.46	583.46	0.0	0.0	584.35	0.89	0.38	0.03	596.00
11500.	0.	11500.	0.	0.	1520.	0.	3.	1.	595.50
0.00	0.0	7.57	0.0	0.120	0.040	0.150	0.039	574.00	220.18
0.004472	70.	70.	70.	2	0	0	0.0	284.54	504.72

*SECNO 13.020

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST
13.02	10.02	584.02	0.0	0.0	584.75	0.73	0.38	0.02	596.00
11500.	0.	11500.	0.	0.	1680.	0.	7.	1.	595.50
0.01	0.0	6.85	0.0	0.120	0.040	0.150	0.039	574.00	217.39
0.003269	100.	100.	100.	0	0	0	0.0	288.74	506.13

*SECNO 13.030

13.03	10.41	584.41	0.0	0.0	585.05	0.64	0.29	0.01	596.00
11500.	0.	11500.	0.	0.	1792.	0.	11.	2.	595.50
0.01	0.0	6.42	0.0	0.120	0.040	0.150	0.039	574.00	215.46

0.002671	100.	100.	100.	0	0	0	0.0	291.51	506.97

*SECNO 13.040

13.04	11.42	585.42	0.0	0.0	585.89	0.47	0.82	0.02	596.00
11500.	0.	11500.	0.	0.	2090.	0.	29.	5.	595.50
0.03	0.0	5.50	0.0	0.120	0.040	0.150	0.040	574.00	213.16
0.001635	500.	400.	200.	2	0	0	0.0	296.02	509.18

*SECNO 13.050

13.05	12.07	586.07	0.0	0.0	586.47	0.39	0.57	0.01	596.00
11500.	0.	11500.	0.	0.	2283.	0.	49.	7.	595.50
0.05	0.0	5.04	0.0	0.120	0.040	0.150	0.040	574.00	211.86
0.001235	500.	400.	200.	2	0	0	0.0	298.73	510.59

*SECNO 13.100

13.10	12.80	586.80	0.0	0.0	587.13	0.33	0.66	0.01	596.00
11500.	0.	11500.	0.	0.	2502.	0.	71.	10.	595.50
0.08	0.0	4.60	0.0	0.120	0.063	0.150	0.046	574.00	210.40
0.002290	600.	400.	200.	2	0	0	0.0	301.78	512.17

*SECNO 13.200

3265 DIVIDED FLOW

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	QLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST
13.20	15.08	589.08	0.0	0.0	589.28	0.20	2.14	0.01	596.00
11500.	0.	11490.	10.	0.	3211.	47.	163.	21.	595.50
0.19	0.0	3.58	0.22	0.120	0.063	0.150	0.054	574.00	196.88
0.001093	1700.	1400.	1200.	2	0	0	0.0	409.22	698.72

*SECNO 14.000

3265 DIVIDED FLOW

SECTION 14 OF COE FPI STUDY, OTTAWA COUNTY, 1974

14.00	17.12	590.52	0.0	0.0	590.65	0.13	1.36	0.01	593.00
11500.	17.	11462.	21.	63.	3987.	142.	317.	43.	591.00
0.36	0.27	2.87	0.15	0.120	0.063	0.150	0.057	573.40	125.64
0.000555	1900.	1800.	1600.	2	0	0	0.0	691.38	1230.23

*SECNO 14.100

3265 DIVIDED FLOW

14.10	17.45	590.85	0.0	0.0	590.97	0.12	0.32	0.00	593.00
11500.	17.	11446.	37.	91.	4098.	237.	415.	59.	591.00
0.46	0.19	2.79	0.16	0.120	0.040	0.120	0.054	573.40	120.38
0.000207	1000.	1000.	900.	2	0	0	0.0	728.24	1233.51

*SECNO 14.200

3265 DIVIDED FLOW

14.20	17.64	591.04	0.0	0.0	591.15	0.12	0.18	0.00	593.00

11500.	22.	11428.	51.	109.	4161.	293.	508.	74.	591.00
0.55	0.20	2.75	0.17	0.120	0.040	0.120	0.052	573.40	117.41
0.000197	1000.	900.	850.	2	0	0	0.0	753.19	1235.37

*SECNO 14.300

3265 DIVIDED FLOW

14.30	18.01	591.41	0.0	0.0	591.52	0.11	0.36	0.00	593.00
11500.	36.	11369.	95.	149.	4287.	421.	686.	99.	591.00
0.73	0.24	2.65	0.23	0.120	0.046	0.120	0.051	573.40	111.45
0.000234	2200.	1700.	800.	2	0	0	0.0	823.74	1239.09

*SECNO .0

3265 DIVIDED FLOW

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	QLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

AT OTTAWA COUNTY- KENT COUNTY LINE (COE FPI STUDY,1972 X-SECTION C)

0.0	16.56	591.66	0.0	0.0	591.79	0.13	0.27	0.01	589.30
11500.	1330.	9896.	274.	2539.	3190.	833.	842.	136.	592.20
0.84	0.52	3.10	0.33	0.120	0.040	0.120	0.050	575.10	-20.20
0.000282	1800.	1200.	1000.	1	0	0	0.0	1609.29	1801.55

*SECNO .500

3265 DIVIDED FLOW

ABOUT 2000 FT D/S OF M-11 BRIDGE (COE FPI STUDY,1972 X-SECTION D)

0.50	15.79	592.19	0.0	0.0	592.28	0.09	0.48	0.00	590.80
11500.	244.	10213.	1043.	791.	4055.	2985.	1208.	211.	594.50
1.12	0.31	2.52	0.35	0.120	0.040	0.150	0.048	576.40	153.86
0.000162	2750.	2300.	1600.	2	0	0	0.0	1383.30	1728.65

CCHV= 0.300 CEHV= 0.500

*SECNO 1.000

3265 DIVIDED FLOW

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA= 610.30 ELREA= 610.30

1 FT D/S OF M-11 BRIDGE (COE FPI STUDY, 1972 X-SECTION 1)

1.00	18.01	592.51	0.0	0.0	592.57	0.07	0.29	0.01	612.10
11500.	0.	11500.	0.	0.	5464.	0.	1521.	257.	612.10
1.38	0.0	2.10	0.0	0.120	0.040	0.150	0.047	574.50	411.35
0.000133	2600.	1990.	2100.	2	0	0	0.0	492.38	920.00

*SECNO 1.100

3265 DIVIDED FLOW

3370 NORMAL BRIDGE,NRD= 9 MIN ELTRD= 610.00 MAX ELLC= 612.10

D/S FACE OF M-11 BRIDGE. PIERS WERE INCLUDED IN GR CARDS

1.10	17.90	592.50	0.0	0.0	592.58	0.08	0.00	0.01	612.10
11500.	0.	11500.	0.	0.	4958.	0.	1521.	257.	612.10
1.38	0.0	2.32	0.0	0.013	0.013	0.013	0.047	574.60	410.99
0.000025	1.	1.	1.	0	0	0	0.0	449.88	905.06

*SECNO 1.200

3265 DIVIDED FLOW

3370 NORMAL BRIDGE,NRD= 9 MIN ELTRD= 610.00 MAX ELLC= 612.10

U/S FACE OF M-11 BR.-HIGH WATER MARKS(REF:TECH APPENDIX-COE FPI STUDY)

YEAR	PEAK FLOW AT GRAND RAPIDS GAGE	HIGH WATER ELEV AT BRIDGE
1948	42200	602.70
1947	38600	601.46
1960	31800	600.40
1950	27200	599.00
1933	11500	592.37

1.20	17.90	592.50	0.0	0.0	592.58	0.08	0.00	0.00	612.10
11500.	0.	11500.	0.	0.	4956.	0.	1528.	258.	612.10
1.39	0.0	2.32	0.0	0.013	0.013	0.013	0.046	574.60	410.99
0.000025	56.	56.	56.	0	0	0	0.0	449.84	905.02

*SECNO 1.300

3265 DIVIDED FLOW

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA= 612.10 ELREA= 612.10

1.30	18.02	592.52	0.0	0.0	592.59	0.07	0.00	0.00	612.10
11500.	0.	11500.	0.	0.	5466.	0.	1528.	258.	612.10
1.39	0.0	2.10	0.0	0.120	0.035	0.120	0.046	574.50	411.34
0.000102	1.	1.	1.	1	0	0	0.0	492.43	920.00

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  HEC2 RELEASE DATED NOV 76 UPDATED  AUG1977
  ERROR CORR -  01,02
  MODIFICATION -  50,51,52,53
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T1      GRAND RIVER, KENT COUNTY, MICHIGAN. JOB NO. HUDI 62-0104-007
T2      INITIAL WATER SURFACE ANALYSIS BY CONVERGENT METHOD.
T3      GRANDVILLE AND WALKER TOWNSHIP

J1  ICHECK     INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ
      -10.       3.        0.        0. -1.000000      0.0       0.0       0.        0.0       0.0
J2  NPROF      IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE
     2.000      0.0       =1.000    0.0       0.0       0.0       0.0       0.0       0.0       0.0

*PROF 2

CCHV=    0.100 CEHV=    0.300
*SECNO 13.000
2096 WSEL NOT GIVEN,AVG OF MAX,MIN USED
   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        QLOSS     BANK ELEV
   Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA    LEFT/RIGHT
   TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN       SSTA
   SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID      ENDST

3720 CRITICAL DEPTH ASSUMED

          SECTION 13 OF COE FPI STUDY,OTTAWA COUNTY, 1974

    13.00     10.67    584.67    584.67       0.0    587.96      3.29       0.0       0.0     596.00
    27200.        0.    27200.        0.        0.    1869.        0.        0.        0.     595.50
      0.0       0.0     14.56       0.0     0.120    0.040     0.150       0.0    574.00     214.66
 0.013078        0.        0.        0.         0        18         0       0.0    292.89     507.54

*SECNO 13.001

3301 HV CHANGED MORE THAN HVINS

    13.00     11.74    585.74    584.70       0.0    588.15      2.41      0.10      0.09     596.00
    27200.        0.    27200.        0.        0.    2183.        0.        0.        0.     595.50
      0.00      0.0     12.46       0.0     0.120    0.040     0.150     0.036    574.00     212.53
 0.007963       10.       10.       10.        17         5         0       0.0    297.33     509.86

*SECNO 13.002
    13.00     12.18    586.18       0.0       0.0    588.32      2.14      0.14      0.03     596.00
    27200.        0.    27200.        0.        0.    2317.        0.        1.        0.     595.50
      0.00      0.0     11.74       0.0     0.120    0.040     0.150     0.037    574.00     211.63
 0.006587       20.       20.       20.         2         0         0       0.0    299.21     510.84

*SECNO 13.010
    13.01     13.00    587.00       0.0       0.0    588.75      1.75      0.39      0.04     596.00
    27200.        0.    27200.        0.        0.    2565.        0.        5.        1.     595.50
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0.00	0.0	10.61	0.0	0.120	0.040	0.150	0.039	574.00	209.96
0.004779	70.	70.	70.	2	0	0	0.0	302.66	512.62

*SECNO 13.020

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	QLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST
13.02	13.71	587.71	0.0	0.0	589.20	1.49	0.42	0.03	596.00
27200.	0.	27200.	0.	0.	2779.	0.	12.	1.	595.50
0.01	0.0	9.79	0.0	0.120	0.040	0.150	0.039	574.00	206.45
0.003740	100.	100.	100.	2	0	0	0.0	307.70	514.15

*SECNO 13.030

3265 DIVIDED FLOW

13.03	14.23	588.23	0.0	0.0	589.56	1.33	0.34	0.02	596.00
27200.	0.	27200.	0.	0.	2939.	2.	18.	2.	595.50
0.01	0.0	9.26	0.13	0.120	0.040	0.150	0.039	574.00	203.31
0.003170	100.	100.	100.	2	0	0	0.0	330.52	660.15

*SECNO 13.040

3265 DIVIDED FLOW

13.04	15.62	589.62	0.0	0.0	590.61	1.00	1.02	0.03	596.00
27200.	0.	27157.	43.	0.	3385.	103.	47.	5.	595.50
0.02	0.0	8.02	0.42	0.120	0.040	0.150	0.040	574.00	192.88
0.002114	500.	400.	200.	2	0	0	0.0	452.14	722.71

*SECNO 13.050

3265 DIVIDED FLOW

13.05	16.54	590.54	0.0	0.0	591.37	0.83	0.74	0.02	596.00
27200.	0.	27069.	131.	0.	3694.	237.	81.	9.	595.50
0.04	0.0	7.33	0.55	0.120	0.040	0.150	0.040	574.00	189.10
0.001633	500.	400.	200.	2	0	0	0.0	494.31	743.85

*SECNO 13.100

3265 DIVIDED FLOW

13.10	17.58	591.58	0.0	0.0	592.25	0.67	0.86	0.02	596.00
27200.	0.	26787.	413.	0.	4050.	404.	118.	13.	595.50
0.05	0.0	6.61	1.02	0.120	0.063	0.150	0.046	574.00	187.37
0.003008	600.	400.	200.	2	0	0	0.0	512.24	751.27

*SECNO 13.200

3265 DIVIDED FLOW

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	QLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST
13.20	20.65	594.65	0.0	0.0	595.03	0.38	2.76	0.03	596.00

27200.	0.	26103.	1097.	0.	5147.	1017.	285.	31.	595.50
0.13	0.0	5.07	1.08	0.120	0.063	0.150	0.054	574.00	182.25
0.001399	1700.	1400.	1200.	2	0	0	0.0	661.29	869.24

*SECNO 14.000

SECTION 14 OF COE FPI STUDY, OTTAWA COUNTY, 1974

14.00	23.08	596.48	0.0	0.0	596.69	0.21	1.64	0.02	593.00
27200.	1080.	23817.	2303.	1148.	6055.	3026.	616.	69.	591.00
0.27	0.94	3.93	0.76	0.120	0.063	0.150	0.058	573.40	12.10
0.000648	1900.	1800.	1600.	3	0	0	0.0	1277.71	1289.81

*SECNO 14.100

14.10	23.46	596.86	0.0	0.0	597.08	0.22	0.38	0.00	593.00
27200.	763.	24407.	2030.	1247.	6188.	3277.	849.	97.	591.00
0.35	0.61	3.94	0.62	0.120	0.040	0.120	0.055	573.40	3.32
0.000255	1000.	1000.	900.	2	0	0	0.0	1290.26	1293.58

*SECNO 14.200

14.20	23.69	597.09	0.0	0.0	597.30	0.21	0.22	0.00	593.00
27200.	797.	24285.	2118.	1310.	6272.	3434.	1073.	123.	591.00
0.42	0.61	3.87	0.62	0.120	0.040	0.120	0.053	573.40	-4.00
0.000242	1000.	900.	850.	2	0	0	0.0	1299.92	1295.92

*SECNO 14.300

14.30	24.15	597.54	0.0	0.0	597.73	0.18	0.42	0.00	593.00
27200.	978.	23640.	2582.	1439.	6432.	3739.	1456.	164.	591.00
0.56	0.68	3.68	0.69	0.120	0.046	0.120	0.052	573.40	-23.62
0.000278	2200.	1700.	800.	2	0	0	0.0	1324.08	1300.45

*SECNO .0

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

AT OTTAWA COUNTY- KENT COUNTY LINE (COE FPI STUDY,1972 X-SECTION C)

0.0	22.77	597.87	0.0	0.0	597.99	0.12	0.25	0.01	589.30
27200.	6397.	17012.	3791.	9196.	4987.	6540.	1924.	226.	592.20
0.69	0.70	3.41	0.58	0.120	0.040	0.120	0.050	575.10	-526.47
0.000193	1800.	1000.	1000.	0	0	0	0.0	2803.50	2277.03

*SECNO .500

ABOUT 2000 FT D/S OF M-11 BRIDGE (COE FPI STUDY,1972 X-SECTION D)

0.50	21.88	598.27	0.0	0.0	598.41	0.13	0.41	0.00	590.80
27200.	1971.	20318.	4911.	2940.	6055.	9228.	2889.	341.	594.50
0.93	0.67	3.36	0.53	0.120	0.040	0.150	0.048	576.40	139.94
0.000173	2750.	2300.	1600.	2	0	0	0.0	1940.37	2080.31

CCHV= 0.300 CEHV= 0.500

*SECNO 1.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA= 610.30 ELREA= 610.30

1 FT D/S OF M-11 BRIDGE (COE FPI STUDY, 1972 X-SECTION 1)

1.00	24.12	598.62	0.0	0.0	598.77	0.15	0.36	0.01	612.10
27200.	0.	27200.	0.	0.	8784.	0.	3538.	402.	612.10
1.11	0.0	3.10	0.0	0.120	0.040	0.150	0.047	574.50	370.00
0.000181	2600.	1990.	2100.	2	0	0	0.0	550.00	920.00

*SECNO 1.100

3265 DIVIDED FLOW

3370 NORMAL BRIDGE,NRD= 9 MIN ELTRD= 610.00 MAX ELLC= 612.10

D/S FACE OF M-11 BRIDGE. PIERS WERE INCLUDED IN GR CARDS

1.10	24.01	598.61	0.0	0.0	598.79	0.18	0.00	0.02	612.10
27200.	0.	27200.	0.	0.	8008.	0.	3538.	402.	612.10
1.11	0.0	3.40	0.0	0.013	0.013	0.013	0.047	574.60	370.00
0.000038	1.	.1.	1.	1	0	0	0.0	506.08	920.00

*SECNO 1.200

3265 DIVIDED FLOW

3370 NORMAL BRIDGE,NRD= 9 MIN ELTRD= 610.00 MAX ELLC= 612.10

U/S FACE OF M-11 BR.-HIGH WATER MARKS(REF:TECH APPENDIX-COE FPI STUDY)

YEAR	PEAK FLOW AT GRAND RAPIDS GAGE	HIGH WATER ELEV AT BRIDGE
1948	42200	602.70
1947	38600	601.46
1960	31800	600.40
1950	27200	599.00
1933	11500	592.37

1.20	24.01	598.61	0.0	0.0	598.79	0.18	0.00	0.00	612.10
27200.	0.	27200.	0.	0.	8008.	0.	3548.	402.	612.10
1.11	0.0	3.40	0.0	0.013	0.013	0.013	0.047	574.60	370.00
0.000038	56.	56.	56.	0	0	0	0.0	506.08	920.00

*SECNO 1.300

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE.ELLEA= 612.10 ELREA= 612.10

1.30	24.15	598.65	0.0	0.0	598.80	0.15	0.00	0.01	612.10
27200.	0.	27200.	0.	0.	8799.	0.	3548.	402.	612.10
1.11	0.0	3.09	0.0	0.120	0.035	0.120	0.047	574.50	370.00
0.000138	1.	1.	1.	2	0	0	0.0	550.00	920.00

00BREAK00

1) COUNTY: KENT

2) STUDY NAME: GRANDVILLE / WALKER TWP

3) WATERCOURSE: GRAND RIVER

4) DOCUMENT TYPE: CONVERGENCE RUNS

00BREAK00

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**************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED  AUG1977
  ERROR CORR -  01,02
  MODIFICATION -  50,51,52,53
**************************************************

T1      CHECK FOR CONVERGENCE
T2
T3      DISCHARGE 11500 STARTING ELEVATION 583.7

J1  ICHECK     INQ        NINV       IDIR       STRT       METRIC     HVINS      Q          WSEL       FQ
      -10.       2.         0.         0.  0.0             0.0        0.0        0.      583.700     0.0
J2  NPROF      IPLOT      PRFVS      XSECV      XSECH      FN         ALLDC      IBW        CHNIM      ITRACE
      6.000      0.0       -1.000      0.0        0.0        0.0        0.0        0.0        0.0        0.0
*PROF 6

CCHV=   0.100 CEHV=   0.300
*SECNO 13.000
    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS    BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA   LEFT/RIGHT
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST

          SECTION 13 OF COE FPI STUDY,OTTAWA COUNTY, 1974

      13.00       9.70     583.70       0.0     583.70     584.51       0.81       0.0        0.0     596.00
      11500.        0.     11500.        0.        0.       1587.         0.         0.         0.      595.50
        0.0         0.0      7.24        0.0       0.120      0.040      0.150      0.0      574.00     219.00
    0.003904        0.       0.          0.        0          0          0          0.0      286.43     505.43

*SECNO 13.001
      13.00       9.75     583.75       0.0       0.0      584.55       0.80       0.04       0.00    596.00
      11500.        0.     11500.        0.        0.       1600.         0.         0.         0.      595.50
        0.00        0.0      7.19        0.0       0.120      0.040      0.150      0.036    574.00     218.78
    0.003807       10.      10.          10.       1          0          0          0.0      286.75     505.53

*SECNO 13.002
      13.00       9.86     583.86       0.0       0.0      584.63       0.77       0.07       0.00    596.00
      11500.        0.     11500.        0.        0.       1634.         0.         1.         0.      595.50
        0.00        0.0      7.04        0.0       0.120      0.040      0.150      0.037    574.00     218.19
    0.003566       20.      20.          20.       2          0          0          0.0      287.60     505.79

*SECNO 13.010
      13.01      10.18     584.18       0.0       0.0      584.87       0.69       0.23       0.01    596.00
      11500.        0.     11500.        0.        0.       1725.         0.         4.         1.      595.50
        0.00        0.0      6.67        0.0       0.120      0.040      0.150      0.039    574.00     216.61
    0.003007       70.      70.          70.       2          0          0          0.0      289.87     506.47

*SECNO 13.020
    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS    BANK ELEV
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Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST
13.02	10.54	584.54	0.0	0.0	585.15	0.61	0.27	0.01	596.00
11500.	0.	11500.	0.	0.	1829.	0.	8.	1.	595.50
0.01	0.0	6.29	0.0	0.120	0.040	0.150	0.039	574.00	214.93
0.002504	100.	100.	100.	2	0	0	0.0	292.32	507.25

*SECNO 13.030

13.03	10.83	584.83	0.0	0.0	585.39	0.56	0.23	0.01	596.00
11500.	0.	11500.	0.	0.	1912.	0.	12.	2.	595.50
0.01	0.0	6.01	0.0	0.120	0.040	0.150	0.039	574.00	214.36
0.002173	100.	100.	100.	1	0	0	0.0	293.50	507.86

*SECNO 13.040

13.04	11.67	585.67	0.0	0.0	586.11	0.44	0.71	0.01	596.00
11500.	0.	11500.	0.	0.	2165.	0.	31.	5.	595.50
0.03	0.0	5.31	0.0	0.120	0.040	0.150	0.040	574.00	212.65
0.001462	500.	400.	200.	1	0	0	0.0	297.08	509.73

*SECNO 13.050

13.05	12.25	586.25	0.0	0.0	586.63	0.38	0.52	0.01	596.00
11500.	0.	11500.	0.	0.	2337.	0.	52.	7.	595.50
0.06	0.0	4.92	0.0	0.120	0.040	0.150	0.040	574.00	211.50
0.001146	500.	400.	200.	2	0	0	0.0	299.48	510.98

*SECNO 13.100

13.10	12.93	586.93	0.0	0.0	587.25	0.32	0.62	0.01	596.00
11500.	0.	11500.	0.	0.	2542.	0.	74.	10.	595.50
0.08	0.0	4.52	0.0	0.120	0.063	0.150	0.046	574.00	210.14
0.002179	600.	400.	200.	2	0	0	0.0	302.32	512.46

*SECNO 13.200

3265 DIVIDED FLOW

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST
13.20	15.14	589.14	0.0	0.0	589.34	0.20	2.08	0.01	596.00
11500.	0.	11488.	12.	0.	3230.	52.	167.	22.	595.50
0.19	0.0	3.56	0.23	0.120	0.063	0.150	0.054	574.00	196.44
0.001074	1700.	1400.	1200.	2	0	0	0.0	413.84	701.35

*SECNO 14.000

3265 DIVIDED FLOW

SECTION 14 OF COE FPI STUDY, OTTAWA COUNTY, 1974

14.00	17.16	590.56	0.0	0.0	590.69	0.13	1.34	0.01	593.00
11500.	18.	11458.	24.	66.	4001.	153.	322.	44.	591.00
0.37	0.27	2.86	0.16	0.120	0.063	0.150	0.057	573.40	125.00
0.000550	1900.	1800.	1600.	2	0	0	0.0	695.82	1230.62

*SECNO 14.100

3265 DIVIDED FLOW

14.10	17.49	590.89	0.0	0.0	591.01	0.12	0.32	0.00	593.00
11500.	18.	11442.	40.	94.	4110.	247.	421.	59.	591.00
0.47	0.19	2.78	0.16	0.120	0.040	0.120	0.054	573.40	119.82
0.000205	1000.	1000.	900.	2	0	0	0.0	732.16	1233.86

*SECNO 14.200

3265 DIVIDED FLOW

14.20	17.67	591.07	0.0	0.0	591.19	0.12	0.18	0.00	593.00
11500.	22.	11424.	53.	112.	4172.	304.	514.	75.	591.00
0.56	0.20	2.74	0.18	0.120	0.040	0.120	0.052	573.40	116.88
0.000195	1000.	900.	850.	2	0	0	0.0	760.66	1235.70

*SECNO 14.300

3265 DIVIDED FLOW

14.30	18.04	591.44	0.0	0.0	591.55	0.11	0.36	0.00	593.00
11500.	37.	11365.	98.	153.	4297.	432.	693.	100.	591.00
0.74	0.24	2.64	0.23	0.120	0.046	0.120	0.051	573.40	110.96
0.000232	2200.	1700.	800.	2	0	0	0.0	828.67	1239.40

*SECNO .0

3265 DIVIDED FLOW

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

AT OTTAWA COUNTY- KENT COUNTY LINE (COE FPI STUDY,1972 X-SECTION C)

0.0	16.59	591.69	0.0	0.0	591.82	0.13	0.27	0.01	589.30
11500.	1340.	9881.	279.	2562.	3198.	847.	850.	137.	592.20
0.84	0.52	3.09	0.33	0.120	0.040	0.120	0.050	575.10	-22.47
0.000280	1800.	1000.	1000.	1	0	0	0.0	1616.59	1803.68

*SECNO .500

3265 DIVIDED FLOW

ABOUT 2000 FT D/S OF M-11 BRIDGE (COE FPI STUDY,1972 X-SECTION D)

0.50	15.81	592.21	0.0	0.0	592.30	0.09	0.48	0.00	590.80
11500.	246.	10206.	1048.	799.	4062.	3002.	1218.	212.	594.50
1.13	0.31	2.51	0.35	0.120	0.040	0.150	0.048	576.40	153.80
0.000160	2750.	2300.	1600.	2	0	0	0.0	1385.10	1729.98

CCHV= 0.300 CEHV= 0.500
*SECNO 1.000

3265 DIVIDED FLOW

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA= 610.30 ELREA= 610.30

1 FT D/S OF M-11 BRIDGE (COE FPI STUDY, 1972 X-SECTION 1)

1.00	18.03	592.53	0.0	0.0	592.60	0.07	0.29	0.01	612.10
11500.	0.	11500.	0.	0.	5475.	0.	1532.	258.	612.10
1.39	0.0	2.10	0.0	0.120	0.040	0.150	0.047	574.50	411.30
0.000132	2600.	1990.	2100.	2	0	0	0.0	492.67	920.00

*SECNO 1.100

3265 DIVIDED FLOW

3370 NORMAL BRIDGE,NRD= 9 MIN ELTRD= 610.00 MAX ELLC= 612.10

D/S FACE OF M-11 BRIDGE. PIERS WERE INCLUDED IN GR CARDS

1.10	17.92	592.52	0.0	0.0	592.60	0.08	0.00	0.01	612.10
11500.	0.	11500.	0.	0.	4967.	0.	1533.	258.	612.10
1.39	0.0	2.32	0.0	0.013	0.013	0.013	0.047	574.60	410.95
0.000025	1.	1.	1.	0	0	0	0.0	450.13	905.27

*SECNO 1.200

3265 DIVIDED FLOW

3370 NORMAL BRIDGE,NRD= 9 MIN ELTRD= 610.00 MAX ELLC= 612.10

U/S FACE OF M-11 BR.-HIGH WATER MARKS(REF:TECH APPENDIX-COE FPI STUDY)

YEAR	PEAK FLOW AT GRAND RAPIDS GAGE	HIGH WATER ELEV AT BRIDGE
1948	42200	602.70
1947	38600	601.46
1960	31800	600.40
1950	27200	599.00
1933	11500	592.37

1.20	17.92	592.52	0.0	0.0	592.60	0.08	0.00	0.00	612.10
11500.	0.	11500.	0.	0.	4966.	0.	1539.	259.	612.10
1.40	0.0	2.32	0.0	0.013	0.013	0.013	0.046	574.60	410.95
0.000025	56.	56.	56.	0	0	0	0.0	450.09	905.24

*SECNO 1.300

3265 DIVIDED FLOW

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
T	E	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA

SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST
3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA= 612.10 ELREA= 612.10									
1.30	18.04	592.54	0.0	0.0	592.61	0.07	0.00	0.00	612.10
11500.	0.	11500.	0.	0.	5477.	0.	1539.	259.	612.10
1.40	0.0	2.10	0.0	0.120	0.035	0.120	0.046	574.50	411.30
0.000101	1.	1.	1.	1	0	0	0.0	492.72	920.00

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*****************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED  AUG1977
  ERROR CORR -  01,02
  MODIFICATION -  50,51,52,53
*****************************************************

T1       CHECK FOR CONVERGENCE
T2
T3       DISCHARGE 11500 STARTING ELEVATION 585.7

J1  ICHECK     INQ        NINV       IDIR       STRT       METRIC     HVINS      Q          WSEL       FQ

     -10.        2.         0.         0.   0.0            0.0        0.0        0.    585.700      0.0

J2  NPROF      IPLOT      PRFVS      XSECV      XSECH      FN         ALLDC      IBW        CHNIM      ITRACE

     7.000      0.0       -1.000      0.0        0.0        0.0        0.0        0.0        0.0        0.0

*PROF 7

CCHV=   0.100 CEHV=   0.300
*SECNO 13.000
   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS    BANK ELEV
   Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA    LEFT/RIGHT
   TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN       SSTA
   SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID      ENDST

          SECTION 13 OF COE FPI STUDY,OTTAWA COUNTY, 1974

    13.00     11.70    585.70      0.0     585.70    586.14      0.44      0.0       0.0     596.00
   11500.        0.    11500.        0.        0.     2172.        0.        0.        0.     595.50
      0.0       0.0      5.29      0.0     0.120     0.040     0.150      0.0     574.00     212.60
 0.001446        0.        0.        0.         0         0         0      0.0     297.18     509.78

*SECNO 13.001
    13.00     11.72    585.72      0.0       0.0    586.15      0.43      0.01      0.00     596.00
   11500.        0.    11500.        0.        0.     2177.        0.        0.        0.     595.50
      0.00      0.0      5.28      0.0     0.120     0.040     0.150     0.036    574.00     212.57
 0.001437       10.       10.       10.         0         0         0      0.0     297.24     509.81

*SECNO 13.002
    13.00     11.75    585.75      0.0       0.0    586.18      0.43      0.03      0.00     596.00
   11500.        0.    11500.        0.        0.     2186.        0.        2.        0.     595.50
      0.00      0.0      5.26      0.0     0.120     0.040     0.150     0.037    574.00     212.51
 0.001418       20.       20.       20.         0         0         0      0.0     297.37     509.88

*SECNO 13.010
    13.01     11.86    585.86      0.0       0.0    586.28      0.42      0.10      0.00     596.00
   11500.        0.    11500.        0.        0.     2218.        0.        5.        1.     595.50
      0.01      0.0      5.18      0.0     0.120     0.040     0.150     0.039    574.00     212.29
 0.001353       70.       70.       70.         1         0         0      0.0     297.82     510.11

*SECNO 13.020
   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS    BANK ELEV
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Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST
13.02	12.01	586.01	0.0	0.0	586.41	0.40	0.13	0.00	596.00
11500.	0.	11500.	0.	0.	2262.	0.	10.	1.	595.50
0.01	0.0	5.08	0.0	0.120	0.040	0.150	0.039	574.00	212.00
0.001271	100.	100.	100.	1	0	0	0.0	298.44	510.44
*SECNO 13.030									
13.03	12.15	586.15	0.0	0.0	586.53	0.39	0.12	0.00	596.00
11500.	0.	11500.	0.	0.	2303.	0.	15.	2.	595.50
0.02	0.0	4.99	0.0	0.120	0.040	0.150	0.039	574.00	211.72
0.001201	100.	100.	100.	0	0	0	0.0	299.01	510.74
*SECNO 13.040									
13.04	12.63	586.63	0.0	0.0	586.97	0.34	0.43	0.00	596.00
11500.	0.	11500.	0.	0.	2451.	0.	37.	5.	595.50
0.04	0.0	4.69	0.0	0.120	0.040	0.150	0.040	574.00	210.74
0.000986	500.	400.	200.	2	0	0	0.0	301.07	511.80
*SECNO 13.050									
13.05	13.03	587.03	0.0	0.0	587.34	0.31	0.36	0.00	596.00
11500.	0.	11500.	0.	0.	2572.	0.	60.	8.	595.50
0.06	0.0	4.47	0.0	0.120	0.040	0.150	0.040	574.00	209.85
0.000847	500.	400.	200.	0	0	0	0.0	302.83	512.68
*SECNO 13.100									
13.10	13.54	587.54	0.0	0.0	587.82	0.28	0.47	0.00	596.00
11500.	0.	11500.	0.	0.	2727.	0.	85.	10.	595.50
0.09	0.0	4.22	0.0	0.120	0.063	0.150	0.046	574.00	207.30
0.001757	600.	400.	200.	2	0	0	0.0	306.48	513.78
*SECNO 13.200									

3265 DIVIDED FLOW

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST
13.20	15.44	589.44	0.0	0.0	589.63	0.18	1.80	0.01	596.00
11500.	0.	11478.	22.	0.	3328.	82.	183.	22.	595.50
0.20	0.0	3.45	0.26	0.120	0.063	0.150	0.054	574.00	194.20
0.000982	1700.	1400.	1200.	2	0	0	0.0	437.53	714.82

*SECNO 14.000

3265 DIVIDED FLOW

SECTION 14 OF COE FPI STUDY, OTTAWA COUNTY, 1974

14.00	17.37	590.77	0.0	0.0	590.89	0.12	1.26	0.01	593.00
11500.	24.	11436.	39.	83.	4069.	211.	343.	45.	591.00
0.38	0.29	2.81	0.19	0.120	0.063	0.150	0.058	573.40	121.75
0.000522	1900.	1800.	1600.	2	0	0	0.0	718.65	1232.66

*SECNO 14.100

3265 DIVIDED FLOW

14.10	17.67	591.07	0.0	0.0	591.19	0.12	0.30	0.00	593.00
11500.	23.	11424.	54.	113.	4173.	305.	445.	61.	591.00
0.48	0.20	2.74	0.18	0.120	0.040	0.120	0.054	573.40	116.83
0.000195	1000.	1000.	900.	2	0	0	0.0	761.43	1235.73

*SECNO 14.200

3265 DIVIDED FLOW

14.20	17.85	591.25	0.0	0.0	591.36	0.11	0.17	0.00	593.00
11500.	27.	11405.	68.	131.	4232.	364.	541.	77.	591.00
0.58	0.21	2.69	0.19	0.120	0.040	0.120	0.052	573.40	114.03
0.000186	1000.	900.	850.	2	0	0	0.0	797.74	1237.48

*SECNO 14.300

3265 DIVIDED FLOW

14.30	18.20	591.60	0.0	0.0	591.70	0.10	0.34	0.00	593.00
11500.	43.	11341.	117.	172.	4352.	493.	724.	103.	591.00
0.76	0.25	2.61	0.24	0.120	0.046	0.120	0.051	573.40	108.39
0.000222	2200.	1700.	800.	2	0	0	0.0	846.03	1241.00

*SECNO .0

3265 DIVIDED FLOW

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

AT OTTAWA COUNTY- KENT COUNTY LINE (COE FPI STUDY,1972 X-SECTION C)

0.0	16.74	591.84	0.0	0.0	591.96	0.12	0.25	0.01	589.30
11500.	1390.	9803.	307.	2687.	3241.	925.	887.	141.	592.20
0.87	0.52	3.02	0.33	0.120	0.040	0.120	0.050	575.10	-34.73
0.000265	1800.	1000.	1000.	1	0	0	0.0	1655.98	1815.19

*SECNO .500

3265 DIVIDED FLOW

ABOUT 2000 FT D/S OF M-11 BRIDGE (COE FPI STUDY,1972 X-SECTION D)

0.50	15.94	592.34	0.0	0.0	592.42	0.08	0.45	0.00	590.80
11500.	261.	10167.	1072.	843.	4103.	3093.	1266.	217.	594.50
1.16	0.31	2.48	0.35	0.120	0.040	0.150	0.048	576.40	153.51
0.000154	2750.	2300.	1600.	2	0	0	0.0	1395.04	1737.29

CCHV= 0.300 CEHV= 0.500

*SECNO 1.000

3265 DIVIDED FLOW

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA= 610.30 ELREA= 610.30

1 FT D/S CF M-11 BRIDGE (COE FPI STUDY, 1972 X-SECTION 1)

1.00	18.14	592.64	0.0	0.0	592.71	0.07	0.28	0.01	612.10
11500.	0.	11500.	0.	0.	5532.	0.	1586.	264.	612.10
1.42	0.0	2.08	0.0	0.120	0.040	0.150	0.047	574.50	411.04
0.000128	2600.	1990.	2100.	2	0	0	0.0	494.28	920.00

*SECNO 1.100

3265 DIVIDED FLOW

3370 NORMAL BRIDGE,NRD= 9 MIN ELTRD= 610.00 MAX ELLC= 612.10

D/S FACE OF M-11 BRIDGE. PIERS WERE INCLUDED IN GR CARDS

1.10	18.03	592.63	0.0	0.0	592.72	0.08	0.00	0.01	612.10
11500.	0.	11500.	0.	0.	5019.	0.	1586.	264.	612.10
1.42	0.0	2.29	0.0	0.013	0.013	0.013	0.047	574.60	410.72
0.000024	1.	1.	1.	0	0	0	0.0	451.51	906.42

*SECNO 1.200

3265 DIVIDED FLOW

3370 NORMAL BRIDGE,NRD= 9 MIN ELTRD= 610.00 MAX ELLC= 612.10

U/S FACE OF M-11 BR.-HIGH WATER MARKS(REF:TECH APPENDIX-COE FPI STUDY)

YEAR	PEAK FLOW AT GRAND RAPIDS GAGE	HIGH WATER ELEV AT BRIDGE
1948	42200	602.70
1947	38600	601.46
1960	31800	600.40
1950	27200	599.00
1933	11500	592.37

1.20	18.04	592.64	0.0	0.0	592.72	0.08	0.00	0.00	612.10
11500.	0.	11500.	0.	0.	5018.	0.	1592.	264.	612.10
1.43	0.0	2.29	0.0	0.013	0.013	0.013	0.046	574.60	410.72
0.000024	56.	56.	56.	0	0	0	0.0	451.48	906.38

*SECNO 1.300

3265 DIVIDED FLOW

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA

SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST
3495 OVERBANK AREA ASSUMED NON-EFFECTIVE.ELLEA= 612.10 ELREA= 612.10									
1.30	18.15	592.65	0.0	0.0	592.72	0.07	0.00	0.00	612.10
11500.	0.	11500.	0.	0.	5533.	0.	1593.	264.	612.10
1.43	0.0	2.08	0.0	0.120	0.035	0.120	0.046	574.50	411.04
0.000098	1.	1.	1.	1	0	0	0.0	494.32	920.00

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*************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED  AUG1977
  ERROR CORR -  01,02
  MODIFICATION -  50,51,52,53
*************************************************

T1       CHECK FOR CONVERGENCE
T2
T3       DISCHARGE 42200 STARTING ELEV  589

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ
     -10.       6.        0.        0.  0.0           0.0       0.0       0.    589.000     0.0

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE
     8.000     0.0      -1.000     0.0       0.0       0.0       0.0       0.0       0.0       0.0

*PROF 8

CCHV=   0.100 CEHV=   0.300
*SECNO 13.000

3265 DIVIDED FLOW

   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS   BANK ELEV
   Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA   LEFT/RIGHT
   TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN      SSTA
   SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID     ENDST

        SECTION 13 OF COE FP1 STUDY,OTTAWA COUNTY, 1974

    13.00     15.00    589.00      0.0    589.00    591.72      2.72      0.0       0.0     596.00
   42200.        0.    42181.      19.        0.     3185.       40.        0.        0.     595.50
     0.0       0.0     13.24      0.49     0.120     0.040     0.150      0.0    574.00     197.50
 0.006087        0.        0.        0.         0         0         0      0.0    402.67     695.00

*SECNO 13.001

3265 DIVIDED FLOW

    13.00     15.15    589.15      0.0       0.0    591.79      2.64      0.06      0.01     596.00
   42200.        0.    42171.      29.        0.     3234.       53.        1.        0.     595.50
     0.00       0.0     13.04      0.54     0.120     0.040     0.150     0.036    574.00     196.35
 0.005813       10.       10.       10.         2         0         0      0.0    414.82     701.91

*SECNO 13.002

3265 DIVIDED FLOW

    13.00     15.42    589.42      0.0       0.0    591.92      2.50      0.11      0.01     596.00
   42200.        0.    42151.      49.        0.     3320.       79.        2.        0.     595.50
     0.00       0.0     12.70      0.61     0.120     0.040     0.150     0.038    574.00     194.38
 0.005378       20.       20.       20.         2         0         0      0.0    435.62     713.73
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*SECNO 13.010

3265 DIVIDED FLOW

13.01	16.12	590.12	0.0	0.0	592.29	2.17	0.34	0.03	596.00
42200.	0.	42068.	132.	0.	3555.	174.	8.	1.	595.50
0.00	0.0	11.83	0.76	0.120	0.040	0.150	0.039	574.00	189.79
0.004428	70.	70.	70.	2	0	0	0.0	487.20	740.91

*SECNO 13.020

3265 DIVIDED FLOW

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST
13.02	16.83	590.83	0.0	0.0	592.72	1.89	0.40	0.03	596.00
42200.	0.	41942.	258.	0.	3794.	283.	17.	2.	595.50
0.00	0.0	11.06	0.91	0.120	0.040	0.150	0.039	574.00	188.61
0.003619	100.	100.	100.	2	0	0	0.0	499.36	745.94

*SECNO 13.030

3265 DIVIDED FLOW

13.03	17.37	591.37	0.0	0.0	593.07	1.70	0.34	0.02	596.00
42200.	0.	41835.	365.	0.	3978.	370.	27.	3.	595.50
0.01	0.0	10.52	0.99	0.120	0.040	0.150	0.039	574.00	187.72
0.003122	100.	100.	100.	2	0	0	0.0	508.62	749.77

*SECNO 13.040

3265 DIVIDED FLOW

13.04	18.82	592.82	0.0	0.0	594.13	1.31	1.02	0.04	596.00
42200.	0.	41522.	678.	0.	4486.	619.	68.	7.	595.50
0.02	0.0	9.26	1.10	0.120	0.040	0.150	0.040	574.00	185.30
0.002146	500.	400.	200.	2	0	0	0.0	533.71	760.15

*SECNO 13.050

3265 DIVIDED FLOW

13.05	19.79	593.79	0.0	0.0	594.91	1.11	0.75	0.02	596.00
42200.	0.	41308.	892.	0.	4832.	799.	114.	12.	595.50
0.03	0.0	8.55	1.12	0.120	0.040	0.150	0.040	574.00	183.69
0.001702	500.	400.	200.	0	0	0	0.0	574.34	791.02

*SECNO 13.100

3265 DIVIDED FLOW

13.10	20.94	594.94	0.0	0.0	595.82	0.88	0.89	0.02	596.00
42200.	0.	40385.	1815.	0.	5254.	1106.	164.	16.	595.50
0.05	0.0	7.69	1.64	0.120	0.063	0.150	0.046	574.00	181.77
0.003150	600.	400.	200.	2	0	0	0.0	690.63	895.64

*SECNO 13.200

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV

Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST
13.20	24.22	598.22	0.0	0.0	598.73	0.51	2.88	0.04	596.00
42200.	62.	38775.	3363.	94.	6483.	2706.	407.	43.	595.50
0.12	0.66	5.98	1.24	0.120	0.063	0.150	0.055	574.00	115.41
0.001468	1700.	1400.	1200.	2	0	0	0.0	1078.06	1193.47

*SECNO 14.000

SECTION 14 OF COE FPI STUDY, OTTAWA COUNTY, 1974

14.00	26.79	600.19	0.0	0.0	600.45	0.26	1.69	0.03	593.00
42200.	2924.	33397.	5879.	2370.	7372.	5781.	903.	114.	591.00
0.25	1.23	4.53	1.02	0.120	0.063	0.150	0.058	573.40	-165.23
0.000662	1900.	1800.	1600.	3	0	0	0.0	2654.51	2489.28

*SECNO 14.100

14.10	27.17	600.57	0.0	0.0	600.86	0.28	0.40	0.01	593.00
42200.	2055.	34961.	5184.	2549.	7507.	6497.	1257.	172.	591.00
0.31	0.81	4.66	0.80	0.120	0.040	0.120	0.055	573.40	-235.78
0.000275	1000.	1000.	900.	2	0	0	0.0	2753.66	2517.88

*SECNO 14.200

14.20	27.43	600.83	0.0	0.0	601.10	0.27	0.24	0.00	593.00
42200.	2118.	34711.	5370.	2685.	7598.	6986.	1605.	229.	591.00
0.38	0.79	4.57	0.77	0.120	0.040	0.120	0.053	573.40	-283.34
0.000261	1000.	900.	850.	2	0	0	0.0	2820.50	2537.16

*SECNO 14.300

14.30	27.92	601.32	0.0	0.0	601.54	0.23	0.44	0.00	593.00
42200.	2507.	33266.	6428.	2977.	7772.	7929.	2185.	308.	591.00
0.50	0.84	4.28	0.81	0.120	0.046	0.120	0.052	573.40	-373.67
0.000294	2200.	1700.	800.	2	0	0	0.0	2947.46	2573.79

*SECNO .0

3280 CROSS SECTION 0.0 EXTENDED 1.69 FEET

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

AT OTTAWA COUNTY- KENT COUNTY LINE (COE FPI STUDY,1972 X-SECTION C)

0.0	26.59	601.69	0.0	0.0	601.80	0.11	0.25	0.01	589.30
42200.	11715.	22317.	8168.	14734.	6093.	11595.	2934.	399.	592.20
0.64	0.80	3.66	0.70	0.120	0.040	0.120	0.050	575.10	-700.00
0.000170	1800.	1000.	1000.	2	0	0	0.0	3232.91	2532.91

*SECNO .500

ABOUT 2000 FT D/S OF M-11 BRIDGE (COE FPI STUDY,1972 X-SECTION D)

0.50	25.65	602.05	0.0	0.0	602.22	0.17	0.40	0.02	590.80
42200.	3804.	28753.	9644.	4316.	7301.	14241.	4364.	526.	594.50
0.85	0.88	3.94	0.68	0.120	0.040	0.150	0.048	576.40	131.31

0.000186	2750.	2300.	1600.	2	0	0	0.0	2050.74	2182.05

CCHV= 0.300 CEHV= 0.500

*SECNO 1.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA= 610.30 ELREA= 610.30

1 FT D/S OF M-11 BRIDGE (COE FPI STUDY, 1972 X-SECTION 1)

1.00	27.92	602.42	0.0	0.0	602.66	0.23	0.41	0.03	612.10
42200.	0.	42200.	0.	0.	10874.	0.	5251.	589.	612.10
1.00	0.0	3.88	0.0	0.120	0.040	0.150	0.047	574.50	370.00
0.000218	2600.	1990.	2100.	2	0	0	0.0	550.00	920.00

*SECNO 1.100

3265 DIVIDED FLOW

3370 NORMAL BRIDGE,NRD= 9 MIN ELTRD= 610.00 MAX ELLC= 612.10

D/S FACE OF M-11 BRIDGE. PIERS WERE INCLUDED IN GR CARDS

1.10	27.80	602.40	0.0	0.0	602.68	0.28	0.00	0.02	612.10
42200.	0.	42200.	0.	0.	9924.	0.	5251.	589.	612.10
1.00	0.0	4.25	0.0	0.013	0.013	0.013	0.047	574.60	370.00
0.000049	1.	1.	1.	2	0	0	0.0	506.26	920.00

*SECNO 1.200

3265 DIVIDED FLOW

3370 NORMAL BRIDGE,NRD= 9 MIN ELTRD= 610.00 MAX ELLC= 612.10

U/S FACE OF M-11 BR.-HIGH WATER MARKS(REF:TECH APPENDIX-COE FPI STUDY)

YEAR	PEAK FLOW AT GRAND RAPIDS GAGE	HIGH WATER ELEV AT BRIDGE
1948	42200	602.70
1947	38600	601.46
1960	31800	600.40
1950	27200	599.00
1933	11500	592.37

1.20	27.80	602.40	0.0	0.0	602.68	0.28	0.00	0.00	612.10
42200.	0.	42200.	0.	0.	9927.	0.	5264.	590.	612.10
1.00	0.0	4.25	0.0	0.013	0.013	0.013	0.047	574.60	370.00
0.000049	56.	56.	56.	0	0	0	0.0	506.26	920.00

*SECNO 1.300

SFCNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	ARCB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 612.10 ELREA= 612.10

1.30	27.97	602.47	0.0	0.0	602.70	0.23	0.00	0.01	612.10
42200.	0.	42200.	0.	0.	10897.	0.	5264.	590.	612.10
1.00	0.0	3.87	0.0	0.120	0.035	0.120	0.047	574.50	370.00
0.000165	1.	1.	1.	2	0	0	0.0	550.00	920.00

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**************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED  AUG1977
  ERROR CORR -  01,02
  MODIFICATION -  50,51,52,53
**************************************************

T1      CHECK FOR CONVERGENCE
T2
T3      DISCHARGE 42200 STARTING ELEV  592

J1  ICHECK     INQ        NINV       IDIR       STRT       METRIC     HVINS      Q          WSEL       FQ
      -10.       6.         0.         0.  0.0             0.0        0.0        0.       592.000    0.0
J2  NPROF      IPLOT      PRFVS      XSECV      XSECH      FN         ALLDC      IBW        CHNIM      ITRACE
      9.000      0.0       -1.000      0.0        0.0        0.0        0.0        0.0        0.0        0.0
*PROF 9

CCHV=   0.100 CEHV=   0.300
*SECNO 13.000

3265 DIVIDED FLOW

   SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      BANK ELEV
   Q          QLCB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        LEFT/RIGHT
   TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
   SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST

          SECTION 13 OF COE FPI STUDY,OTTAWA COUNTY, 1974

    13.00      18.00      592.00     0.0        592.00     593.51     1.52       0.0        0.0        596.00
   42200.         0.      41702.     498.          0.      4197.      475.          0.         0.      595.50
     0.0        0.0        9.94       1.05       0.120      0.040      0.150      0.0        574.00     186.67
0.002642          0.         0.         0.         0          0          0        0.0        519.53     754.29

*SECNO 13.001

3265 DIVIDED FLOW

    13.00      18.03      592.03     0.0        0.0        593.54     1.51       0.03       0.00       596.00
   42200.         0.      41696.     504.          0.      4206.      480.          1.         0.      595.50
     0.00       0.0        9.91       1.05       0.120      0.040      0.150      0.036      574.00     186.62
0.002624          10.        10.        10.         0          0          0        0.0        519.98     754.47

*SECNO 13.002

3265 DIVIDED FLOW

    13.00      18.11      592.11     0.0        0.0        593.60     1.48       0.05       0.00       596.00
   42200.         0.      41678.     522.          0.      4236.      494.          3.         0.      595.50
     0.00       0.0        9.84       1.06       0.120      0.040      0.150      0.038      574.00     186.48
0.002567          20.        20.        20.         2          0          0        0.0        521.45     755.08
```

*SECNO 13.010

3265 DIVIDED FLOW

13.01	18.35	592.35	0.0	0.0	593.78	1.42	0.17	0.01	596.00
42200.	0.	41625.	575.	0.	4321.	536.	11.	1.	595.50
0.00	0.0	9.63	1.07	0.120	0.040	0.150	0.039	574.00	186.08
0.002412	70.	70.	70.	2	0	0	0.0	525.65	756.82

*SECNO 13.020

3265 DIVIDED FLOW

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST
13.02	18.67	592.67	0.0	0.0	594.02	1.34	0.23	0.01	596.00
42200.	0.	41555.	645.	0.	4433.	592.	22.	2.	595.50
0.01	0.0	9.37	1.09	0.120	0.040	0.150	0.039	574.00	185.55
0.002227	100.	100.	100.	2	0	0	0.0	531.13	759.08

*SECNO 13.030

3265 DIVIDED FLOW

13.03	18.96	592.96	0.0	0.0	594.24	1.28	0.21	0.01	596.00
42200.	0.	41492.	708.	0.	4535.	643.	34.	4.	595.50
0.01	0.0	9.15	1.10	0.120	0.040	0.150	0.039	574.00	185.07
0.002075	100.	100.	100.	2	0	0	0.0	536.06	761.13

*SECNO 13.040

3265 DIVIDED FLOW

13.04	19.90	593.90	0.0	0.0	594.99	1.09	0.73	0.02	596.00
42200.	0.	41283.	917.	0.	4873.	823.	81.	8.	595.50
0.02	0.0	8.47	1.11	0.120	0.040	0.150	0.040	574.00	183.50
0.001659	500.	400.	200.	2	0	0	0.0	585.55	801.10

*SECNO 13.050

3265 DIVIDED FLOW

13.05	20.64	594.64	0.0	0.0	595.60	0.97	0.60	0.01	596.00
42200.	0.	41107.	1093.	0.	5142.	1013.	131.	12.	595.50
0.04	0.0	7.99	1.08	0.120	0.040	0.150	0.040	574.00	182.27
0.001402	500.	400.	200.	2	0	0	0.0	660.01	868.09

*SECNO 13.100

13.10	21.58	595.58	0.0	0.0	596.37	0.79	0.75	0.02	596.00
42200.	0.	40118.	2082.	0.	5492.	1336.	185.	17.	595.50
0.05	0.0	7.30	1.56	0.120	0.063	0.150	0.046	574.00	180.70
0.002723	600.	400.	200.	2	0	0	0.0	772.88	953.59

*SECNO 13.200

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

13.20	24.51	598.51	0.0	0.0	599.00	0.49	2.60	0.03	596.00
42200.	79.	38595.	3526.	115.	6596.	2903.	440.	45.	595.50
0.12	0.69	5.85	1.21	0.120	0.063	0.150	0.055	574.00	110.23
0.001373	1700.	1400.	1200.	1	0	0	0.0	1110.57	1220.80

*SECNO 14.000

SECTION 14 OF COE FPI STUDY, OTTAWA COUNTY, 1974

14.00	26.98	600.38	0.0	0.0	600.63	0.25	1.60	0.02	593.00
42200.	2987.	33203.	6011.	2453.	7437.	6124.	952.	119.	591.00
0.25	1.22	4.46	0.98	0.120	0.063	0.150	0.058	573.40	-199.19
0.000635	1900.	1800.	1600.	2	0	0	0.0	2702.25	2503.05

*SECNO 14.100

14.10	27.35	600.75	0.0	0.0	601.02	0.27	0.39	0.01	593.00
42200.	2098.	34791.	5311.	2641.	7569.	6832.	1316.	178.	591.00
0.32	0.79	4.60	0.78	0.120	0.040	0.120	0.055	573.40	-268.34
0.000265	1000.	1000.	900.	2	0	0	0.0	2799.43	2531.08

*SECNO 14.200

14.20	27.59	600.99	0.0	0.0	601.25	0.26	0.23	0.00	593.00
42200.	2160.	34545.	5495.	2779.	7657.	7303.	1674.	235.	591.00
0.39	0.78	4.51	0.75	0.120	0.040	0.120	0.053	573.40	-313.92
0.000251	1000.	900.	850.	2	0	0	0.0	2863.47	2549.56

*SECNO 14.300

14.30	28.07	601.47	0.0	0.0	601.69	0.22	0.43	0.00	593.00
42200.	2548.	33095.	6557.	3075.	7824.	8218.	2266.	317.	591.00
0.52	0.83	4.23	0.80	0.120	0.046	0.120	0.052	573.40	-401.04
0.000284	2200.	1700.	800.	2	0	0	0.0	2985.92	2584.88

*SECNO .0

3280 CROSS SECTION 0.0 EXTENDED 1.83 FEET

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

AT OTTAWA COUNTY- KENT COUNTY LINE (COE FPI STUDY,1972 X-SECTION C)

0.0	26.73	601.83	0.0	0.0	601.94	0.11	0.24	0.01	589.30
42200.	11770.	22190.	8240.	14940.	6133.	11794.	3028.	408.	592.20
0.66	0.79	3.62	0.70	0.120	0.040	0.120	0.050	575.10	-700.00
0.000165	1800.	1000.	1000.	2	0	0	0.0	3240.45	2540.45

*SECNO .500

ABOUT 2000 FT D/S OF M-11 BRIDGE (COE FPI STUDY,1972 X-SECTION D)

0.50	25.78	602.18	0.0	0.0	602.34	0.16	0.39	0.02	590.80
42200.	3823.	28671.	9706.	4362.	7342.	14410.	4474.	535.	594.50
0.87	0.88	3.91	0.67	0.120	0.040	0.150	0.048	576.40	131.03
0.000181	2750.	2300.	1600.	2	0	0	0.0	2051.15	2182.17

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 CCHV=    0.300 CEHV=    0.500
 *SECNO 1.000
 3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA=      610.30 ELREA=      610.30

          1 FT D/S OF M-11 BRIDGE (COE FPI STUDY, 1972 X-SECTION 1)

      1.00     28.04    602.54      0.0       0.0    602.77      0.23      0.40      0.03    612.10
     42200.        0.   42200.       0.        0.   10938.        0.      5369.      599.    612.10
      1.02       0.0      3.86      0.0     0.120     0.040     0.150     0.047    574.50    370.00
  0.000213     2600.     1990.     2100.         2         0         0       0.0    550.00    920.00

 *SECNO 1.100
 3265 DIVIDED FLOW

 3370 NORMAL BRIDGE,NRD=   9 MIN ELTRD=   610.00 MAX ELLC=   612.10

          D/S FACE OF M-11 BRIDGE. PIERS WERE INCLUDED IN GR CARDS

      1.10     27.92    602.52      0.0       0.0    602.79      0.28      0.00      0.02    612.10
     42200.        0.   42200.       0.        0.    9982.        0.      5370.      599.    612.10
      1.02       0.0      4.23      0.0     0.013     0.013     0.013     0.047    574.60    370.00
  0.000049        1.        1.        1.         2         0         0       0.0    506.26    920.00

 *SECNO 1.200
 3265 DIVIDED FLOW

 3370 NORMAL BRIDGE,NRD=   9 MIN ELTRD=   610.00 MAX ELLC=   612.10

          U/S FACE OF M-11 BR.-HIGH WATER MARKS(REF:TECH APPENDIX-COE FPI STUDY)

                YEAR PEAK FLOW AT GRAND RAPIDS GAGE      HIGH WATER ELEV AT BRIDGE

                1948      42200                          602.70

                1947      38600                          601.46

                1960      31800                          600.40

                1950      27200                          599.00

                1933      11500                          592.37

      1.20     27.92    602.52      0.0       0.0    602.80      0.28      0.00      0.00    612.10
     42200.        0.   42200.       0.        0.    9986.        0.      5382.      599.    612.10
      1.02       0.0      4.23      0.0     0.013     0.013     0.013     0.047    574.60    370.00
  0.000048        56.       56.       56.         0         0         0       0.0    506.26    920.00

 *SECNO 1.300
    SECNO      DEPTH      CWSEL      CRIWS      WSELK         EG         HV         HL      QLOSS   BANK ELEV
        Q       QLOB        QCH       QROB       ALOB        ACH       AROB        VOL        TWA  LEFT/RIGHT
        V       VLOB        VCH       VROB        XNL       XNCH        XNR        WTN     ELMIN       SSTA
```

SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST
3495 OVEPBANK AREA ASSUMED NON-EFFECTIVE.ELLEA=					612.10 ELREA=		612.10		
1.30	28.08	602.58	0.0	0.0	602.81	0.23	0.00	0.01	612.10
42200.	0.	42200.	0.	0.	10960.	0.	5383.	599.	612.10
1.02	0.0	3.85	0.0	0.120	0.035	0.120	0.047	574.50	370.00
0.000162	1.	1.	1.	2	0	0	0.0	550.00	920.00



1) COUNTY: KENT

2) STUDY NAME: GRANDVILLE, WALKER

3) WATERCOURSE: GRAND RIVER

4) DOCUMENT TYPE: PRODUCTION 10, 50, 100, 500
SUMMARIES & INPUT



THIS RUN EXECUTED 02/19/81

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  HEC2 RELEASE DATED NOV 76 UPDATED  AUG1977
  ERROR CORR -  01,02
  MODIFICATION -  50,51,52,53
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C
T1 FIS GRANDVILLE & WALKER, KENT COUNTY, MICHIGAN.
T2 10 -YEAR FLOOD
T3 GRAND RIVER

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ	
	0.	2.	0.	0.	0.0	0.0	0.0	0.	599.760	0.0	
J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE	
	1.000	0.0	-1.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
J3	VARIABLE CODES FOR SUMMARY PRINTOUT										
	38.000	1.000	53.000	21.000	22.000	54.000	4.000	39.000	150.000	201.000	
J5	LPRNT	NUMSEC			********REQUESTED SECTION NUMBERS********						
	-10.000	-10.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
QT	5.000	33500.000	48700.000	55800.000	75100.000	55800.000	0.0	0.0	0.0	0.0	
NC	0.070	0.070	0.030	0.100	0.300	0.0	0.0	0.0	0.0	0.0	
ET	0.0	0.0	0.0	0.0	0.0	1.400	0.0	0.0	0.0	0.0	

CITY LIMITS VALLEY SECTION A

XI	0.0	51.000	11300.000	11590.000	177800.000	177800.000	177800.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	10300.000	0.0	11930.000	0.0	0.0	0.0	0.0
GR	610.000	6300.000	610.000	6300.000	610.000	6700.000	600.000	8900.000	590.000	9200.000
GR	590.000	9350.000	600.000	9500.000	600.000	9800.000	590.000	10600.000	588.200	10800.000
GR	590.700	10900.000	587.200	10950.000	586.800	11000.000	591.100	11040.000	586.500	11050.000
GR	586.200	11080.000	584.200	11082.000	583.700	11090.000	584.200	11100.000	583.700	11110.000
GR	584.400	11120.000	589.000	11150.000	583.200	11180.000	587.000	11200.000	586.500	11225.000
GR	587.800	11250.000	588.000	11275.000	589.300	11300.000	582.800	11320.000	582.800	11330.000
GR	576.400	11400.000	575.400	11420.000	575.700	11430.000	575.600	11440.000	575.300	11450.000
GR	576.000	11460.000	575.100	11470.000	576.000	11480.000	576.800	11500.000	580.500	11520.000
GR	580.700	11530.000	587.500	11545.000	592.300	11590.000	591.500	11610.000	588.500	11620.000
GR	588.500	11660.000	591.500	11675.000	593.000	11700.000	592.500	11800.000	592.500	11910.000
GR	611.000	11930.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

X1	0.100	26.000	2000.000	2240.000	780.000	750.000	920.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	1430.000	0.0	2500.000	0.0	0.0	0.0	0.0
GR	615.000	1000.000	615.000	1040.000	615.000	1260.000	615.000	1300.000	615.000	1430.000
GR	591.000	1450.000	590.000	1790.000	588.900	2000.000	587.900	2013.000	582.800	2025.000
GR	581.200	2038.000	580.000	2051.000	578.700	2063.000	577.500	2076.000	576.400	2088.000
GR	575.600	2101.000	575.600	2139.000	576.800	2152.000	578.100	2164.000	580.100	2177.000
GR	583.900	2190.000	586.600	2202.000	589.500	2215.000	592.300	2240.000	592.300	2480.000
GR	611.000	2500.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

VALLEY SECTION B

RECEIVED
FEB 23 1981
WATER MANAGEMENT
approved

X1	0.500	38.000	2500.000	2830.000	1570.000	1100.000	1380.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	2200.000	0.0	3280.000	0.0	0.0	0.0	0.0
GR	607.000	2200.000	607.000	2200.000	587.800	2220.000	590.000	2270.000	591.500	2350.000
GR	591.100	2400.000	588.000	2420.000	588.500	2450.000	591.500	2475.000	590.800	2500.000
GR	583.000	2520.000	578.000	2530.000	577.000	2540.000	576.800	2560.000	577.000	2570.000
GR	576.400	2580.000	576.800	2630.000	577.800	2650.000	578.000	2680.000	578.200	2700.000
GR	579.000	2750.000	579.800	2780.000	584.000	2782.000	588.000	2810.000	594.500	2830.000
GR	591.500	2850.000	595.200	2875.000	593.000	2900.000	594.500	3000.000	594.000	3020.000
GR	589.000	3030.000	588.000	3050.000	587.000	3100.000	586.500	3150.000	586.700	3200.000
GR	586.000	3300.000	586.500	3400.000	611.000	3500.000	0.0	0.0	0.0	0.0
NC	0.0	0.0	0.0	0.300	0.500	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	0.0	9.100	0.0	0.0	2370.000	2920.000
X1	1.000	49.000	2370.000	2920.000	2700.000	1950.000	2450.000	0.0	0.0	0.0
GR	612.100	2370.000	612.100	2370.000	593.500	2370.000	593.000	2410.000	590.500	2415.000
GR	586.500	2420.000	586.500	2420.000	586.500	2425.000	586.500	2425.000	587.500	2480.000
GR	585.500	2495.000	585.500	2495.000	584.000	2500.000	584.000	2500.000	581.000	2530.000
GR	581.000	2545.000	579.000	2565.000	579.500	2570.000	579.500	2570.000	579.800	2575.000
GR	579.800	2575.000	580.500	2615.000	581.800	2625.000	581.000	2635.000	581.000	2645.000
GR	581.000	2645.000	581.000	2650.000	581.000	2650.000	579.000	2705.000	576.000	2720.000
GR	576.000	2720.000	575.500	2725.000	575.500	2725.000	575.000	2735.000	576.200	2795.000
GR	576.200	2795.000	576.500	2800.000	576.500	2800.000	574.600	2810.000	576.200	2840.000
GR	581.000	2855.000	592.000	2865.000	592.000	2870.000	592.000	2870.000	592.000	2875.000
GR	592.000	2875.000	591.000	2890.000	594.000	2920.000	612.100	2920.000	0.0	0.0
X1	1.100	49.000	2370.000	2920.000	1.000	1.000	1.000	0.0	0.0	0.0
X2	0.0	0.0	0.0	612.100	610.300	0.0	0.0	0.0	0.0	0.0
BT	4.000	2370.000	612.100	612.100	2370.000	612.100	610.300	2920.000	612.100	610.300
BT	2920.000	612.100	612.100	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GR	612.100	2370.000	612.100	2370.000	593.500	2370.000	593.000	2410.000	590.500	2415.000
GR	586.500	2420.000	610.300	2420.000	610.300	2425.000	586.500	2425.000	587.500	2480.000
GR	585.500	2495.000	610.300	2495.000	610.300	2500.000	584.000	2500.000	581.000	2530.000
GR	581.000	2545.000	579.000	2565.000	579.500	2570.000	610.300	2570.000	610.300	2575.000
GR	579.800	2575.000	580.500	2615.000	581.800	2625.000	581.000	2635.000	581.000	2645.000
GR	610.300	2645.000	610.300	2650.000	581.000	2650.000	579.000	2705.000	576.000	2720.000
GR	610.300	2720.000	610.300	2725.000	575.500	2725.000	575.000	2735.000	576.200	2795.000
GR	610.300	2795.000	610.300	2800.000	576.500	2800.000	574.600	2810.000	576.200	2840.000
GR	581.000	2855.000	592.000	2865.000	592.000	2870.000	610.300	2870.000	610.300	2875.000
GR	592.000	2875.000	591.000	2890.000	594.000	2920.000	612.100	2920.000	0.0	0.0

BRIDGE SECTION C M-11 BRIDGE U/S

X1	1.200	0.0	0.0	0.0	56.000	56.000	56.000	0.0	0.0	0.0
X2	0.0	0.0	0.0	612.100	610.300	0.0	1.000	0.0	0.0	0.0
X1	1.300	49.000	2370.000	2920.000	1.000	1.000	1.000	0.0	0.0	0.0
GR	612.100	2370.000	612.100	2370.000	593.500	2370.000	593.000	2410.000	590.500	2415.000
GR	586.500	2420.000	586.500	2420.000	586.500	2425.000	586.500	2425.000	587.500	2480.000
GR	585.500	2495.000	585.500	2495.000	584.000	2500.000	584.000	2500.000	581.000	2530.000
GR	581.000	2545.000	579.000	2565.000	579.500	2570.000	579.500	2570.000	579.800	2575.000
GR	579.800	2575.000	580.500	2615.000	581.800	2625.000	581.000	2635.000	581.000	2645.000
GR	581.000	2645.000	581.000	2650.000	581.000	2650.000	579.000	2705.000	576.000	2720.000
GR	576.000	2720.000	575.500	2725.000	575.500	2725.000	575.000	2735.000	576.200	2795.000
GR	576.200	2795.000	576.500	2800.000	576.500	2800.000	574.600	2810.000	576.200	2840.000
GR	581.000	2855.000	592.000	2865.000	592.000	2870.000	592.000	2870.000	592.000	2875.000
GR	592.000	2875.000	591.000	2890.000	594.000	2920.000	612.100	2920.000	0.0	0.0

VALLEY SECTION D

X1	2.000	47.000	3190.000	3575.000	142.000	142.000	142.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	3020.000	0.0	3750.000	0.0	0.0	0.0	0.0
GR	612.000	3020.000	612.000	3020.000	593.700	3050.000	595.000	3060.000	595.000	3090.000

GR	568.700	3108.000	588.700	3140.000	589.000	3150.000	589.500	3190.000	585.000	3190.000
GR	584.000	3193.000	579.800	3200.000	579.800	3270.000	581.000	3300.000	581.000	3320.000
GR	581.600	3330.000	581.600	3360.000	579.000	3380.000	577.300	3410.000	577.100	3420.000
GR	577.500	3450.000	577.000	3460.000	577.600	3485.000	578.500	3497.000	578.500	3520.000
GR	585.000	3535.000	595.200	3575.000	596.000	3600.000	596.000	3700.000	605.000	3750.000
GR	607.200	3770.000	607.400	3800.000	594.700	3855.000	591.000	3900.000	590.800	3930.000
GR	590.300	3940.000	590.300	4000.000	588.000	4100.000	588.000	4260.000	591.700	4396.000
GR	591.700	4445.000	590.000	4500.000	591.600	4650.000	595.000	4700.000	600.600	4790.000
GR	603.000	4860.000	608.900	4940.000	0.0	0.0	0.0	0.0	0.0	0.0
X1	2.100	49.000	3190.000	3590.000	1060.000	850.000	1000.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	2830.000	0.0	3720.000	0.0	0.0	0.0	0.0
GR	612.000	2830.000	612.000	2830.000	589.500	2850.000	589.500	3000.000	595.000	3020.000
GR	595.000	3020.000	595.000	3050.000	595.000	3050.000	589.500	3070.000	595.000	3090.000
GR	588.700	3108.000	588.700	3140.000	589.000	3150.000	589.500	3190.000	585.000	3190.000
GR	584.000	3193.000	579.800	3200.000	579.800	3270.000	581.000	3300.000	581.000	3320.000
GR	581.600	3330.000	581.600	3360.000	579.000	3380.000	577.300	3410.000	577.100	3420.000
GR	577.500	3450.000	577.000	3460.000	577.600	3485.000	578.500	3497.000	578.500	3520.000
GR	585.000	3535.000	595.200	3590.000	596.000	3600.000	596.000	3700.000	605.000	3720.000
GR	607.200	3740.000	607.400	3770.000	594.700	3855.000	591.000	3900.000	590.800	3930.000
GR	590.300	3940.000	590.300	4000.000	588.000	4100.000	588.000	4260.000	591.700	4396.000
GR	591.700	4445.000	590.000	4500.000	600.000	4600.000	610.000	4720.000	0.0	0.0
NC	0.0	0.0	0.0	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	0.0	9.100	0.0	0.0	938.000	3850.000

VALLEY SECTION E

X1	3.000	60.000	3480.000	3790.000	3140.000	3350.000	3400.000	0.0	0.0	0.0
X5	5.000	600.980	604.640	606.240	609.080	606.340	0.0	0.0	0.0	0.0
GR	610.000	900.000	595.000	920.000	590.000	1220.000	590.000	1220.000	590.000	1220.000
GR	589.500	2100.000	589.000	2200.000	590.000	2250.000	589.000	2289.000	588.800	2350.000
GR	589.000	2420.000	589.000	2450.000	588.600	2550.000	592.000	2600.000	592.300	2650.000
GR	589.000	2700.000	589.000	2750.000	592.000	2850.000	592.000	2870.000	593.500	2950.000
GR	592.500	3000.000	591.000	3050.000	590.500	3100.000	590.000	3150.000	589.700	3170.000
GR	589.000	3200.000	590.000	3245.000	594.300	3300.000	590.500	3350.000	589.500	3375.000
GR	598.200	3390.000	596.800	3400.000	598.500	3415.000	600.000	3420.000	598.000	3440.000
GR	597.000	3441.000	588.500	3480.000	588.000	3490.000	585.000	3490.000	582.200	3515.000
GR	580.000	3550.000	579.700	3570.000	580.000	3587.000	579.000	3600.000	579.000	3620.000
GR	578.000	3635.000	578.000	3650.000	576.700	3665.000	576.000	3695.000	575.000	3701.000
GR	575.000	3718.000	577.000	3735.000	580.000	3743.000	588.000	3780.000	590.000	3780.000
GR	590.600	3790.000	595.000	3850.000	591.000	3860.000	615.000	3900.000	616.000	3960.000
ET	0.0	0.0	0.0	0.0	0.0	9.100	0.0	0.0	3120.000	4106.000

VALLEY SECTION F

X1	4.000	37.000	3270.000	3500.000	5300.000	6900.000	6500.000	0.0	0.0	0.0
X5	5.000	601.560	605.020	606.440	609.100	606.540	0.0	0.0	0.0	0.0
GR	610.000	3080.000	610.000	3080.000	610.000	3080.000	610.000	3080.000	599.500	3100.000
GR	599.000	3110.000	600.300	3135.000	589.800	3155.000	587.900	3180.000	586.500	3200.000
GR	586.900	3225.000	593.200	3270.000	583.000	3310.000	576.300	3335.000	576.800	3360.000
GR	575.700	3368.000	576.000	3395.000	577.500	3410.000	577.500	3435.000	580.000	3460.000
GR	591.500	3500.000	589.900	3550.000	589.900	3565.000	595.600	3635.000	595.600	3650.000
GR	588.600	3715.000	587.700	3750.000	593.300	3800.000	596.700	3850.000	599.500	3870.000
GR	599.800	3900.000	596.800	3930.000	596.800	3970.000	598.600	4100.000	600.000	4130.000
GR	613.000	4150.000	614.500	4200.000	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	0.0	9.100	0.0	0.0	2565.000	4230.000

VALLEY SECTION G

X1	4.100	39.000	3225.000	3500.000	2500.000	2250.000	2400.000	0.0	-1.500	0.0
X5	5.000	602.200	605.200	606.500	609.260	606.500	0.0	0.0	0.0	0.0
GR	610.000	2550.000	591.400	2570.000	591.400	2700.000	594.000	2750.000	594.400	2800.000
GR	593.400	2850.000	593.400	2900.000	597.400	3000.000	597.700	3050.000	599.500	3100.000
GR	599.221	3110.000	600.300	3135.000	589.800	3155.000	587.900	3180.000	586.500	3200.000

GR	586.900	3225.000	593.200	3270.000	583.000	3310.000	576.300	3335.000	576.800	3360.000
GR	575.700	3368.000	576.000	3395.000	577.500	3410.000	577.500	3435.000	580.000	3460.000
GR	591.500	3500.000	589.900	3550.000	589.900	3565.000	595.600	3635.000	595.600	3650.000
GR	588.600	3715.000	587.700	3750.000	593.300	3800.000	596.700	3850.000	599.500	3870.000
GR	599.800	3900.000	596.800	3930.000	600.000	3970.000	610.000	4730.000	0.0	0.0

VALLEY SECTION H WALKER CITY LIMITS

X1	4.900	58.000	2500.000	2785.000	2100.000	2700.000	2350.000	0.0	0.300	0.0
X3	0.0	0.0	0.0	2050.000	0.0	3300.000	0.0	0.0	0.0	0.0
X5	5.000	602.550	605.480	606.500	609.260	606.600	0.0	0.0	0.0	0.0
GR	610.000	1550.000	594.000	1580.000	594.000	2062.000	592.600	2150.000	592.500	2200.000
GR	592.000	2250.000	595.600	2300.000	599.000	2350.000	599.000	2398.000	599.000	2398.000
GR	592.500	2470.000	590.700	2500.000	585.000	2520.000	579.000	2530.000	573.500	2550.000
GR	572.500	2560.000	573.500	2570.000	572.600	2580.000	572.700	2590.000	578.000	2600.000
GR	579.800	2620.000	578.000	2630.000	573.700	2650.000	573.700	2670.000	576.000	2690.000
GR	583.000	2700.000	580.000	2710.000	580.000	2720.000	582.200	2730.000	581.700	2740.000
GR	581.700	2750.000	584.500	2760.000	592.500	2764.000	596.000	2785.000	588.500	2830.000
GR	589.000	2850.000	588.500	2867.000	585.500	2875.000	588.500	2900.000	588.500	2960.000
GR	596.000	2990.000	594.800	3000.000	595.000	3040.000	592.000	3100.000	591.000	3150.000
GR	593.500	3200.000	594.200	3250.000	594.000	3300.000	591.000	3500.000	592.000	3650.000
GR	591.000	3900.000	592.000	4070.000	591.700	4250.000	592.500	4400.000	591.000	4450.000
GR	591.300	4510.000	600.000	4800.000	610.000	5550.000	0.0	0.0	0.0	0.0

X1	5.000	64.000	2500.000	2785.000	510.000	460.000	510.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	2200.000	0.0	3200.000	0.0	0.0	0.0	0.0
X5	5.000	602.550	605.480	606.500	609.260	606.600	0.0	0.0	0.0	0.0
GR	607.000	2000.000	606.500	2030.000	594.000	2062.000	592.600	2150.000	592.500	2200.000
GR	592.000	2250.000	595.600	2300.000	606.500	2350.000	606.500	2398.000	606.500	2398.000
GR	592.500	2470.000	590.700	2500.000	585.000	2520.000	579.000	2530.000	573.500	2550.000
GR	572.500	2560.000	573.500	2570.000	572.600	2580.000	572.700	2590.000	578.000	2600.000
GR	579.800	2620.000	578.000	2630.000	573.700	2650.000	573.700	2670.000	576.000	2690.000
GR	583.000	2700.000	580.000	2710.000	580.000	2720.000	582.200	2730.000	581.700	2740.000
GR	581.700	2750.000	584.500	2760.000	592.500	2764.000	596.000	2785.000	588.500	2830.000
GR	589.000	2850.000	588.500	2867.000	585.500	2875.000	588.500	2900.000	588.500	2960.000
GR	596.000	2990.000	594.800	3000.000	595.000	3040.000	592.000	3100.000	591.000	3150.000
GR	593.500	3200.000	594.200	3250.000	594.000	3300.000	591.000	3500.000	592.000	3650.000
GR	591.000	3900.000	592.000	4070.000	591.700	4250.000	592.500	4400.000	591.000	4450.000
GR	591.300	4510.000	600.000	4530.000	602.500	4600.000	603.000	4650.000	606.000	4750.000
GR	606.000	4800.000	598.000	4800.000	597.500	4892.000	602.000	4900.000	0.0	0.0
EJ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

GRAND RIVER

SUMMARY PRINTOUT TABLE 150

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10K*S	VCH	AREA	.01K
	0.0	177800.00	0.0	0.0	575.10	33500.00	599.76	0.0	599.89	1.05	3.60	18700.56	32703.73
	0.0	177800.00	0.0	0.0	575.10	48700.00	603.26	0.0	603.41	1.06	4.04	24369.66	47334.19
	0.0	177800.00	0.0	0.0	575.10	55800.00	604.82	0.0	604.98	1.04	4.20	26900.80	54601.71
	0.0	177800.00	0.0	0.0	575.10	75100.00	607.98	0.0	608.17	1.13	4.74	32035.73	70648.75
	0.100	920.00	0.0	0.0	575.60	33500.00	599.76	0.0	600.07	2.34	5.26	11617.43	21917.59
	0.100	920.00	0.0	0.0	575.60	48700.00	603.24	0.0	603.60	2.35	5.92	15261.85	31753.02
	0.100	920.00	0.0	0.0	575.60	55800.00	604.79	0.0	605.17	2.32	6.15	16894.11	36650.10
	0.100	920.00	0.0	0.0	575.60	75100.00	607.92	0.0	608.40	2.50	6.94	20208.57	47464.89
	0.500	1380.00	0.0	0.0	576.40	33500.00	600.12	0.0	600.30	1.12	3.83	14148.84	31724.08
	0.500	1380.00	0.0	0.0	576.40	48700.00	603.61	0.0	603.85	1.24	4.50	17899.88	43670.07
	0.500	1380.00	0.0	0.0	576.40	55800.00	605.16	0.0	605.42	1.27	4.74	19567.88	49498.32
	0.500	1380.00	0.0	0.0	576.40	75100.00	608.33	0.0	608.67	1.45	5.48	22991.75	62400.82
	1.000	2450.00	0.0	0.0	574.60	33500.00	600.39	0.0	600.57	1.09	3.43	9771.82	32040.49
	1.000	2450.00	0.0	0.0	574.60	48700.00	603.90	0.0	604.17	1.29	4.16	11704.60	42935.11
	1.000	2450.00	0.0	0.0	574.60	55800.00	605.45	0.0	605.76	1.35	4.44	12557.64	48105.00
	1.000	2450.00	0.0	0.0	574.60	75100.00	608.65	0.0	609.08	1.60	5.24	14318.43	59431.14
	1.100	1.00	610.30	612.10	574.60	33500.00	600.37	0.0	600.58	2.10	3.67	9134.93	23129.65
	1.100	1.00	610.30	612.10	574.60	48700.00	603.88	0.0	604.19	2.66	4.45	10943.15	29855.26
	1.100	1.00	610.30	612.10	574.60	55800.00	605.43	0.0	605.78	2.87	4.75	11735.51	32909.62
	1.100	1.00	610.30	612.10	574.60	75100.00	608.62	0.0	609.11	3.63	5.61	13379.32	39420.35
	1.200	56.00	610.30	612.10	574.60	33500.00	600.39	0.0	600.60	2.10	3.67	9135.99	23133.44
	1.200	56.00	610.30	612.10	574.60	48700.00	603.90	0.0	604.21	2.66	4.45	10943.91	29858.15
	1.200	56.00	610.30	612.10	574.60	55800.00	605.45	0.0	605.80	2.87	4.75	11741.43	32932.71
	1.200	56.00	610.30	612.10	574.60	75100.00	608.64	0.0	609.13	3.62	5.61	13386.88	39450.70
	1.300	1.00	0.0	0.0	574.60	33500.00	600.42	0.0	600.60	1.09	3.42	9790.37	32139.41
	1.300	1.00	0.0	0.0	574.60	48700.00	603.95	0.0	604.22	1.28	4.15	11730.82	43090.83
	1.300	1.00	0.0	0.0	574.60	55800.00	605.51	0.0	605.81	1.34	4.43	12587.00	48286.71
	1.300	1.00	0.0	0.0	574.60	75100.00	608.73	0.0	609.15	1.58	5.23	14358.41	59698.09
	2.000	142.00	0.0	0.0	577.00	33500.00	600.40	0.0	600.66	1.34	4.14	9594.62	28918.64
	2.000	142.00	0.0	0.0	577.00	48700.00	603.93	0.0	604.28	1.56	4.98	12053.21	38955.76
	2.000	142.00	0.0	0.0	577.00	55800.00	605.48	0.0	605.88	1.62	5.30	13166.13	43829.75
	2.000	142.00	0.0	0.0	577.00	75100.00	608.70	0.0	609.23	1.88	6.19	15488.33	54744.91
	2.100	1000.00	0.0	0.0	577.00	33500.00	600.60	0.0	600.79	1.11	3.75	11896.65	31796.63
	2.100	1000.00	0.0	0.0	577.00	48700.00	604.18	0.0	604.45	1.25	4.45	15034.62	43575.19
	2.100	1000.00	0.0	0.0	577.00	55800.00	605.76	0.0	606.06	1.28	4.71	16428.14	49282.34
	2.100	1000.00	0.0	0.0	577.00	75100.00	609.06	0.0	609.44	1.46	5.46	19345.96	62166.53
*	3.000	3400.00	0.0	0.0	575.00	33500.00	600.98	0.0	601.03	0.42	2.40	33628.04	51599.02
*	3.000	3400.00	0.0	0.0	575.00	48700.00	604.64	0.0	604.69	0.40	2.61	44498.34	76957.81
*	3.000	3400.00	0.0	0.0	575.00	55800.00	606.24	0.0	606.29	0.39	2.68	49263.39	89417.00
*	3.000	3400.00	0.0	0.0	575.00	75100.00	609.08	0.0	609.14	0.44	3.05	57740.08	113473.62
*	4.000	6500.00	0.0	0.0	575.70	33500.00	601.56	0.0	601.90	2.04	5.29	10859.29	23435.12
*	4.000	6500.00	0.0	0.0	575.70	48700.00	605.02	0.0	605.43	2.20	6.08	14465.54	32852.09
*	4.000	6500.00	0.0	0.0	575.70	55800.00	606.44	0.0	606.89	2.25	6.40	15957.41	37187.98
*	4.000	6500.00	0.0	0.0	575.70	75100.00	609.10	0.0	609.68	2.66	7.43	18771.09	46004.49

	SECND	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10K*S	VCH	AREA	.01K
*	4.100	2400.00	0.0	0.0	574.20	33500.00	602.20	0.0	602.34	0.96	3.71	17704.53	34169.30
*	4.100	2400.00	0.0	0.0	574.20	48700.00	605.20	0.0	605.38	1.11	4.34	23134.63	46280.34
*	4.100	2400.00	0.0	0.0	574.20	55800.00	606.50	0.0	606.70	1.14	4.56	25703.19	52215.52
*	4.100	2400.00	0.0	0.0	574.20	75100.00	609.26	0.0	609.50	1.28	5.17	31565.87	66364.12
*	4.900	2350.00	0.0	0.0	572.80	33500.00	602.55	0.0	602.73	1.00	3.85	15307.61	33519.29
*	4.900	2350.00	0.0	0.0	572.80	48700.00	605.48	0.0	605.72	1.23	4.64	18970.02	43824.03
*	4.900	2350.00	0.0	0.0	572.80	55800.00	606.50	0.0	606.78	1.37	5.02	20245.04	47715.94
*	4.900	2350.00	0.0	0.0	572.80	75100.00	609.26	0.0	609.62	1.62	5.83	23695.05	58993.59
*	5.000	510.00	0.0	0.0	572.50	33500.00	602.55	0.0	602.76	1.10	4.08	12856.27	31943.62
*	5.000	510.00	0.0	0.0	572.50	48700.00	605.48	0.0	605.79	1.43	5.04	15574.70	40707.73
*	5.000	510.00	0.0	0.0	572.50	55800.00	606.50	0.0	606.86	1.61	5.48	16540.72	43992.46
*	5.000	510.00	0.0	0.0	572.50	75100.00	609.26	0.0	609.75	1.96	6.46	19300.70	53600.53



1) COUNTY: KENT

2) STUDY NAME: GRANDVILLE / WALKER TOWNSHIP

3) WATERCOURSE: GRAND RIVER

4) DOCUMENT TYPE: SUMMARY'S — CONVEYANCE



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**************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED  AUG1977
  ERROR CORR -  01,02
  MODIFICATION -  50,51,52,53
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NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

GRANDVILLE AND WALKER TO

SUMMARY PRINTOUT TABLE 150

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10K*S	VCH	AREA	.01K
*	13.000	0.0	0.0	0.0	574.00	11500.00	581.66	581.66	583.61	148.91	11.21	1025.73	942.41
*	13.000	0.0	0.0	0.0	574.00	27200.00	584.67	584.67	587.96	130.78	14.56	1868.76	2378.50
*	13.000	0.0	0.0	0.0	574.00	31800.00	585.40	585.40	589.02	126.23	15.26	2083.82	2830.38
*	13.000	0.0	0.0	0.0	574.00	38600.00	586.40	586.40	590.48	121.79	16.21	2380.59	3497.68
*	13.000	0.0	0.0	0.0	574.00	42200.00	586.91	586.91	591.21	119.25	16.65	2535.29	3864.44
	13.000	0.0	0.0	0.0	574.00	11500.00	583.70	0.0	584.51	39.04	7.24	1587.38	1840.44
	13.000	0.0	0.0	0.0	574.00	11500.00	585.70	0.0	586.14	14.46	5.29	2172.44	3024.48
	13.000	0.0	0.0	0.0	574.00	42200.00	589.00	0.0	591.72	60.87	13.24	3224.76	5409.09
	13.000	0.0	0.0	0.0	574.00	42200.00	592.00	0.0	593.51	26.42	9.94	4672.32	8210.71
*	13.000	0.0	0.0	0.0	574.00	33500.00	585.66	585.66	589.39	124.69	15.50	2161.41	3000.09
*	13.000	0.0	0.0	0.0	574.00	48700.00	587.79	587.79	592.48	116.71	17.37	2803.70	4507.93
*	13.000	0.0	0.0	0.0	574.00	55800.00	588.83	588.83	593.76	111.99	17.83	3156.50	5272.80
*	13.000	0.0	0.0	0.0	574.00	75100.00	591.40	591.40	596.76	98.09	18.66	4362.92	7582.89
	13.001	10.00	0.0	0.0	574.00	11500.00	582.42	0.0	583.78	84.52	9.33	1232.15	1250.87
	13.001	10.00	0.0	0.0	574.00	27200.00	585.74	584.70	588.15	79.63	12.46	2183.11	3048.15
	13.001	10.00	0.0	0.0	574.00	31800.00	586.52	0.0	589.21	78.73	13.15	2417.48	3583.97
	13.001	10.00	0.0	0.0	574.00	38600.00	587.62	0.0	590.68	77.72	14.03	2750.52	4378.48
*	13.001	10.00	0.0	0.0	574.00	42200.00	588.16	586.94	591.41	77.95	14.47	2917.15	4779.62
	13.001	10.00	0.0	0.0	574.00	11500.00	583.75	0.0	584.55	38.07	7.19	1600.19	1863.81
	13.001	10.00	0.0	0.0	574.00	11500.00	585.72	0.0	586.15	14.37	5.28	2176.72	3033.97
	13.001	10.00	0.0	0.0	574.00	42200.00	589.15	0.0	591.79	58.13	13.04	3287.53	5535.09
	13.001	10.00	0.0	0.0	574.00	42200.00	592.03	0.0	593.54	26.24	9.91	4686.02	8238.81
	13.001	10.00	0.0	0.0	574.00	33500.00	586.81	0.0	589.59	77.90	13.36	2506.68	3795.67
*	13.001	10.00	0.0	0.0	574.00	48700.00	589.23	587.84	592.69	75.70	14.93	3318.84	5597.18
	13.001	10.00	0.0	0.0	574.00	55800.00	590.37	0.0	593.98	72.24	15.29	3846.09	6565.30
	13.001	10.00	0.0	0.0	574.00	75100.00	592.80	0.0	596.96	68.40	16.51	5091.01	9080.46

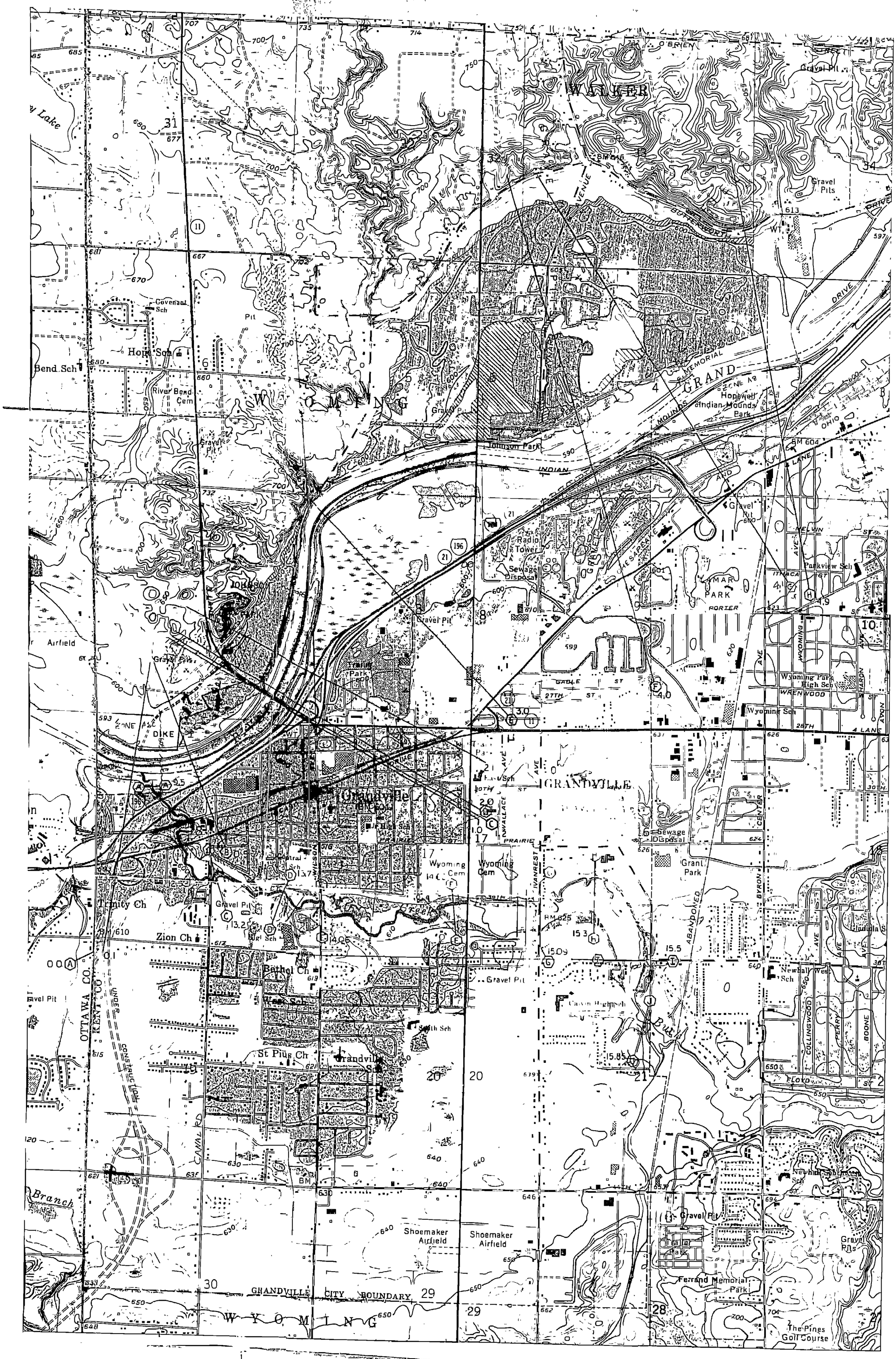
SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10K*S	VCH	AREA	.01K
13.002	20.00	0.0	0.0	574.00	11500.00	582.79	0.0	583.95	66.93	8.65	1330.17	1405.70
13.002	20.00	0.0	0.0	574.00	27200.00	586.18	0.0	588.32	65.87	11.74	2317.31	3351.31
13.002	20.00	0.0	0.0	574.00	31800.00	586.98	0.0	589.38	65.80	12.43	2558.40	3920.29
13.002	20.00	0.0	0.0	574.00	38600.00	588.11	0.0	590.85	65.86	13.28	2906.60	4756.41
13.002	20.00	0.0	0.0	574.00	42200.00	588.70	0.0	591.59	66.25	13.65	3111.71	5184.65
13.002	20.00	0.0	0.0	574.00	11500.00	583.86	0.0	584.63	35.66	7.04	1633.91	1925.82
13.002	20.00	0.0	0.0	574.00	11500.00	585.75	0.0	586.18	14.18	5.26	2185.72	3053.96
13.002	20.00	0.0	0.0	574.00	42200.00	589.42	0.0	591.92	53.78	12.70	3399.23	5754.45
13.002	20.00	0.0	0.0	574.00	42200.00	592.11	0.0	593.60	25.67	9.84	4730.26	8329.73
13.002	20.00	0.0	0.0	574.00	33500.00	587.26	0.0	589.76	66.03	12.67	2643.99	4122.65
13.002	20.00	0.0	0.0	574.00	48700.00	589.77	0.0	592.87	64.89	14.13	3562.84	6045.82
13.002	20.00	0.0	0.0	574.00	55800.00	590.89	0.0	594.15	62.35	14.55	4103.42	7066.83
13.002	20.00	0.0	0.0	574.00	75100.00	593.32	0.0	597.13	60.25	15.80	5371.45	9675.05
13.010	70.00	0.0	0.0	574.00	11500.00	583.46	0.0	584.35	44.72	7.57	1519.89	1719.72
13.010	70.00	0.0	0.0	574.00	27200.00	587.00	0.0	588.75	47.79	10.61	2564.61	3934.63
13.010	70.00	0.0	0.0	574.00	31800.00	587.85	0.0	589.82	48.71	11.26	2823.44	4556.27
13.010	70.00	0.0	0.0	574.00	38600.00	589.04	0.0	591.30	50.27	12.06	3242.13	5444.18
13.010	70.00	0.0	0.0	574.00	42200.00	589.68	0.0	592.05	49.91	12.36	3520.64	5973.11
13.010	70.00	0.0	0.0	574.00	11500.00	584.18	0.0	584.87	30.07	6.67	1725.19	2097.03
13.010	70.00	0.0	0.0	574.00	11500.00	585.86	0.0	586.28	13.53	5.18	2217.98	3125.96
13.010	70.00	0.0	0.0	574.00	42200.00	590.12	0.0	592.29	44.28	11.83	3729.63	6341.92
13.010	70.00	0.0	0.0	574.00	42200.00	592.35	0.0	593.78	24.12	9.63	4857.57	8592.77
13.010	70.00	0.0	0.0	574.00	33500.00	588.15	0.0	590.20	49.09	11.48	2917.86	4781.18
13.010	70.00	0.0	0.0	574.00	48700.00	590.77	0.0	593.31	48.99	12.83	4047.84	6957.62
13.010	70.00	0.0	0.0	574.00	55800.00	591.87	0.0	594.59	47.74	13.29	4606.63	8076.32
13.010	70.00	0.0	0.0	574.00	75100.00	594.35	0.0	597.56	47.38	14.55	5969.75	10910.00
13.020	100.00	0.0	0.0	574.00	11500.00	584.02	0.0	584.75	32.69	6.85	1679.78	2011.24
13.020	100.00	0.0	0.0	574.00	27200.00	587.71	0.0	589.20	37.40	9.79	2778.89	4447.39
13.020	100.00	0.0	0.0	574.00	31800.00	588.60	0.0	590.28	38.82	10.40	3071.51	5104.11
13.020	100.00	0.0	0.0	574.00	38600.00	589.87	0.0	591.78	39.73	11.09	3608.42	6123.71
13.020	100.00	0.0	0.0	574.00	42200.00	590.52	0.0	592.52	39.50	11.39	3923.43	6714.92
13.020	100.00	0.0	0.0	574.00	11500.00	584.54	0.0	585.15	25.04	6.29	1829.18	2298.28
13.020	100.00	0.0	0.0	574.00	11500.00	586.01	0.0	586.41	12.71	5.08	2262.45	3226.18
13.020	100.00	0.0	0.0	574.00	42200.00	590.83	0.0	592.72	36.19	11.06	4077.07	7014.98
13.020	100.00	0.0	0.0	574.00	42200.00	592.67	0.0	594.02	22.27	9.37	5025.27	8942.44
13.020	100.00	0.0	0.0	574.00	33500.00	588.92	0.0	590.67	39.26	10.60	3194.15	5346.25
13.020	100.00	0.0	0.0	574.00	48700.00	591.63	0.0	593.79	38.76	11.85	4481.60	7822.14
13.020	100.00	0.0	0.0	574.00	55800.00	592.72	0.0	595.05	38.40	12.34	5054.99	9004.76
13.020	100.00	0.0	0.0	574.00	75100.00	595.26	0.0	598.03	38.65	13.56	6591.53	12080.06
13.030	100.00	0.0	0.0	574.00	11500.00	584.41	0.0	585.05	26.71	6.42	1791.83	2225.04
13.030	100.00	0.0	0.0	574.00	27200.00	588.23	0.0	589.56	31.70	9.26	2940.71	4830.95
13.030	100.00	0.0	0.0	574.00	31800.00	589.16	0.0	590.66	32.95	9.82	3289.76	5539.52
13.030	100.00	0.0	0.0	574.00	38600.00	590.48	0.0	592.17	33.49	10.46	3900.17	6669.82
13.030	100.00	0.0	0.0	574.00	42200.00	591.13	0.0	592.91	33.35	10.75	4224.84	7307.05
13.030	100.00	0.0	0.0	574.00	11500.00	584.83	0.0	585.39	21.73	6.01	1911.92	2466.96
13.030	100.00	0.0	0.0	574.00	11500.00	586.15	0.0	586.53	12.01	4.99	2303.22	3319.01
13.030	100.00	0.0	0.0	574.00	42200.00	591.37	0.0	593.07	31.22	10.52	4347.64	7552.23
13.030	100.00	0.0	0.0	574.00	42200.00	592.96	0.0	594.24	20.75	9.15	5177.80	9263.46
13.030	100.00	0.0	0.0	574.00	33500.00	589.49	0.0	591.04	33.13	10.00	3433.40	5820.42
13.030	100.00	0.0	0.0	574.00	48700.00	592.23	0.0	594.17	33.13	11.23	4793.79	8460.73
13.030	100.00	0.0	0.0	574.00	55800.00	593.33	0.0	595.43	33.12	11.73	5381.11	9695.69
13.030	100.00	0.0	0.0	574.00	75100.00	595.91	0.0	598.41	33.36	12.91	7092.07	13002.12

SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	C#SEL	CRI#S	EG	10K*S	VCH	AREA	.01K
13.040	400.00	0.0	0.0	574.00	11500.00	585.42	0.0	585.89	16.35	5.50	2089.96	2843.69
13.040	400.00	0.0	0.0	574.00	27200.00	589.62	0.0	590.61	21.14	8.02	3487.74	5916.00
13.040	400.00	0.0	0.0	574.00	31800.00	590.64	0.0	591.75	21.71	8.49	3980.35	6825.66
13.040	400.00	0.0	0.0	574.00	38600.00	592.02	0.0	593.28	22.01	9.08	4680.57	8227.62
13.040	400.00	0.0	0.0	574.00	42200.00	592.68	0.0	594.02	22.21	9.37	5030.72	8953.85
13.040	400.00	0.0	0.0	574.00	11500.00	585.67	0.0	586.11	14.62	5.31	2164.97	3007.94
13.040	400.00	0.0	0.0	574.00	11500.00	586.63	0.0	586.97	9.86	4.69	2450.75	3662.44
13.040	400.00	0.0	0.0	574.00	42200.00	592.82	0.0	594.13	21.46	9.26	5104.82	9109.52
13.040	400.00	0.0	0.0	574.00	42200.00	593.90	0.0	594.99	16.59	8.47	5695.93	10360.67
13.040	400.00	0.0	0.0	574.00	33500.00	590.99	0.0	592.15	21.80	8.64	4158.24	7175.02
13.040	400.00	0.0	0.0	574.00	48700.00	593.81	0.0	595.29	22.53	9.84	5647.24	10260.21
13.040	400.00	0.0	0.0	574.00	55800.00	594.95	0.0	596.56	22.86	10.32	6368.27	11671.24
13.040	400.00	0.0	0.0	574.00	75100.00	597.60	0.0	599.54	22.74	11.44	8638.16	15749.52
13.050	400.00	0.0	0.0	574.00	11500.00	586.07	0.0	586.47	12.35	5.04	2283.08	3273.04
13.050	400.00	0.0	0.0	574.00	27200.00	590.54	0.0	591.37	16.33	7.33	3931.75	6731.09
13.050	400.00	0.0	0.0	574.00	31800.00	591.60	0.0	592.52	16.68	7.76	4464.07	7786.68
13.050	400.00	0.0	0.0	574.00	38600.00	593.01	0.0	594.07	17.15	8.33	5204.54	9320.02
13.050	400.00	0.0	0.0	574.00	42200.00	593.69	0.0	594.82	17.37	8.61	5582.51	10125.20
13.050	400.00	0.0	0.0	574.00	11500.00	586.25	0.0	586.63	11.46	4.92	2336.97	3396.55
13.050	400.00	0.0	0.0	574.00	11500.00	587.03	0.0	587.34	8.47	4.47	2571.63	3951.63
13.050	400.00	0.0	0.0	574.00	42200.00	593.79	0.0	594.91	17.02	8.55	5631.50	10227.53
13.050	400.00	0.0	0.0	574.00	42200.00	594.64	0.0	595.60	14.02	7.99	6155.55	11269.85
13.050	400.00	0.0	0.0	574.00	33500.00	591.96	0.0	592.92	16.81	7.91	4652.29	8169.66
13.050	400.00	0.0	0.0	574.00	48700.00	594.85	0.0	596.10	17.79	9.07	6302.17	11547.59
13.050	400.00	0.0	0.0	574.00	55800.00	596.02	0.0	597.38	17.98	9.52	7177.17	13160.72
13.050	400.00	0.0	0.0	574.00	75100.00	598.70	0.0	600.35	17.98	10.62	9815.23	17709.78
13.100	400.00	0.0	0.0	574.00	11500.00	586.80	0.0	587.13	22.90	4.60	2502.04	2402.88
13.100	400.00	0.0	0.0	574.00	27200.00	591.58	0.0	592.25	30.08	6.61	4454.69	4959.33
13.100	400.00	0.0	0.0	574.00	31800.00	592.68	0.0	593.42	30.79	7.00	5027.86	5731.17
13.100	400.00	0.0	0.0	574.00	38600.00	594.15	0.0	594.99	31.66	7.50	5844.72	6859.61
13.100	400.00	0.0	0.0	574.00	42200.00	594.86	0.0	595.75	32.06	7.73	6307.17	7452.82
13.100	400.00	0.0	0.0	574.00	11500.00	586.93	0.0	587.25	21.79	4.52	2541.64	2463.33
13.100	400.00	0.0	0.0	574.00	11500.00	587.54	0.0	587.82	17.57	4.22	2726.56	2743.18
13.100	400.00	0.0	0.0	574.00	42200.00	594.94	0.0	595.82	31.50	7.69	6360.50	7519.18
13.100	400.00	0.0	0.0	574.00	42200.00	595.58	0.0	596.37	27.23	7.30	6828.00	8086.35
13.100	400.00	0.0	0.0	574.00	33500.00	593.06	0.0	593.83	31.04	7.13	5231.57	6013.04
13.100	400.00	0.0	0.0	574.00	48700.00	596.07	0.0	597.04	32.18	8.11	7225.00	8584.38
13.100	400.00	0.0	0.0	574.00	55800.00	597.28	0.0	598.32	31.78	8.48	8317.12	9898.25
13.100	400.00	0.0	0.0	574.00	75100.00	600.08	0.0	601.29	31.03	9.31	11479.07	13482.07
13.200	1400.00	0.0	0.0	574.00	11500.00	589.08	0.0	589.28	10.93	3.58	3258.36	3478.48
13.200	1400.00	0.0	0.0	574.00	27200.00	594.65	0.0	595.03	13.99	5.07	6163.95	7272.72
13.200	1400.00	0.0	0.0	574.00	31800.00	595.86	0.0	596.29	14.46	5.38	7048.64	8363.37
13.200	1400.00	0.0	0.0	574.00	38600.00	597.43	0.0	597.91	14.70	5.80	8462.05	10067.71
13.200	1400.00	0.0	0.0	574.00	42200.00	598.19	0.0	598.70	14.79	6.00	9246.66	10972.56
13.200	1400.00	0.0	0.0	574.00	11500.00	589.14	0.0	589.34	10.74	3.56	3282.37	3509.15
13.200	1400.00	0.0	0.0	574.00	11500.00	589.44	0.0	589.63	9.82	3.45	3409.78	3669.12
13.200	1400.00	0.0	0.0	574.00	42200.00	598.22	0.0	598.73	14.68	5.98	9283.71	11014.84
13.200	1400.00	0.0	0.0	574.00	42200.00	598.51	0.0	599.00	13.73	5.85	9613.13	11389.25
13.200	1400.00	0.0	0.0	574.00	33500.00	596.27	0.0	596.71	14.54	5.50	7385.89	8785.30
13.200	1400.00	0.0	0.0	574.00	48700.00	599.45	0.0	600.01	14.94	6.32	10690.71	12600.01
13.200	1400.00	0.0	0.0	574.00	55800.00	600.69	0.0	601.29	15.07	6.62	12238.73	14371.71
13.200	1400.00	0.0	0.0	574.00	75100.00	603.56	0.0	604.26	15.43	7.34	15948.48	19117.86

SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10K*S	VCH	AREA	.01K
14.000	1800.00	0.0	0.0	573.40	11500.00	590.52	0.0	590.65	5.55	2.87	4192.53	4880.25
14.000	1800.00	0.0	0.0	573.40	27200.00	596.48	0.0	596.69	6.48	3.93	10229.02	10681.07
14.000	1800.00	0.0	0.0	573.40	31800.00	597.75	0.0	597.97	6.51	4.13	11876.79	12463.27
14.000	1800.00	0.0	0.0	573.40	38600.00	599.38	0.0	599.63	6.61	4.41	14118.98	15008.28
14.000	1800.00	0.0	0.0	573.40	42200.00	600.17	0.0	600.43	6.65	4.54	15463.59	16364.85
14.000	1800.00	0.0	0.0	573.40	11500.00	590.56	0.0	590.69	5.50	2.86	4219.96	4904.97
14.000	1800.00	0.0	0.0	573.40	11500.00	590.77	0.0	590.89	5.22	2.81	4363.79	5034.21
14.000	1800.00	0.0	0.0	573.40	42200.00	600.19	0.0	600.45	6.62	4.53	15521.86	16404.79
14.000	1800.00	0.0	0.0	573.40	42200.00	600.38	0.0	600.63	6.35	4.46	16013.59	16744.45
14.000	1800.00	0.0	0.0	573.40	33500.00	598.17	0.0	598.41	6.53	4.21	12452.93	13105.41
14.000	1800.00	0.0	0.0	573.40	48700.00	601.47	0.0	601.73	6.59	4.70	19129.06	18971.09
14.000	1800.00	0.0	0.0	573.40	55800.00	602.73	0.0	603.00	6.47	4.84	23109.63	21939.47
14.000	1800.00	0.0	0.0	573.40	75100.00	605.66	0.0	605.92	6.06	5.07	33949.52	30516.40
14.100	1000.00	0.0	0.0	573.40	11500.00	590.85	0.0	590.97	2.07	2.79	4425.60	8002.42
14.100	1000.00	0.0	0.0	573.40	27200.00	596.86	0.0	597.08	2.55	3.94	10712.41	17024.54
14.100	1000.00	0.0	0.0	573.40	31800.00	598.13	0.0	598.36	2.62	4.19	12381.41	19651.85
14.100	1000.00	0.0	0.0	573.40	38600.00	599.77	0.0	600.03	2.72	4.51	14676.59	23391.82
14.100	1000.00	0.0	0.0	573.40	42200.00	600.55	0.0	600.84	2.76	4.66	16498.65	25388.50
14.100	1000.00	0.0	0.0	573.40	11500.00	590.89	0.0	591.01	2.05	2.78	4451.09	8037.50
14.100	1000.00	0.0	0.0	573.40	11500.00	591.07	0.0	591.19	1.95	2.74	4590.46	8236.61
14.100	1000.00	0.0	0.0	573.40	42200.00	600.57	0.0	600.86	2.75	4.66	16553.05	25441.70
14.100	1000.00	0.0	0.0	573.40	42200.00	600.75	0.0	601.02	2.65	4.60	17041.79	25921.39
14.100	1000.00	0.0	0.0	573.40	33500.00	598.55	0.0	598.80	2.65	4.27	12968.13	20594.89
14.100	1000.00	0.0	0.0	573.40	48700.00	601.85	0.0	602.15	2.79	4.88	20281.02	29156.65
14.100	1000.00	0.0	0.0	573.40	55800.00	603.10	0.0	603.41	2.80	5.07	24359.53	33326.83
14.100	1000.00	0.0	0.0	573.40	75100.00	606.01	0.0	606.33	2.79	5.46	35358.50	44963.66
14.200	900.00	0.0	0.0	573.40	11500.00	591.04	0.0	591.15	1.97	2.75	4562.73	8194.76
14.200	900.00	0.0	0.0	573.40	27200.00	597.09	0.0	597.30	2.42	3.87	11015.81	17495.12
14.200	900.00	0.0	0.0	573.40	31800.00	598.37	0.0	598.59	2.48	4.11	12713.76	20184.89
14.200	900.00	0.0	0.0	573.40	38600.00	600.02	0.0	600.27	2.59	4.44	15059.89	24000.84
14.200	900.00	0.0	0.0	573.40	42200.00	600.81	0.0	601.08	2.62	4.57	17215.20	26092.25
14.200	900.00	0.0	0.0	573.40	11500.00	591.07	0.0	591.19	1.95	2.74	4587.86	8232.69
14.200	900.00	0.0	0.0	573.40	11500.00	591.25	0.0	591.36	1.86	2.69	4727.11	8438.89
14.200	900.00	0.0	0.0	573.40	42200.00	600.83	0.0	601.10	2.61	4.57	17269.54	26145.85
14.200	900.00	0.0	0.0	573.40	42200.00	600.99	0.0	601.25	2.51	4.51	17739.30	26610.60
14.200	900.00	0.0	0.0	573.40	33500.00	598.80	0.0	599.03	2.51	4.20	13308.44	21146.12
14.200	900.00	0.0	0.0	573.40	48700.00	602.11	0.0	602.39	2.64	4.78	21092.11	29978.50
14.200	900.00	0.0	0.0	573.40	55800.00	603.36	0.0	603.66	2.65	4.97	25257.18	34256.34
14.200	900.00	0.0	0.0	573.40	75100.00	606.27	0.0	606.57	2.65	5.36	36451.73	46147.86
14.300	1700.00	0.0	0.0	573.40	11500.00	591.41	0.0	591.52	2.34	2.65	4857.56	7513.94
14.300	1700.00	0.0	0.0	573.40	27200.00	597.54	0.0	597.73	2.78	3.68	11609.98	16301.45
14.300	1700.00	0.0	0.0	573.40	31800.00	598.83	0.0	599.03	2.85	3.89	13354.32	18838.58
14.300	1700.00	0.0	0.0	573.40	38600.00	600.50	0.0	600.72	2.94	4.18	16356.08	22515.61
14.300	1700.00	0.0	0.0	573.40	42200.00	601.30	0.0	601.53	2.95	4.29	18628.12	24586.42
14.300	1700.00	0.0	0.0	573.40	11500.00	591.44	0.0	591.55	2.32	2.64	4882.77	7545.88
14.300	1700.00	0.0	0.0	573.40	11500.00	591.60	0.0	591.70	2.22	2.61	5017.55	7715.98
14.300	1700.00	0.0	0.0	573.40	42200.00	601.32	0.0	601.54	2.94	4.28	18677.73	24632.28
14.300	1700.00	0.0	0.0	573.40	42200.00	601.47	0.0	601.69	2.84	4.23	19116.66	25038.83
14.300	1700.00	0.0	0.0	573.40	33500.00	599.27	0.0	599.47	2.88	3.97	13967.97	19750.74
14.300	1700.00	0.0	0.0	573.40	48700.00	602.60	0.0	602.84	2.94	4.45	22678.79	28394.27
14.300	1700.00	0.0	0.0	573.40	55800.00	603.86	0.0	604.10	2.93	4.60	27011.93	32586.43
14.300	1700.00	0.0	0.0	573.40	75100.00	606.76	0.0	607.00	2.88	4.92	38563.06	44231.24

SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10K*S	VCH	AREA	.01K
0.0	1000.00	0.0	0.0	575.10	11500.00	591.66	0.0	591.79	2.82	3.10	6561.92	6845.07
0.0	1000.00	0.0	0.0	575.10	27200.00	597.87	0.0	597.99	1.93	3.41	20722.72	19575.15
0.0	1000.00	0.0	0.0	575.10	31800.00	599.18	0.0	599.29	1.85	3.50	24478.41	23391.16
0.0	1000.00	0.0	0.0	575.10	38600.00	600.87	0.0	600.98	1.75	3.62	29757.06	29163.60
0.0	1000.00	0.0	0.0	575.10	42200.00	601.67	0.0	601.79	1.71	3.67	32370.36	32267.06
0.0	1000.00	0.0	0.0	575.10	11500.00	591.69	0.0	591.82	2.80	3.09	6606.81	6878.69
0.0	1000.00	0.0	0.0	575.10	11500.00	591.84	0.0	591.96	2.65	3.02	6852.49	7062.70
0.0	1000.00	0.0	0.0	575.10	42200.00	601.69	0.0	601.80	1.70	3.66	32422.44	32330.12
0.0	1000.00	0.0	0.0	575.10	42200.00	601.83	0.0	601.94	1.65	3.62	32866.54	32869.93
0.0	1000.00	0.0	0.0	575.10	33500.00	599.62	0.0	599.73	1.82	3.54	25835.90	24803.77
0.0	1000.00	0.0	0.0	575.10	48700.00	602.98	0.0	603.10	1.68	3.78	36642.84	37594.14
0.0	1000.00	0.0	0.0	575.10	55800.00	604.24	0.0	604.36	1.67	3.92	40846.98	43120.48
0.0	1000.00	0.0	0.0	575.10	75100.00	607.14	0.0	607.27	1.72	4.29	50844.63	57274.23
0.500	2300.00	0.0	0.0	576.40	11500.00	592.19	0.0	592.28	1.62	2.52	7830.75	9045.36
0.500	2300.00	0.0	0.0	576.40	27200.00	598.27	0.0	598.41	1.73	3.36	18222.98	20669.89
0.500	2300.00	0.0	0.0	576.40	31800.00	599.56	0.0	599.71	1.77	3.55	20771.18	23879.02
0.500	2300.00	0.0	0.0	576.40	38600.00	601.24	0.0	601.40	1.83	3.81	24193.24	28534.48
0.500	2300.00	0.0	0.0	576.40	42200.00	602.04	0.0	602.20	1.86	3.94	25826.85	30909.42
0.500	2300.00	0.0	0.0	576.40	11500.00	592.21	0.0	592.30	1.60	2.51	7862.52	9077.83
0.500	2300.00	0.0	0.0	576.40	11500.00	592.34	0.0	592.42	1.54	2.48	8038.31	9258.02
0.500	2300.00	0.0	0.0	576.40	42200.00	602.05	0.0	602.22	1.86	3.94	25857.37	30954.59
0.500	2300.00	0.0	0.0	576.40	42200.00	602.18	0.0	602.34	1.81	3.91	26113.74	31335.34
0.500	2300.00	0.0	0.0	576.40	33500.00	600.00	0.0	600.15	1.79	3.62	21664.67	25031.83
0.500	2300.00	0.0	0.0	576.40	48700.00	603.34	0.0	603.52	1.94	4.18	28495.60	34971.77
0.500	2300.00	0.0	0.0	576.40	55800.00	604.59	0.0	604.79	2.03	4.43	31080.94	39116.25
0.500	2300.00	0.0	0.0	576.40	75100.00	607.49	0.0	607.74	2.31	5.08	37059.57	49454.38
1.000	1990.00	0.0	0.0	574.50	11500.00	592.51	0.0	592.57	1.33	2.10	5464.38	9974.85
1.000	1990.00	0.0	0.0	574.50	27200.00	598.62	0.0	598.77	1.81	3.10	8784.26	20225.28
1.000	1990.00	0.0	0.0	574.50	31800.00	599.92	0.0	600.09	1.92	3.35	9496.98	22964.01
1.000	1990.00	0.0	0.0	574.50	38600.00	601.61	0.0	601.82	2.09	3.70	10424.85	26718.99
1.000	1990.00	0.0	0.0	574.50	42200.00	602.41	0.0	602.64	2.18	3.88	10866.49	28578.98
1.000	1990.00	0.0	0.0	574.50	11500.00	592.53	0.0	592.60	1.32	2.10	5474.72	10002.37
1.000	1990.00	0.0	0.0	574.50	11500.00	592.64	0.0	592.71	1.28	2.08	5531.60	10154.11
1.000	1990.00	0.0	0.0	574.50	42200.00	602.42	0.0	602.66	2.18	3.88	10874.12	28611.45
1.000	1990.00	0.0	0.0	574.50	42200.00	602.54	0.0	602.77	2.13	3.86	10937.91	28884.01
1.000	1990.00	0.0	0.0	574.50	33500.00	600.36	0.0	600.55	1.96	3.44	9740.56	23929.37
1.000	1990.00	0.0	0.0	574.50	48700.00	603.72	0.0	604.00	2.35	4.20	11592.66	31735.69
1.000	1990.00	0.0	0.0	574.50	55800.00	605.00	0.0	605.32	2.56	4.54	12291.02	34883.83
1.000	1990.00	0.0	0.0	574.50	75100.00	607.93	0.0	608.39	3.11	5.40	13906.78	42571.20
1.100	1.00	610.00	612.10	574.60	11500.00	592.50	0.0	592.58	0.25	2.32	4957.75	23097.18
1.100	1.00	610.00	612.10	574.60	27200.00	598.61	0.0	598.79	0.38	3.40	8008.45	44235.05
1.100	1.00	610.00	612.10	574.60	31800.00	599.90	0.0	600.11	0.41	3.67	8663.81	49528.30
1.100	1.00	610.00	612.10	574.60	38600.00	601.59	0.0	601.84	0.47	4.06	9511.34	56567.30
1.100	1.00	610.00	612.10	574.60	42200.00	602.39	0.0	602.67	0.49	4.26	9916.46	60002.46
1.100	1.00	610.00	612.10	574.60	11500.00	592.52	0.0	592.60	0.25	2.32	4967.31	23157.21
1.100	1.00	610.00	612.10	574.60	11500.00	592.63	0.0	592.72	0.24	2.29	5019.03	23482.23
1.100	1.00	610.00	612.10	574.60	42200.00	602.40	0.0	602.68	0.49	4.25	9923.63	60063.56
1.100	1.00	610.00	612.10	574.60	42200.00	602.52	0.0	602.79	0.49	4.23	9982.45	60566.03
1.100	1.00	610.00	612.10	574.60	33500.00	600.34	0.0	600.57	0.43	3.77	8887.73	51367.68
1.100	1.00	610.00	612.10	574.60	48700.00	603.70	0.0	604.02	0.55	4.60	10579.46	65714.06
1.100	1.00	610.00	612.10	574.60	55800.00	604.96	0.0	605.35	0.61	4.97	11221.30	71342.00
1.100	1.00	610.00	612.10	574.60	75100.00	607.89	0.0	608.43	0.79	5.91	12701.80	84652.12

SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10K*S	VCH	AREA	.01K
1.200	56.00	610.00	612.10	574.60	11500.00	592.50	0.0	592.58	0.25	2.32	4956.32	23088.27
1.200	56.00	610.00	612.10	574.60	27200.00	598.61	0.0	598.79	0.38	3.40	8007.70	44229.09
1.200	56.00	610.00	612.10	574.60	31800.00	599.91	0.0	600.11	0.41	3.67	8662.71	49519.39
1.200	56.00	610.00	612.10	574.60	38600.00	601.59	0.0	601.84	0.47	4.06	9514.91	56597.44
1.200	56.00	610.00	612.10	574.60	42200.00	602.39	0.0	602.67	0.49	4.25	9920.54	60037.23
1.200	56.00	610.00	612.10	574.60	11500.00	592.52	0.0	592.60	0.25	2.32	4965.87	23148.17
1.200	56.00	610.00	612.10	574.60	11500.00	592.64	0.0	592.72	0.24	2.29	5017.61	23473.25
1.200	56.00	610.00	612.10	574.60	42200.00	602.40	0.0	602.68	0.49	4.25	9927.32	60095.12
1.200	56.00	610.00	612.10	574.60	42200.00	602.52	0.0	602.80	0.48	4.23	9986.28	60598.72
1.200	56.00	610.00	612.10	574.60	33500.00	600.35	0.0	600.57	0.43	3.77	8886.37	51356.52
1.200	56.00	610.00	612.10	574.60	48700.00	603.70	0.0	604.03	0.55	4.60	10583.42	65748.44
1.200	56.00	610.00	612.10	574.60	55800.00	604.97	0.0	605.35	0.61	4.97	11225.75	71381.25
1.200	56.00	610.00	612.10	574.60	75100.00	607.89	0.0	608.43	0.79	5.91	12707.37	84703.00
1.300	1.00	0.0	0.0	574.50	11500.00	592.52	0.0	592.59	1.02	2.10	5466.07	11404.98
1.300	1.00	0.0	0.0	574.50	27200.00	598.65	0.0	598.80	1.38	3.09	8798.74	23176.70
1.300	1.00	0.0	0.0	574.50	31800.00	599.95	0.0	600.13	1.46	3.34	9514.16	26321.87
1.300	1.00	0.0	0.0	574.50	38600.00	601.65	0.0	601.86	1.59	3.70	10445.40	30633.71
1.300	1.00	0.0	0.0	574.50	42200.00	602.45	0.0	602.69	1.66	3.88	10889.44	32773.54
1.300	1.00	0.0	0.0	574.50	11500.00	592.54	0.0	592.61	1.01	2.10	5476.54	11436.82
1.300	1.00	0.0	0.0	574.50	11500.00	592.65	0.0	592.72	0.98	2.08	5533.06	11609.16
1.300	1.00	0.0	0.0	574.50	42200.00	602.47	0.0	602.70	1.65	3.87	10896.95	32810.20
1.300	1.00	0.0	0.0	574.50	42200.00	602.58	0.0	602.81	1.62	3.85	10960.46	33120.68
1.300	1.00	0.0	0.0	574.50	33500.00	600.40	0.0	600.58	1.49	3.43	9758.42	27429.40
1.300	1.00	0.0	0.0	574.50	48700.00	603.77	0.0	604.04	1.79	4.19	11614.80	36381.57
1.300	1.00	0.0	0.0	574.50	55800.00	605.05	0.0	605.37	1.94	4.53	12319.22	40015.15
1.300	1.00	0.0	0.0	574.50	75100.00	608.01	0.0	608.46	2.36	5.38	13947.34	48881.45



KEY TO SYMBOLS

FLOOD BOUNDARY AND FLOODWAY DATA

500 Yr Flood Boundary

100 Yr Flood Boundary

FLOODWAY FRINGE

FLOODWAY

500 Yr Flood Boundary

Approximate 100 Yr Flood Boundary

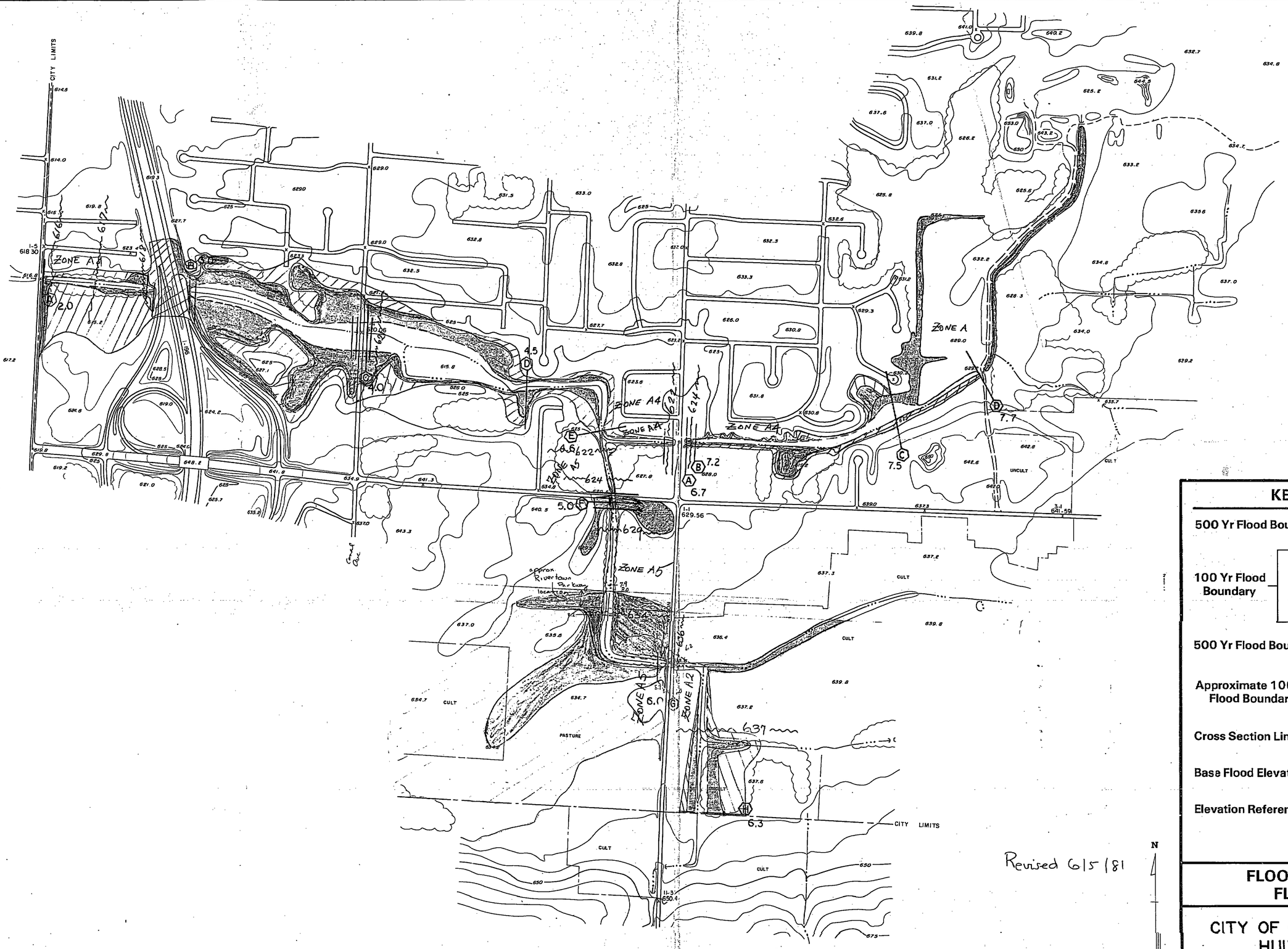
Cross Section Line

FLOOD BOUNDARY AND FLOODWAY MAP

MAP INDEX

BUCK CREEK

RECEIV
DEC
WATER MANAGEMENT



Revised 6/5/81

KEY TO SYMBOLS

- 500 Yr Flood Boundary
- 100 Yr Flood Boundary — FLOODWAY FRINGE — Floodway
- 500 Yr Flood Boundary
- Approximate 100 Yr Flood Boundary
- Cross Section Line
- Base Flood Elevation — 760
- Elevation Reference Mark — × RM 25

FLOOD BOUNDARY AND FLOODWAY MAP

CITY OF GRANDVILLE, MICH.
HUIZENGA, DRAIN

400 0 400 800 1200

SCALE 1" = 400' CONTOUR INTERVAL 5'

A. A. S. C. 17298

ABRAMS
AERIAL SURVEY CORPORATION
LANSING, MICHIGAN



1) COUNTY: KENT

2) STUDY NAME: GRANDVILLE, WALKER TWP

3) WATERCOURSE: GRAND RIVER

4) DOCUMENT TYPE: 10-50-100-500 YEAR
INPUT & SUMMARIES



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**********************************************
  HEC2 RELEASE DATED NOV 76 UPDATED  AUG1977
  ERROR CORR -  01.02
  MODIFICATION -  50,51,52,53
**********************************************

C
T1      GRAND RIVER,KENT COUNTY,MICHIGAN.
T2      GRANDVILLE AND WALKER TOWNSHIP. HUD1 62-0104-006,007.
T3       10-YEAR FLOOD

J1  ICHECK     INQ      NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ
        0.       2.        0.        0.  0.0           0.0       0.0       0.  599.600       0.0

J2  NPROF      IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE
    1.000        0.0    -1.000       0.0       0.0       0.0       0.0       0.0       0.0       0.0

NC    0.120     0.120     0.040     0.100     0.300       0.0       0.0       0.0       0.0       0.0
QT    4.000  33500.000  48700.000  55800.000  75100.000     0.0       0.0       0.0       0.0       0.0

     AT OTTAWA COUNTY- KENT COUNTY LINE (COE FPI STUDY,1972 X-SECTION C)

X1      0.0      52.000   800.000  1090.000     0.0       0.0       0.0       0.0       0.0       0.0
GR  600.000    -700.000  600.000   -700.000  600.000   -700.000  600.000   -700.000  600.000   -700.000
GR  590.200     100.000  588.500   300.000   590.000   350.000   590.800   400.000   587.400   450.000
GR  587.000     500.000  591.000   540.000   586.900   550.000   586.500   581.000   584.000   583.000
GR  583.400     590.000  584.000   600.000   583.400   611.000   584.500   620.000   589.000   650.000
GR  583.000     680.000  587.000   700.000   586.500   730.000   588.000   750.000   588.100   780.000
GR  589.300     800.000  583.000   820.000   583.000   830.000   580.000   860.000   576.000   900.000
GR  575.500     920.000  575.800   935.000   575.300   950.000   576.000   960.000   575.100   970.000
GR  577.000    1000.000  580.500  1020.000   580.800  1030.000   588.000  1045.000   592.200  1090.000
GR  591.500    1110.000  588.200  1120.000   588.700  1160.000   591.500  1175.000   593.000  1200.000
GR  592.600    1325.000  590.000  1450.000   589.000  1500.000   589.000  1550.000   591.000  1750.000
GR  600.000    2440.000  610.000  2990.000     0.0       0.0       0.0       0.0       0.0       0.0
NC    0.0       0.150     0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0

     ABOUT 2000 FT D/S OF M-11 BRIDGE (COE FPI STUDY,1972 X-SECTION D)

X1      0.500    39.000   500.000   830.000  2750.000  1600.000  2300.000     0.0       0.0       0.0
GR  607.000     120.000  589.500   160.000   587.830   200.000   590.000   270.000   591.500   350.000
GR  591.100     400.000  588.000   420.000   588.500   450.000   591.500   475.000   590.800   500.000
GR  583.000     520.000  578.000   530.000   577.000   540.000   576.800   560.000   577.000   570.000
GR  576.400     580.000  576.800   630.000   577.800   650.000   578.000   680.000   578.200   700.000
GR  579.000     750.000  579.800   780.000   584.000   782.000   588.000   810.000   594.500   830.000
GR  591.500     850.000  595.200   875.000   593.000   900.000   594.500  1000.000   594.000  1020.000
GR  589.000    1030.000  588.000  1050.000   587.000  1100.000   586.500  1150.000   586.700  1200.000
GR  586.000    1300.000  586.500  1400.000   600.000  2180.000   610.000  2190.000     0.0       0.0
NC    0.0       0.0       0.0       0.300     0.500     0.0       0.0       0.0       0.0       0.0

     1 FT D/S OF M-11 BRIDGE (COE FPI STUDY, 1972 X-SECTION 1)

X1      1.000    65.000   370.000   920.000  2600.000  2100.000  1990.000     0.0       0.0       0.0
X3     10.000     0.0       0.0       0.0       0.0       0.0       0.0   610.300   610.300     0.0
GR  610.000     100.000  611.000   250.000   612.100   370.000   593.500   370.300   593.400   390.000
GR  593.100     410.000  590.900   415.000   586.800   420.000   587.000   425.000   587.000   430.000
```

Cal case report 3 No
base which start at Yr
on d/s levee

GR	586.900	460.000	587.400	474.000	585.000	495.000	584.500	500.000	580.700	530.000
GR	580.900	545.000	578.900	564.000	579.300	570.000	579.700	575.000	579.700	579.000
GR	579.900	590.600	580.400	618.000	581.800	624.000	580.900	634.000	581.000	645.000
GR	581.000	650.000	580.900	660.000	578.900	708.000	576.000	720.000	575.000	725.000
GR	574.600	738.000	576.300	775.000	575.900	785.000	576.500	795.000	576.000	800.000
GR	574.500	815.000	575.900	820.000	576.300	839.000	581.300	855.000	592.100	864.000
GR	592.000	870.000	592.000	875.000	590.900	885.000	593.900	920.000	612.100	920.000
GR	612.100	950.000	610.300	975.000	611.000	1000.000	610.800	1050.000	610.500	1100.000
GR	610.000	1200.000	609.900	1300.000	608.900	1500.000	608.000	1700.000	606.800	1704.000
GR	605.000	1750.000	597.800	1800.000	596.800	1850.000	593.000	1900.000	591.900	1950.000
GR	591.600	2000.000	589.400	2050.000	590.000	2100.000	590.400	2150.000	605.000	2248.000
NC	0.013	0.013	0.013	0.0	0.0	0.0	0.0	0.0	0.0	0.0

D/S FACE OF M-11 BRIDGE. PIERS WERE INCLUDED IN GR CARDS

X1	1.100	53.000	370.000	920.000	1.000	1.000	1.000	0.0	0.0	0.0
BT	9.000	100.000	610.000	610.000	370.000	612.100	612.100	370.000	612.100	610.300
BT	920.000	612.100	610.300	920.000	612.100	612.100	950.000	612.100	0.0	975.000
BT	610.500	0.0	1000.000	611.000	0.0	1100.000	610.500	0.0	0.0	0.0
GR	610.000	100.000	612.100	370.000	593.500	370.000	593.000	410.000	590.500	415.000
GR	586.500	420.000	610.300	420.000	610.300	425.000	586.500	425.000	587.300	480.000
GR	585.500	495.000	610.300	495.000	610.300	500.000	584.000	500.000	581.000	530.000
GR	581.000	545.000	579.000	565.000	579.500	570.000	610.300	570.000	610.300	575.000
GR	579.800	575.000	580.500	615.000	581.800	625.000	581.000	635.000	581.000	645.000
GR	610.300	645.000	610.300	650.000	581.000	650.000	579.000	705.000	576.000	720.000
GR	610.300	720.000	610.300	725.000	575.500	725.000	575.000	735.000	576.200	795.000
GR	610.300	795.000	610.300	800.000	796.000	800.000	574.600	810.000	576.200	840.000
GR	581.000	855.000	592.000	865.000	592.000	870.000	610.300	870.000	610.300	875.000
GR	592.000	875.000	591.000	890.000	594.000	920.000	612.100	920.000	612.100	950.000
GR	610.500	975.000	611.000	1000.000	610.500	1100.000	0.0	0.0	0.0	0.0

U/S FACE OF M-11 BR.-HIGH WATER MARKS(REF:TECH APPENDIX-COE FPI STUDY)

YEAR	PEAK FLOW AT GRAND RAPIDS GAGE	HIGH WATER ELEV AT BRIDGE
1948	42200	602.70
1947	38600	601.46
1960	31800	600.40
1950	27200	599.00
1933	11500	592.37

X1	1.200	0.0	0.0	0.0	56.000	56.000	56.000	0.0	0.0	0.0
X2	0.0	0.0	0.0	0.0	0.0	0.0	1.000	0.0	0.0	0.0
NC	0.120	0.120	0.035	0.0	0.0	0.0	0.0	0.0	0.0	0.0

1 FT U/S OF M-11 BRIDGE

X1	1.300	65.000	370.000	920.000	1.000	1.000	1.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	612.100	612.100	0.0
GR	610.000	100.000	611.000	250.000	612.100	370.000	593.500	370.000	593.400	390.000
GR	593.100	410.000	590.900	415.000	586.800	420.000	587.000	425.000	587.000	430.000
GR	586.900	460.000	587.400	474.000	585.000	495.000	584.500	500.000	580.700	530.000
GR	580.900	545.000	578.900	564.000	579.300	570.000	579.700	575.000	579.700	579.000
GR	579.900	590.600	580.400	618.000	581.800	624.000	580.900	634.000	581.000	645.000
GR	581.000	650.000	580.900	660.000	578.900	708.000	576.000	720.000	575.000	725.000
GR	574.600	738.000	576.300	775.000	575.900	785.000	576.500	795.000	576.000	800.000
GR	574.500	815.000	575.900	820.000	576.300	839.000	581.300	855.000	592.100	864.000
GR	592.000	870.000	592.000	875.000	590.900	885.000	593.900	920.000	612.100	920.000
GR	612.100	950.000	610.300	975.000	611.000	1000.000	610.800	1050.000	610.500	1100.000
GR	610.000	1200.000	609.900	1300.000	608.900	1500.000	608.000	1700.000	606.800	1704.000
GR	605.000	1750.000	597.800	1800.000	596.800	1850.000	593.000	1900.000	591.900	1950.000

GR	591.600	2000.000	587.400	2050.000	590.000	2100.000	590.400	2150.000	605.000	2248.000

550 FT U/S OF M-11 BRIDGE(COE X-S 2 MOVED U/S TO MODEL CONTRACTION)

X1	2.000	72.000	1060.000	1600.000	550.000	550.000	550.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	0.0	0.0	1800.000	607.400	0.0	0.0	0.0
GR	608.000	0.0	608.400	50.000	607.000	100.000	607.300	130.000	607.000	150.000
GR	606.800	190.000	600.000	220.000	596.800	285.000	586.400	300.000	587.000	350.000
GR	587.400	400.000	587.300	450.000	587.200	540.000	587.600	550.000	587.600	550.000
GR	588.000	630.000	588.000	650.000	586.800	655.000	594.700	675.000	594.000	700.000
GR	595.000	750.000	590.800	850.000	592.000	900.000	588.800	950.000	589.700	1003.000
GR	589.300	1007.000	593.000	1015.000	593.700	1050.000	595.000	1060.000	595.000	1090.000
GR	588.700	1108.000	588.700	1140.000	589.000	1150.000	589.500	1190.000	585.000	1190.000
GR	584.000	1193.000	579.800	1200.000	579.800	1270.000	581.000	1300.000	581.000	1320.000
GR	581.600	1330.000	581.600	1360.000	579.000	1380.000	577.300	1410.000	577.100	1420.800
GR	577.500	1450.000	577.000	1460.000	577.600	1485.000	578.500	1497.000	578.500	1520.000
GR	585.000	1535.000	595.200	1575.000	596.000	1600.000	596.000	1700.000	605.000	1750.000
GR	607.200	1770.000	607.400	1800.000	594.700	1855.000	591.000	1900.000	590.800	1930.000
GR	590.300	1940.000	590.300	2000.000	588.000	2100.000	588.000	2260.000	591.700	2396.000
GR	591.700	2445.000	590.000	2500.000	591.600	2650.000	595.000	2700.000	600.600	2790.000
GR	603.000	2860.000	608.900	2940.000	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.0	0.0	0.0	0.100	0.300	0.0	0.0	0.0	0.0	0.0

(COE FPI STUDY,1972 X-SECTION 3)

X1	3.000	60.000	1420.000	1900.000	4395.000	4695.000	4555.000	0.0	0.0	0.0
GR	610.000	-1100.000	600.000	-1080.000	590.000	-780.000	590.000	-780.000	590.000	-780.000
GR	589.500	100.000	589.000	200.000	590.000	250.000	589.000	289.000	588.800	350.000
GR	589.000	420.000	589.000	450.000	588.600	550.000	592.000	600.000	592.300	650.000
GR	589.000	700.000	589.000	750.000	592.000	850.000	592.000	870.000	593.500	950.000
GR	592.500	1000.000	591.000	1050.000	590.500	1100.000	590.000	1150.000	589.700	1170.000
GR	589.000	1200.000	590.000	1245.000	594.300	1300.000	590.500	1350.000	589.500	1375.000
GR	598.200	1390.000	598.800	1400.000	598.500	1415.000	600.000	1420.000	598.000	1440.000
GR	597.000	1441.000	588.500	1480.000	588.000	1490.000	585.000	1490.000	582.200	1515.000
GR	580.000	1550.000	579.700	1570.000	580.000	1587.000	579.000	1600.000	579.000	1620.000
GR	578.000	1635.000	578.000	1650.000	576.700	1665.000	576.000	1695.000	575.000	1701.800
GR	575.000	1718.000	577.000	1735.000	580.000	1743.000	588.000	1780.000	590.000	1780.000
GR	590.600	1790.000	595.000	1850.000	591.000	1860.000	615.000	1900.000	616.000	1960.000

(COE FPI STUDY, 1972 X-SECTION 4)

X1	4.000	47.000	1270.000	1500.000	6000.000	6550.000	6510.000	0.0	0.0	0.0
GR	594.500	0.0	595.700	50.000	592.700	100.000	592.000	150.000	591.700	200.000
GR	592.000	250.000	591.400	290.000	591.400	700.000	594.000	750.000	594.400	800.000
GR	593.400	850.000	593.400	900.000	597.400	1000.000	597.700	1050.000	599.500	1100.000
GR	599.000	1110.000	600.300	1135.000	589.800	1155.000	587.900	1180.000	586.500	1200.000
GR	586.900	1225.000	593.200	1270.000	583.000	1310.000	576.300	1335.000	576.800	1360.000
GR	575.700	1368.000	576.000	1395.000	577.500	1410.000	577.500	1435.000	580.000	1460.000
GR	591.500	1500.000	589.900	1550.000	589.900	1565.000	595.600	1635.000	595.600	1650.000
GR	588.600	1715.000	587.700	1750.000	593.300	1800.000	596.700	1850.000	599.500	1870.000
GR	599.800	1900.000	596.800	1930.000	596.800	1970.000	598.600	2100.000	600.000	2130.000
GR	613.000	2150.000	614.500	2200.000	0.0	0.0	0.0	0.0	0.0	0.0
QT	4.000	33000.000	48000.000	55000.000	74000.000	0.0	0.0	0.0	0.0	0.0

(COE FPI STUDY, 1972 X-SECTION 5) USGS FIS CITY OF GRAND RAPIDS X-S A

REC INT	FLOW(CFS)	ELEV	(DATA FROM FIS REPORT BY USGS)
10-YEAR	33000	602.8	
50-YEAR	48000	605.0	
100-YEAR	55000	605.8	

500-YEAR 74000 607.7

X1	5.000	64.000	501.000	785.000	5100.000	5200.000	5200.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	398.000	606.500	2800.000	606.000	0.0	0.0	0.0
GR	607.000	0.0	606.500	30.000	594.000	62.000	592.600	150.000	592.500	200.000
GR	592.000	250.000	595.600	300.000	606.500	350.000	606.500	398.000	606.500	398.000
GR	592.500	470.000	590.700	500.000	585.000	520.000	579.000	530.000	573.500	550.000
GR	572.500	560.000	573.500	570.000	572.600	580.000	572.700	590.000	573.000	600.000
GR	579.800	620.000	578.000	630.000	573.700	650.000	573.700	670.000	576.000	690.000
GR	583.000	700.000	580.000	710.000	580.000	720.000	582.200	730.000	581.700	740.000
GR	581.700	750.000	584.500	760.000	592.500	764.000	596.000	785.000	588.500	830.000
GR	589.000	850.000	588.500	867.000	585.500	875.000	588.500	900.000	588.500	960.000
GR	596.000	990.000	594.800	1000.000	595.000	1040.000	592.000	1100.000	591.000	1150.000
GR	593.500	1200.000	594.200	1250.000	594.000	1300.000	591.000	1500.000	592.000	1650.000
GR	591.000	1900.000	592.000	2070.000	591.700	2250.000	592.500	2400.000	591.000	2450.000
GR	591.300	2510.000	600.000	2530.000	602.500	2600.000	603.000	2650.000	606.000	2750.000
GR	606.000	2800.000	598.000	2800.000	597.500	2892.000	602.000	2900.000	0.0	0.0
EJ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

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HEC2 RELEASE DATED NOV 76 UPDATED AUG1977
ERROR CORR - 01,02
MODIFICATION - 50,51,52,53
****

NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

10-YEAR FLOOD

SUMMARY PRINTOUT TABLE 150

SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10K*S	VCH	AREA	.01K
0.0	0.0	0.0	0.0	575.10	33500.00	599.60	0.0	599.72	1.83	3.54	25796.83	24762.91
0.0	0.0	0.0	0.0	575.10	48700.00	603.00	0.0	603.12	1.67	3.78	36707.37	37676.88
0.0	0.0	0.0	0.0	575.10	55800.00	604.20	0.0	604.32	1.69	3.93	40712.80	42939.94
0.0	0.0	0.0	0.0	575.10	75100.00	607.10	0.0	607.23	1.73	4.30	50720.48	57090.38
0.500	2300.00	0.0	0.0	576.40	33500.00	599.98	0.0	600.13	1.80	3.63	21628.75	24985.01
0.500	2300.00	0.0	0.0	576.40	48700.00	603.35	0.0	603.54	1.93	4.17	28549.30	35055.78
0.500	2300.00	0.0	0.0	576.40	55800.00	604.55	0.0	604.76	2.04	4.44	31024.14	39023.07
0.500	2300.00	0.0	0.0	576.40	75100.00	607.46	0.0	607.71	2.32	5.09	36991.93	49331.58
1.000	1990.00	0.0	0.0	574.50	33500.00	600.35	0.0	600.53	1.97	3.44	9732.12	23895.67
1.000	1990.00	0.0	0.0	574.50	48700.00	603.74	0.0	604.01	2.35	4.20	11601.37	31774.30
1.000	1990.00	0.0	0.0	574.50	55800.00	604.96	0.0	605.28	2.57	4.55	12271.82	34796.83
1.000	1990.00	0.0	0.0	574.50	75100.00	607.90	0.0	608.36	3.12	5.41	13889.86	42487.86
1.100	1.00	610.00	612.10	574.60	33500.00	600.33	0.0	600.55	0.43	3.77	8879.70	51301.38
1.100	1.00	610.00	612.10	574.60	48700.00	603.71	0.0	604.04	0.55	4.60	10587.49	65783.81
1.100	1.00	610.00	612.10	574.60	55800.00	604.93	0.0	605.31	0.61	4.98	11203.37	71183.50
1.100	1.00	610.00	612.10	574.60	75100.00	607.86	0.0	608.40	0.79	5.92	12686.20	84509.69
1.200	56.00	610.00	612.10	574.60	33500.00	600.33	0.0	600.55	0.43	3.77	8878.34	51290.39
1.200	56.00	610.00	612.10	574.60	48700.00	603.71	0.0	604.04	0.55	4.60	10591.33	65817.25
1.200	56.00	610.00	612.10	574.60	55800.00	604.93	0.0	605.32	0.61	4.98	11207.84	71223.00
1.200	56.00	610.00	612.10	574.60	75100.00	607.86	0.0	608.40	0.79	5.92	12691.78	84560.56
1.300	1.00	0.0	0.0	574.50	33500.00	600.38	0.0	600.56	1.50	3.44	9750.09	27391.31
1.300	1.00	0.0	0.0	574.50	48700.00	603.79	0.0	604.06	1.79	4.19	11623.52	36425.73
1.300	1.00	0.0	0.0	574.50	55800.00	605.02	0.0	605.34	1.95	4.54	12299.88	39913.68
1.300	1.00	0.0	0.0	574.50	75100.00	607.98	0.0	608.43	2.37	5.39	13930.67	48787.41
2.000	550.00	0.0	0.0	577.00	33500.00	600.54	0.0	600.65	1.23	3.05	17949.41	30250.86
2.000	550.00	0.0	0.0	577.00	48700.00	604.02	0.0	604.18	1.29	3.55	23258.68	42810.94
2.000	550.00	0.0	0.0	577.00	55800.00	605.29	0.0	605.47	1.36	3.79	25227.10	47870.05
2.000	550.00	0.0	0.0	577.00	75100.00	608.37	0.0	608.60	1.50	4.35	31322.86	61318.95
3.000	4555.00	0.0	0.0	575.00	33500.00	601.07	0.0	601.13	0.88	2.54	33119.55	35630.20
3.000	4555.00	0.0	0.0	575.00	48700.00	604.59	0.0	604.65	0.86	2.82	43546.82	52608.49
3.000	4555.00	0.0	0.0	575.00	55800.00	605.89	0.0	605.96	0.88	2.97	47420.69	59602.09
3.000	4555.00	0.0	0.0	575.00	75100.00	609.05	0.0	609.14	0.93	3.32	56841.86	78063.19

SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10K*S	VCH	AREA	.01K
4.000	6510.00	0.0	0.0	575.70	33500.00	601.77	0.0	601.97	1.95	4.46	20549.53	23995.46
4.000	6510.00	0.0	0.0	575.70	48700.00	605.26	0.0	605.49	1.96	4.96	28023.99	34786.03
4.000	6510.00	0.0	0.0	575.70	55800.00	606.58	0.0	606.82	2.02	5.20	30819.55	39307.38
4.000	6510.00	0.0	0.0	575.70	75100.00	609.76	0.0	610.04	2.14	5.79	37647.94	51380.22
5.000	5200.00	0.0	0.0	572.50	33000.00	602.56	0.0	602.67	0.97	3.28	25930.22	33567.62
5.000	5200.00	0.0	0.0	572.50	48000.00	606.09	0.0	606.23	1.06	3.77	34000.54	46658.28
5.000	5200.00	0.0	0.0	572.50	55000.00	607.44	0.0	607.58	1.11	3.98	37734.12	52312.01
5.000	5200.00	0.0	0.0	572.50	74000.00	610.69	0.0	610.86	1.19	4.46	47178.97	67724.56

1) COUNTY: KENT

2) STUDY NAME: GRANDVILLE, WALKER

3) WATERCOURSE: GRAND RIVER

4) DOCUMENT TYPE: PRODUCTION 10, 50, 100, 500
SUMMARIES & INPUT

THIS RUN EXECUTED 02/19/81

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*****************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED  AUG1977
  ERROR CORR -  01,02
  MODIFICATION -  50,51,52,53
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RECEIVED
FEB 23 1981
WATER MANAGEMENT

approved

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C
T1      FIS GRANDVILLE & WALKER, KENT COUNTY, MICHIGAN.
T2      10 -YEAR FLOOD
T3      GRAND RIVER

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ
       0.        2.        0.        0.   0.0          0.0       0.0        0.   599.760     0.0

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLOC     IBW       CHNIM     ITRACE
      1.000     0.0      -1.000     0.0       0.0       0.0       0.0       0.0       0.0       0.0

J3  VARIABLE CODES FOR SUMMARY PRINTOUT
     38.000     1.000    53.000    21.000    22.000    54.000     4.000    39.000   150.000   201.000

J5  LPRNT     NUMSEC                    ********REQUESTED SECTION NUMBERS********
    -10.000   -10.000     0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
QT      5.000  33500.000  48700.000  55800.000  75100.000  55800.000     0.0       0.0       0.0       0.0
NC      0.070      0.070      0.030      0.100      0.300      0.0       0.0       0.0       0.0       0.0
ET      0.0        0.0        0.0        0.0        0.0        1.400     0.0       0.0       0.0       0.0

        CITY LIMITS  VALLEY SECTION A

X1      0.0       51.000  11300.000  11590.000 177800.000 177800.000 177800.000     0.0       0.0       0.0
X3      0.0        0.0        0.0    10300.000     0.0    11930.000     0.0       0.0       0.0       0.0
GR    610.000   6300.000   610.000   6300.000   610.000   6700.000   600.000   8900.000   590.000   9200.000
GR    590.000   9350.000   600.000   9500.000   600.000   9800.000   590.000  10600.000   588.200  10800.000
GR    590.700  10900.000   587.200  10950.000   586.800  11000.000   591.100  11040.000   586.500  11050.000
GR    586.200  11080.000   584.200  11082.000   583.700  11090.000   584.200  11100.000   583.700  11110.000
GR    584.400  11120.000   589.000  11150.000   583.200  11180.000   587.000  11200.000   586.500  11225.000
GR    587.800  11250.000   588.000  11275.000   589.300  11300.000   582.800  11320.000   582.800  11330.000
GR    576.400  11400.000   575.400  11420.000   575.700  11430.000   575.600  11440.000   575.300  11450.000
GR    576.000  11460.000   575.100  11470.000   576.000  11480.000   576.800  11500.000   580.500  11520.000
GR    580.700  11530.000   587.500  11545.000   592.300  11590.000   591.500  11610.000   588.500  11620.000
GR    588.500  11660.000   591.500  11675.000   593.000  11700.000   592.500  11800.000   592.500  11910.000
GR    611.000  11930.000     0.0        0.0        0.0        0.0       0.0       0.0       0.0       0.0

X1      0.100     26.000   2000.000   2240.000    780.000    750.000    920.000     0.0       0.0       0.0
X3      0.0        0.0        0.0     1430.000     0.0     2500.000     0.0       0.0       0.0       0.0
GR    615.000   1000.000   615.000   1040.000   615.000   1260.000   615.000   1300.000   615.000   1430.000
GR    591.000   1450.000   590.000   1790.000   588.900   2000.000   587.900   2013.000   582.800   2025.000
GR    581.200   2036.000   580.000   2051.000   578.700   2063.000   577.500   2076.000   576.400   2088.000
GR    575.600   2101.000   575.600   2139.000   576.800   2152.000   578.100   2164.000   580.100   2177.000
GR    583.900   2190.000   586.600   2202.000   589.500   2215.000   592.300   2240.000   592.300   2480.000
GR    611.000   2500.000     0.0        0.0        0.0        0.0       0.0       0.0       0.0       0.0

        VALLEY SECTION B
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X1	0.500	38.000	2500.000	2830.000	1570.000	1100.000	1380.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	2200.000	0.0	3280.000	0.0	0.0	0.0	0.0
GR	607.000	2200.000	607.000	2200.000	587.800	2220.000	590.000	2270.000	591.500	2350.000
GR	591.100	2400.000	588.000	2420.000	588.500	2450.000	591.500	2475.000	590.800	2500.000
GR	583.000	2520.000	578.000	2530.000	577.000	2540.000	576.800	2560.000	577.000	2570.000
GR	576.400	2580.000	576.800	2630.000	577.800	2650.000	578.000	2680.000	578.200	2700.000
GR	579.000	2750.000	579.800	2780.000	584.000	2782.000	588.000	2810.000	594.500	2830.000
GR	591.500	2850.000	595.200	2875.000	593.000	2900.000	594.500	3000.000	594.000	3020.000
GR	589.000	3030.000	588.000	3050.000	587.000	3100.000	586.500	3150.000	586.700	3200.000
GR	586.000	3300.000	586.500	3400.000	611.000	3500.000	0.0	0.0	0.0	0.0
NC	0.0	0.0	0.0	0.300	0.500	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	0.0	9.100	0.0	0.0	2370.000	2920.000
X1	1.000	49.000	2370.000	2920.000	2700.000	1950.000	2450.000	0.0	0.0	0.0
GR	612.100	2370.000	612.100	2370.000	593.500	2370.000	593.000	2410.000	590.500	2415.000
GR	586.500	2420.000	586.500	2420.000	586.500	2425.000	586.500	2425.000	587.500	2480.000
GR	585.500	2495.000	585.500	2495.000	584.000	2500.000	584.000	2500.000	581.000	2530.000
GR	581.000	2545.000	579.000	2565.000	579.500	2570.000	579.500	2570.000	579.800	2575.000
GR	579.800	2575.000	580.500	2615.000	581.800	2625.000	581.000	2635.000	581.000	2645.000
GR	581.000	2645.000	581.000	2650.000	581.000	2650.000	579.000	2705.000	576.000	2720.000
GR	576.000	2720.000	575.500	2725.000	575.500	2725.000	575.000	2735.000	576.200	2795.000
GR	576.200	2795.000	576.500	2800.000	576.500	2800.000	574.600	2810.000	576.200	2840.000
GR	581.000	2855.000	592.000	2865.000	592.000	2870.000	592.000	2870.000	592.000	2875.000
GR	592.000	2875.000	591.000	2890.000	594.000	2920.000	612.100	2920.000	0.0	0.0
X1	1.100	49.000	2370.000	2920.000	1.000	1.000	1.000	0.0	0.0	0.0
X2	0.0	0.0	0.0	612.100	610.300	0.0	0.0	0.0	0.0	0.0
BT	4.000	2370.000	612.100	612.100	2370.000	612.100	610.300	2920.000	612.100	610.300
BT	2920.000	612.100	612.100	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GR	612.100	2370.000	612.100	2370.000	593.500	2370.000	593.000	2410.000	590.500	2415.000
GR	586.500	2420.000	610.300	2420.000	610.300	2425.000	586.500	2425.000	587.500	2480.000
GR	585.500	2495.000	610.300	2495.000	610.300	2500.000	584.000	2500.000	581.000	2530.000
GR	581.000	2545.000	579.000	2565.000	579.500	2570.000	610.300	2570.000	610.300	2575.000
GR	579.800	2575.000	580.500	2615.000	581.800	2625.000	581.000	2635.000	581.000	2645.000
GR	610.300	2645.000	610.300	2650.000	581.000	2650.000	579.000	2705.000	576.000	2720.000
GR	610.300	2720.000	610.300	2725.000	575.500	2725.000	575.000	2735.000	576.200	2795.000
GR	610.300	2795.000	610.300	2800.000	576.500	2800.000	574.600	2810.000	576.200	2840.000
GR	581.000	2855.000	592.000	2865.000	592.000	2870.000	610.300	2870.000	610.300	2875.000
GR	592.000	2875.000	591.000	2890.000	594.000	2920.000	612.100	2920.000	0.0	0.0

BRIDGE SECTION C M-11 BRIDGE U/S

X1	1.200	0.0	0.0	0.0	56.000	56.000	56.000	0.0	0.0	0.0
X2	0.0	0.0	0.0	612.100	610.300	0.0	1.000	0.0	0.0	0.0
X1	1.300	49.000	2370.000	2920.000	1.000	1.000	1.000	0.0	0.0	0.0
GR	612.100	2370.000	612.100	2370.000	593.500	2370.000	593.000	2410.000	590.500	2415.000
GR	586.500	2420.000	586.500	2420.000	586.500	2425.000	586.500	2425.000	587.500	2480.000
GR	585.500	2495.000	585.500	2495.000	584.000	2500.000	584.000	2500.000	581.000	2530.000
GR	581.000	2545.000	579.000	2565.000	579.500	2570.000	579.500	2570.000	579.800	2575.000
GR	579.800	2575.000	580.500	2615.000	581.800	2625.000	581.000	2635.000	581.000	2645.000
GR	581.000	2645.000	581.000	2650.000	581.000	2650.000	579.000	2705.000	576.000	2720.000
GR	576.000	2720.000	575.500	2725.000	575.500	2725.000	575.000	2735.000	576.200	2795.000
GR	576.200	2795.000	576.500	2800.000	576.500	2800.000	574.600	2810.000	576.200	2840.000
GR	581.000	2855.000	592.000	2865.000	592.000	2870.000	592.000	2870.000	592.000	2875.000
GR	592.000	2875.000	591.000	2890.000	594.000	2920.000	612.100	2920.000	0.0	0.0

VALLEY SECTION D

X1	2.000	47.000	3190.000	3575.000	142.000	142.000	142.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	3020.000	0.0	3750.000	0.0	0.0	0.0	0.0
GR	612.000	3020.000	612.000	3020.000	593.700	3050.000	595.000	3060.000	595.000	3090.000

GR	568.700	3108.000	588.700	3140.000	589.000	3150.000	589.500	3190.000	585.000	3190.000
GR	584.000	3193.000	579.800	3200.000	579.800	3270.000	581.000	3300.000	581.000	3320.000
GR	581.600	3330.000	581.600	3360.000	579.000	3380.000	577.300	3410.000	577.100	3420.000
GR	577.500	3450.000	577.000	3460.000	577.600	3485.000	578.500	3497.000	578.500	3520.000
GR	585.000	3535.000	595.200	3575.000	596.000	3600.000	596.000	3700.000	605.000	3750.000
GR	607.200	3770.000	607.400	3800.000	594.700	3855.000	591.000	3900.000	590.800	3930.000
GR	590.300	3940.000	590.300	4000.000	588.000	4100.000	588.000	4260.000	591.700	4396.000
GR	591.700	4445.000	590.000	4500.000	591.600	4650.000	595.000	4700.000	600.600	4790.000
GR	603.000	4860.000	608.900	4940.000	0.0	0.0	0.0	0.0	0.0	0.0
X1	2.100	49.000	3190.000	3590.000	1060.000	850.000	1000.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	2830.000	0.0	3720.000	0.0	0.0	0.0	0.0
GR	612.000	2830.000	612.000	2830.000	589.500	2850.000	589.500	3000.000	595.000	3020.000
GR	595.000	3020.000	595.000	3050.000	595.000	3050.000	589.500	3070.000	595.000	3090.000
GR	588.700	3108.000	588.700	3140.000	589.000	3150.000	589.500	3190.000	585.000	3190.000
GR	584.000	3193.000	579.800	3200.000	579.800	3270.000	581.000	3300.000	581.000	3320.000
GR	581.600	3330.000	581.600	3360.000	579.000	3380.000	577.300	3410.000	577.100	3420.000
GR	577.500	3450.000	577.000	3460.000	577.600	3485.000	578.500	3497.000	578.500	3520.000
GR	585.000	3535.000	595.200	3590.000	596.000	3600.000	596.000	3700.000	605.000	3720.000
GR	607.200	3740.000	607.400	3770.000	594.700	3855.000	591.000	3900.000	590.800	3930.000
GR	590.300	3940.000	590.300	4000.000	588.000	4100.000	588.000	4260.000	591.700	4396.000
GR	591.700	4445.000	590.000	4500.000	600.000	4600.000	610.000	4720.000	0.0	0.0
NC	0.0	0.0	0.0	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	0.0	9.100	0.0	0.0	938.000	3850.000

VALLEY SECTION E

X1	3.000	60.000	3480.000	3790.000	3140.000	3350.000	3400.000	0.0	0.0	0.0
X5	5.000	600.980	604.640	606.243	609.080	606.340	0.0	0.0	0.0	0.0
GR	610.000	900.000	595.000	920.000	590.000	1220.000	590.000	1220.000	590.000	1220.000
GR	589.500	2100.000	589.000	2200.000	590.000	2250.000	589.000	2289.000	588.800	2350.000
GR	589.000	2420.000	589.000	2450.000	588.600	2550.000	592.000	2600.000	592.300	2650.000
GR	589.000	2700.000	589.000	2750.000	592.000	2850.000	592.000	2870.000	593.500	2950.000
GR	592.500	3000.000	591.000	3050.000	590.500	3100.000	590.000	3150.000	589.700	3170.000
GR	589.000	3200.000	590.000	3245.000	594.300	3300.000	590.500	3350.000	589.500	3375.000
GR	598.200	3390.000	598.800	3400.000	598.500	3415.000	600.000	3420.000	598.000	3440.000
GR	597.000	3441.000	588.500	3480.000	588.000	3490.000	585.000	3490.000	582.200	3515.000
GR	580.000	3550.000	579.700	3570.000	580.000	3587.000	579.000	3600.000	579.000	3620.000
GR	578.000	3635.000	578.000	3650.000	576.700	3665.000	576.000	3695.000	575.000	3701.000
GR	575.000	3718.000	577.000	3735.000	580.000	3743.000	588.000	3780.000	590.000	3780.000
GR	590.600	3790.000	595.000	3850.000	591.000	3860.000	615.000	3900.000	616.000	3960.000
ET	0.0	0.0	0.0	0.0	0.0	9.100	0.0	0.0	3120.000	4106.000

VALLEY SECTION F

X1	4.000	37.000	3270.000	3500.000	5300.000	6900.000	6500.000	0.0	0.0	0.0
X5	5.000	601.560	605.020	606.440	609.100	606.540	0.0	0.0	0.0	0.0
GR	610.000	3080.000	610.000	3080.000	610.000	3080.000	610.000	3080.000	599.500	3100.000
GR	599.000	3110.000	600.300	3135.000	589.800	3155.000	587.900	3180.000	586.500	3200.000
GR	586.900	3225.000	593.200	3270.000	583.000	3310.000	576.300	3335.000	576.800	3360.000
GR	575.700	3368.000	576.000	3395.000	577.500	3410.000	577.500	3435.000	580.000	3460.000
GR	591.500	3500.000	589.900	3550.000	589.900	3565.000	595.600	3635.000	595.600	3650.000
GR	588.600	3715.000	587.700	3750.000	593.300	3800.000	596.700	3850.000	599.500	3870.000
GR	599.800	3900.000	596.800	3930.000	596.800	3970.000	598.600	4100.000	600.000	4130.000
GR	613.000	4150.000	614.500	4200.000	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	0.0	9.100	0.0	0.0	2565.000	4230.000

VALLEY SECTION G

X1	4.100	39.000	3225.000	3500.000	2500.000	2250.000	2400.000	0.0	-1.500	0.0
X5	5.000	602.200	605.200	606.500	609.260	606.500	0.0	0.0	0.0	0.0
GR	610.000	2550.000	591.400	2570.000	591.400	2700.000	594.000	2750.000	594.400	2800.000
GR	593.400	2850.000	593.400	2900.000	597.400	3000.000	597.700	3050.000	599.500	3100.000
GR	588.700	3108.000	588.700	3135.000	589.800	3155.000	587.900	3180.000	586.500	3200.000

GR	586.900	3225.000	593.200	3270.000	583.000	3310.000	576.300	3335.000	576.800	3360.000
GR	575.700	3368.000	576.000	3395.000	577.500	3410.000	577.500	3435.000	580.000	3460.000
GR	591.500	3500.000	589.900	3550.000	589.900	3565.000	595.600	3635.000	595.600	3650.000
GR	588.600	3715.000	587.700	3750.000	593.300	3800.000	596.700	3850.000	599.500	3870.000
GR	599.800	3900.000	596.800	3930.000	600.000	3970.000	610.000	4730.000	0.0	0.0

VALLEY SECTION H WALKER CITY LIMITS

X1	4.900	58.000	2500.000	2785.000	2100.000	2700.000	2350.000	0.0	0.300	0.0
X3	0.0	0.0	0.0	2050.000	0.0	3300.000	0.0	0.0	0.0	0.0
X5	5.000	602.550	605.480	606.500	609.260	606.600	0.0	0.0	0.0	0.0
GR	610.000	1550.000	594.000	1580.000	594.000	2062.000	592.600	2150.000	592.500	2200.000
GR	592.000	2250.000	595.600	2300.000	599.000	2350.000	599.000	2398.000	599.000	2398.000
GR	592.500	2470.000	590.700	2500.000	585.000	2520.000	579.000	2530.000	573.500	2550.000
GR	572.500	2560.000	573.500	2570.000	572.600	2580.000	572.700	2590.000	578.000	2600.000
GR	579.800	2620.000	578.000	2630.000	573.700	2650.000	573.700	2670.000	576.000	2690.000
GR	583.000	2700.000	580.000	2710.000	580.000	2720.000	582.200	2730.000	581.700	2740.000
GR	581.700	2750.000	584.500	2760.000	592.500	2764.000	596.000	2785.000	588.500	2830.000
GR	589.000	2850.000	588.500	2867.000	585.500	2875.000	588.500	2900.000	588.500	2960.000
GR	596.000	2990.000	594.800	3000.000	595.000	3040.000	592.000	3100.000	591.000	3150.000
GR	593.500	3200.000	594.200	3250.000	594.000	3300.000	591.000	3500.000	592.000	3650.000
GR	591.000	3900.000	592.000	4070.000	591.700	4250.000	592.500	4400.000	591.000	4450.000
GR	591.300	4510.000	600.000	4800.000	610.000	5550.000	0.0	0.0	0.0	0.0

X1	5.000	64.000	2500.000	2785.000	510.000	460.000	510.000	0.0	0.0	0.0
X3	0.0	0.0	0.0	2200.000	0.0	3200.000	0.0	0.0	0.0	0.0
X5	5.000	602.550	605.480	606.500	609.260	606.600	0.0	0.0	0.0	0.0
GR	607.000	2000.000	606.500	2030.000	594.000	2062.000	592.600	2150.000	592.500	2200.000
GR	592.000	2250.000	595.600	2300.000	606.500	2350.000	606.500	2398.000	606.500	2398.000
GR	592.500	2470.000	590.700	2500.000	585.000	2520.000	579.000	2530.000	573.500	2550.000
GR	572.500	2560.000	573.500	2570.000	572.600	2580.000	572.700	2590.000	578.000	2600.000
GR	579.800	2620.000	578.000	2630.000	573.700	2650.000	573.700	2670.000	576.000	2690.000
GR	583.000	2700.000	580.000	2710.000	580.000	2720.000	582.200	2730.000	581.700	2740.000
GR	581.700	2750.000	584.500	2760.000	592.500	2764.000	596.000	2785.000	588.500	2830.000
GR	589.000	2850.000	588.500	2867.000	585.500	2875.000	588.500	2900.000	588.500	2960.000
GR	596.000	2990.000	594.800	3000.000	595.000	3040.000	592.000	3100.000	591.000	3150.000
GR	593.500	3200.000	594.200	3250.000	594.000	3300.000	591.000	3500.000	592.000	3650.000
GR	591.000	3900.000	592.000	4070.000	591.700	4250.000	592.500	4400.000	591.000	4450.000
GR	591.300	4510.000	600.000	4530.000	602.500	4600.000	603.000	4650.000	606.000	4750.000
GR	606.000	4800.000	598.000	4800.000	597.500	4892.000	602.000	4900.000	0.0	0.0
EJ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

GRAND RIVER

SUMMARY PRINTOUT TABLE 150

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10K*S	VCH	AREA	.01K
	0.0	177800.00	0.0	0.0	575.10	33500.00	599.76	0.0	599.89	1.05	3.60	18700.56	32703.73
	0.0	177800.00	0.0	0.0	575.10	48700.00	603.26	0.0	603.41	1.06	4.04	24369.66	47334.19
	0.0	177800.00	0.0	0.0	575.10	55800.00	604.82	0.0	604.98	1.04	4.20	26900.80	54601.71
	0.0	177800.00	0.0	0.0	575.10	75100.00	607.98	0.0	608.17	1.13	4.74	32035.73	70648.75
	0.100	920.00	0.0	0.0	575.60	33500.00	599.76	0.0	600.07	2.34	5.26	11617.43	21917.59
	0.100	920.00	0.0	0.0	575.60	48700.00	603.24	0.0	603.60	2.35	5.92	15261.85	31753.02
	0.100	920.00	0.0	0.0	575.60	55800.00	604.79	0.0	605.17	2.32	6.15	16894.11	36650.10
	0.100	920.00	0.0	0.0	575.60	75100.00	607.92	0.0	608.40	2.50	6.94	20208.57	47464.89
	0.500	1380.00	0.0	0.0	576.40	33500.00	600.12	0.0	600.30	1.12	3.83	14148.84	31724.08
	0.500	1380.00	0.0	0.0	576.40	48700.00	603.61	0.0	603.85	1.24	4.50	17899.88	43670.07
	0.500	1380.00	0.0	0.0	576.40	55800.00	605.16	0.0	605.42	1.27	4.74	19567.88	49498.32
	0.500	1380.00	0.0	0.0	576.40	75100.00	608.33	0.0	608.67	1.45	5.48	22991.75	62400.82
	1.000	2450.00	0.0	0.0	574.60	33500.00	600.39	0.0	600.57	1.09	3.43	9771.82	32040.49
	1.000	2450.00	0.0	0.0	574.60	48700.00	603.90	0.0	604.17	1.29	4.16	11704.60	42935.11
	1.000	2450.00	0.0	0.0	574.60	55800.00	605.45	0.0	605.76	1.35	4.44	12557.64	48105.00
	1.000	2450.00	0.0	0.0	574.60	75100.00	608.65	0.0	609.08	1.60	5.24	14318.43	59431.14
	1.100	1.00	610.30	612.10	574.60	33500.00	600.37	0.0	600.58	2.10	3.67	9134.93	23129.65
	1.100	1.00	610.30	612.10	574.60	48700.00	603.88	0.0	604.19	2.66	4.45	10943.15	29855.26
	1.100	1.00	610.30	612.10	574.60	55800.00	605.43	0.0	605.78	2.87	4.75	11735.51	32909.62
	1.100	1.00	610.30	612.10	574.60	75100.00	608.62	0.0	609.11	3.63	5.61	13379.32	39420.35
	1.200	56.00	610.30	612.10	574.60	33500.00	600.39	0.0	600.60	2.10	3.67	9135.99	23133.44
	1.200	56.00	610.30	612.10	574.60	48700.00	603.90	0.0	604.21	2.66	4.45	10943.91	29858.15
	1.200	56.00	610.30	612.10	574.60	55800.00	605.45	0.0	605.80	2.87	4.75	11741.43	32932.71
	1.200	56.00	610.30	612.10	574.60	75100.00	608.64	0.0	609.13	3.62	5.61	13386.88	39450.70
	1.300	1.00	0.0	0.0	574.60	33500.00	600.42	0.0	600.60	1.09	3.42	9790.37	32139.41
	1.300	1.00	0.0	0.0	574.60	48700.00	603.95	0.0	604.22	1.28	4.15	11730.82	43090.83
	1.300	1.00	0.0	0.0	574.60	55800.00	605.51	0.0	605.81	1.34	4.43	12587.00	48286.71
	1.300	1.00	0.0	0.0	574.60	75100.00	608.73	0.0	609.15	1.58	5.23	14358.41	59698.09
	2.000	142.00	0.0	0.0	577.00	33500.00	600.40	0.0	600.66	1.34	4.14	9594.62	28918.64
	2.000	142.00	0.0	0.0	577.00	48700.00	603.93	0.0	604.28	1.56	4.98	12053.21	38955.76
	2.000	142.00	0.0	0.0	577.00	55800.00	605.48	0.0	605.88	1.62	5.30	13166.13	43829.75
	2.000	142.00	0.0	0.0	577.00	75100.00	608.70	0.0	609.23	1.88	6.19	15488.33	54744.91
	2.100	1000.00	0.0	0.0	577.00	33500.00	600.60	0.0	600.79	1.11	3.75	11896.65	31796.63
	2.100	1000.00	0.0	0.0	577.00	48700.00	604.18	0.0	604.45	1.25	4.45	15034.62	43575.19
	2.100	1000.00	0.0	0.0	577.00	55800.00	605.76	0.0	606.06	1.28	4.71	16428.14	49282.34
	2.100	1000.00	0.0	0.0	577.00	75100.00	609.06	0.0	609.44	1.46	5.46	19345.96	62166.53
*	3.000	3400.00	0.0	0.0	575.00	33500.00	600.98	0.0	601.03	0.42	2.40	33628.04	51599.02
*	3.000	3400.00	0.0	0.0	575.00	48700.00	604.64	0.0	604.69	0.40	2.61	44498.34	76957.81
*	3.000	3400.00	0.0	0.0	575.00	55800.00	606.24	0.0	606.29	0.39	2.68	49263.39	89417.00
*	3.000	3400.00	0.0	0.0	575.00	75100.00	609.08	0.0	609.14	0.44	3.05	57740.08	113473.62
*	4.000	6500.00	0.0	0.0	575.70	33500.00	601.56	0.0	601.90	2.04	5.29	10859.29	23435.12
*	4.000	6500.00	0.0	0.0	575.70	48700.00	605.02	0.0	605.43	2.20	6.08	14465.54	32852.09
*	4.000	6500.00	0.0	0.0	575.70	55800.00	606.44	0.0	606.89	2.25	6.40	15957.41	37187.98
*	4.000	6500.00	0.0	0.0	575.70	75100.00	609.10	0.0	609.68	2.66	7.43	18771.09	46004.49

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRITS	EG	10K*S	VCH	AREA	.01K
*	4.100	2400.00	0.0	0.0	574.20	33500.00	602.20	0.0	602.34	0.96	3.71	17704.53	34169.30
*	4.100	2400.00	0.0	0.0	574.20	48700.00	605.20	0.0	605.38	1.11	4.34	23134.63	46280.34
*	4.100	2400.00	0.0	0.0	574.20	55800.00	606.50	0.0	606.70	1.14	4.56	25703.19	52215.52
*	4.100	2400.00	0.0	0.0	574.20	75100.00	609.26	0.0	609.50	1.28	5.17	31565.87	66364.12
*	4.900	2350.00	0.0	0.0	572.80	33500.00	602.55	0.0	602.73	1.00	3.85	15307.61	33519.29
*	4.900	2350.00	0.0	0.0	572.80	48700.00	605.48	0.0	605.72	1.23	4.64	18970.02	43824.03
*	4.900	2350.00	0.0	0.0	572.80	55800.00	606.50	0.0	606.78	1.37	5.02	20245.04	47715.94
*	4.900	2350.00	0.0	0.0	572.80	75100.00	609.26	0.0	609.62	1.62	5.83	23695.05	58993.59
*	5.000	510.00	0.0	0.0	572.50	33500.00	602.55	0.0	602.76	1.10	4.08	12856.27	31943.62
*	5.000	510.00	0.0	0.0	572.50	48700.00	605.48	0.0	605.79	1.43	5.04	15574.70	40707.73
*	5.000	510.00	0.0	0.0	572.50	55800.00	606.50	0.0	606.86	1.61	5.48	16540.72	43992.46
*	5.000	510.00	0.0	0.0	572.50	75100.00	609.26	0.0	609.75	1.96	6.46	19300.70	53600.53