

**Exponent™**

**Expanded Two  
Dimensional Flow  
Analysis and  
Determination of No  
Floodway for the  
Congaree River  
Floodplain in  
Richland County,  
South Carolina**

**NB10261.000**

**February 12, 2001**

**Exponent™**

*Failure Analysis Associates®*

[REDACTED]

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## APPENDIX A

**02169500 Congaree River @ Columbia, SC**

## TIME SERIES RECORD

YEAR	MONTH	DAY	MINUTE	DISCHARGE	STAGE
1976	10	8	60	5055.136	3.82
1976	10	8	120	4994.941	3.8
1976	10	8	180	4098.435	3.48
1976	10	8	240	4150.001	3.5
1976	10	8	300	4699.999	3.7
1976	10	8	360	5300.001	3.9
1976	10	8	420	5363.084	3.92
1976	10	8	480	5300.001	3.9
1976	10	8	540	5238.174	3.88
1976	10	8	600	5238.174	3.88
1976	10	8	660	9713.756	5.18
1976	10	8	720	11467.39	5.68
1976	10	8	780	11571.68	5.71
1976	10	8	840	13394.13	6.23
1976	10	8	900	14350	6.5
1976	10	8	960	14350	6.5
1976	10	8	1020	13219.91	6.18
1976	10	8	1080	11886.89	5.799999
1976	10	8	1140	10488.75	5.4
1976	10	8	1200	10417.17	5.38
1976	10	8	1260	11225.59	5.61
1976	10	8	1320	11156.91	5.59
1976	10	8	1380	11641.42	5.73
1976	10	8	1440	11886.89	5.799999
1976	10	9	60	11606.52	5.72
1976	10	9	120	11641.42	5.73
1976	10	9	180	11606.52	5.72
1976	10	9	240	12205.64	5.89
1976	10	9	300	12942.97	6.1
1976	10	9	360	16100.01	7
1976	10	9	420	19100.42	7.88
1976	10	9	480	21807.67	8.78
1976	10	9	540	24339.58	9.62
1976	10	9	600	27655.21	10.72
1976	10	9	660	31865.58	11.99
1976	10	9	720	36627.11	13.29
1976	10	9	780	39789.61	14.12
1976	10	9	840	43394.88	14.99
1976	10	9	900	45979.88	15.6
1976	10	9	960	48338.89	16.14
1976	10	9	1020	50458.53	16.6
1976	10	9	1080	52280.11	16.99
1976	10	9	1140	53175.57	17.18
1976	10	9	1200	56616.27	17.9
1976	10	9	1260	59822.43	18.5
1976	10	9	1320	61870.5	18.87
1976	10	9	1380	62149.45	18.92
1976	10	9	1440	62484.88	18.98
1976	10	10	60	62652.84	19.01
1976	10	10	120	63270.4	19.12

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1976	10	10	180	64399.54	19.32
1976	10	10	240	66165.95	19.63
1976	10	10	300	67894.12	19.93
1976	10	10	360	69885.7	20.23
1976	10	10	420	72475.02	20.6
1976	10	10	480	74752.45	20.92
1976	10	10	540	76049.05	21.1
1976	10	10	600	80451.91	21.7
1976	10	10	660	84341.27	22.2
1976	10	10	720	87760.45	22.61
1976	10	10	780	92202.6	23.13
1976	10	10	840	97475.48	23.73
1976	10	10	900	102589.1	24.31
1976	10	10	960	107093.7	24.82
1976	10	10	1020	110424.4	25.19
1976	10	10	1080	114361.4	25.62
1976	10	10	1140	121243.4	26.38
1976	10	10	1200	127066.2	27.03
1976	10	10	1260	132465.3	27.62
1976	10	10	1320	136211.1	28.02
1976	10	10	1380	138332.9	28.22
1976	10	10	1440	137376	28.13
1976	10	11	60	141333.2	28.5
1976	10	11	120	142629.7	28.62
1976	10	11	180	144914	28.83
1976	10	11	240	146008.5	28.93
1976	10	11	300	147107.7	29.03
1976	10	11	360	148211.1	29.13
1976	10	11	420	149208.1	29.22
1976	10	11	480	150320.2	29.32
1976	10	11	540	151436.6	29.42
1976	10	11	600	152557.4	29.52
1976	10	11	660	153682.8	29.62
1976	10	11	720	155039.2	29.74
1976	10	11	780	154134.3	29.66
1976	10	11	840	153232.2	29.58
1976	10	11	900	152332.9	29.5
1976	10	11	960	151212.9	29.4
1976	10	11	1020	150320.2	29.32
1976	10	11	1080	148986.3	29.2
1976	10	11	1140	147328	29.05
1976	10	11	1200	145679.7	28.9
1976	10	11	1260	144041.4	28.75
1976	10	11	1320	142413.1	28.6
1976	10	11	1380	140794.9	28.45
1976	10	11	1440	139186.6	28.3
1976	10	12	60	137588.2	28.15
1976	10	12	120	136000	28
1976	10	12	180	133948.2	27.78
1976	10	12	240	131819.2	27.55
1976	10	12	300	129158.2	27.26
1976	10	12	360	126432.8	26.96
1976	10	12	420	121686.5	26.43
1976	10	12	480	116963.4	25.9
1976	10	12	540	113347.5	25.51
1976	10	12	600	109428.7	25.08
1976	10	12	660	107809.4	24.9

Appendix A

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1976	10	12	720	107899	24.91
1976	10	12	780	105138.3	24.6
1976	10	12	840	101456.9	24.18
1976	10	12	900	96142.44	23.58
1976	10	12	960	89369.83	22.8
1976	10	12	1020	84341.27	22.2
1976	10	12	1080	80526.37	21.71
1976	10	12	1140	76049.05	21.1
1976	10	12	1200	71209.45	20.42
1976	10	12	1260	68987.18	20.1
1976	10	12	1320	67258.38	19.82
1976	10	12	1380	63326.66	19.13
1976	10	12	1440	59273.73	18.4
1976	10	13	60	55653.05	17.7
1976	10	13	120	52797.89	17.1
1976	10	13	180	50365.74	16.58
1976	10	13	240	48156.04	16.1
1976	10	13	300	46022.65	15.61
1976	10	13	360	43436.87	15
1976	10	13	420	42599.24	14.8
1976	10	13	480	40939.29	14.4
1976	10	13	540	39707.84	14.1
1976	10	13	600	39299.99	14
1976	10	13	660	39299.99	14
1976	10	13	720	38542.1	13.8
1976	10	13	780	35846.06	13.08
1976	10	13	840	34554.12	12.73
1976	10	13	900	33420.27	12.42
1976	10	13	960	33711.95	12.5
1976	10	13	1020	34077.44	12.6
1976	10	13	1080	33784.95	12.52
1976	10	13	1140	33456.68	12.43
1976	10	13	1200	33311.06	12.39
1976	10	13	1260	32947.76	12.29
1976	10	13	1320	32007.97	12.03
1976	10	13	1380	30905.04	11.71
1976	10	13	1440	28836.02	11.1
1976	10	14	60	26694.25	10.4
1976	10	14	120	24979.76	9.83
1976	10	14	180	22706.53	9.08
1976	10	14	240	21867.4	8.8
1976	10	14	300	20678	8.4
1976	10	14	360	19587.94	8.03
1976	10	14	420	18538.21	7.71
1976	10	14	480	17565.99	7.42
1976	10	14	540	18275.2	7.63
1976	10	14	600	21063.33	8.53
1976	10	14	660	22526.28	9.02
1976	10	14	720	22556.29	9.03
1976	10	14	780	22856.94	9.13
1976	10	14	840	23671.98	9.4
1976	10	14	900	23975.06	9.5
1976	10	14	960	24248.37	9.59
1976	10	14	1020	24309.17	9.61
1976	10	14	1080	24278.77	9.599998
1976	10	14	1140	24217.98	9.58
1976	10	14	1200	24217.98	9.58

1976	10	14	1260	24066.09	9.53
1976	10	14	1320	23399.76	9.31
1976	10	14	1380	21628.63	8.72
1976	10	14	1440	19433.25	7.98
1976	10	15	60	16445.21	7.1
1976	10	15	120	15461.75	6.82
1976	10	15	180	13993.02	6.4
1976	10	15	240	12977.47	6.11
1976	10	15	300	12205.64	5.89
1976	10	15	360	10917.9	5.52
1976	10	15	420	10488.75	5.4
1976	10	15	480	10850	5.5
1976	10	15	540	12312.68	5.92
1976	10	15	600	15673.49	6.88
1976	10	15	660	16897.57	7.23
1976	10	15	720	17850	7.5
1976	10	15	780	17565.99	7.42
1976	10	15	840	18144.09	7.59
1976	10	15	900	18934.58	7.83
1976	10	15	960	18144.09	7.59
1976	10	15	1020	19166.86	7.9
1976	10	15	1080	19793.41	8.099999
1976	10	15	1140	20087.54	8.2
1976	10	15	1200	19793.41	8.099999
1976	10	15	1260	19793.41	8.099999
1976	10	15	1320	20058.1	8.19
1976	10	15	1380	18901.48	7.82
1976	10	15	1440	16723.1	7.18

## CONGAREE CREEK AT CAYCE

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# US GEOLOGICAL SURVEY
# DAILY MEAN DISCHARGE DATA
#
# Station name : Congaree Creek At Cayce, S.C.
# Station number: 02169550
# latitude (ddmmss)..... 335615
# longitude (dddmmss)..... 0810440
# state code..... 45
# county..... Lexington
# hydrologic unit code..... 03050110
# basin name..... Congaree
# drainage area (square miles)..... 122
# contributing drainage area (square miles).....
# gage datum (feet above NGVD)..... 128.98
# base discharge (cubic ft/sec)..... 600
# WATSTORE parameter code..... 00060
# WATSTORE statistic code..... 00003
# Discharge is listed in the table in cubic feet per second.
#
# Daily mean discharge data were retrieved from the
# National Water Information System files called ADAPS.
#
# Format of table is as follows.
# Lines starting with the # character are comment lines describing the data
# included in this file. The next line is a row of tab-delimited column
# names that are Date and Discharge. The next line is a row of tab-delimited
# data type codes that describe a 10-character-wide date (10d) and an
# 8-character-wide numeric value for discharge (8n). All following lines are
# rows of tab-delimited data values of date (year.month.day) and discharge.
# A value of "E" or "e" in the Flags field indicates that the discharge for
# this day was estimated. Any other values shown in this field are irrelevant.
#

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# Appendix A

# NOTE this file was requested from the NWIS-W software package  
 # on Mon Dec 4 13:54:52 2000  
 # Dates are now in YYYY.MM.DD format.  
 #  
 # ----Date Range In File----  
 # 1 10/01/1975-09/30/1977

Date	Discharge			Flags	
10s	8n	2s			
10/01/1975		192		11/29/1975	182
10/02/1975		191		11/30/1975	179
10/03/1975		187		12/01/1975	191
10/04/1975		178		12/02/1975	205
10/05/1975		173		12/03/1975	195
10/06/1975		173		12/04/1975	186
10/07/1975		177		12/05/1975	181
10/08/1975		179		12/06/1975	178
10/09/1975		195		12/07/1975	182
10/10/1975		205		12/08/1975	199
10/11/1975		190		12/09/1975	207
10/12/1975		181		12/10/1975	244
10/13/1975		177		12/11/1975	240
10/14/1975		177		12/12/1975	203
10/15/1975		177		12/13/1975	188
10/16/1975		176		12/14/1975	182
10/17/1975		179		12/15/1975	182
10/18/1975		218		12/16/1975	186
10/19/1975		212		12/17/1975	225
10/20/1975		184		12/18/1975	282
10/21/1975		173		12/19/1975	306
10/22/1975		173		12/20/1975	256
10/23/1975		173		12/21/1975	209
10/24/1975		171		12/22/1975	197
10/25/1975		173		12/23/1975	195
10/26/1975		177		12/24/1975	194
10/27/1975		174		12/25/1975	192
10/28/1975		173		12/26/1975	217
10/29/1975		173		12/27/1975	252
10/30/1975		173		12/28/1975	244
				12/29/1975	209
				12/30/1975	216
				12/31/1975	289
				01/01/1976	350
				01/02/1976	314
				01/03/1976	264
				01/04/1976	230
				01/05/1976	211
				01/06/1976	201
				01/07/1976	211
				01/08/1976	292
				01/09/1976	356
				01/10/1976	308
				01/11/1976	253
				01/12/1976	223
				01/13/1976	200
				01/14/1976	204
				01/15/1976	207
				01/16/1976	207
				01/17/1976	199
				01/18/1976	181
				01/19/1976	187
				01/20/1976	184
				01/21/1976	188
				01/22/1976	188
				01/23/1976	186
				01/24/1976	187
				01/25/1976	188
				01/26/1976	188
				01/27/1976	247
				01/28/1976	360
				01/29/1976	368
				01/30/1976	289
				01/31/1976	226
				02/01/1976	211

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02/02/1976	238	04/13/1976	155
02/03/1976	248	04/14/1976	158
02/04/1976	226	04/15/1976	156
02/05/1976	207	04/16/1976	154
02/06/1976	201	04/17/1976	154
02/07/1976	195	04/18/1976	153
02/08/1976	184	04/19/1976	152
02/09/1976	190	04/20/1976	150
02/10/1976	190	04/21/1976	147
02/11/1976	190	04/22/1976	148
02/12/1976	181	04/23/1976	150
02/13/1976	181	04/24/1976	143
02/14/1976	181	04/25/1976	142
02/15/1976	179	04/26/1976	147
02/16/1976	179	04/27/1976	146
02/17/1976	181	04/28/1976	148
02/18/1976	178	04/29/1976	148
02/19/1976	179	04/30/1976	152
02/20/1976	181	05/01/1976	197
02/21/1976	178	05/02/1976	226
02/22/1976	181	05/03/1976	187
02/23/1976	183	05/04/1976	160
02/24/1976	178	05/05/1976	152
02/25/1976	173	05/06/1976	149
02/26/1976	172	05/07/1976	153
02/27/1976	172	05/08/1976	158
02/28/1976	172	05/09/1976	162
02/29/1976	172	05/10/1976	158
03/01/1976	171	05/11/1976	153
03/02/1976	170	05/12/1976	152
03/03/1976	168	05/13/1976	147
03/04/1976	166	05/14/1976	152
03/05/1976	166	05/15/1976	170
03/06/1976	173	05/16/1976	238
03/07/1976	181	05/17/1976	218
03/08/1976	171	05/18/1976	181
03/09/1976	195	05/19/1976	159
03/10/1976	230	05/20/1976	149
03/11/1976	214	05/21/1976	144
03/12/1976	186	05/22/1976	141
03/13/1976	231	05/23/1976	147
03/14/1976	279	05/24/1976	197
03/15/1976	263	05/25/1976	235
03/16/1976	346	05/26/1976	201
03/17/1976	542	05/27/1976	171
03/18/1976	426	05/28/1976	164
03/19/1976	312	05/29/1976	190
03/20/1976	240	05/30/1976	197
03/21/1976	214	05/31/1976	170
03/22/1976	208	06/01/1976	156
03/23/1976	200	06/02/1976	153
03/24/1976	196	06/03/1976	181
03/25/1976	191	06/04/1976	255
03/26/1976	190	06/05/1976	280
03/27/1976	191	06/06/1976	226
03/28/1976	195	06/07/1976	167
03/29/1976	190	06/08/1976	155
03/30/1976	191	06/09/1976	150
03/31/1976	192	06/10/1976	178
04/01/1976	194	06/11/1976	166
04/02/1976	186	06/12/1976	152
04/03/1976	177	06/13/1976	144
04/04/1976	174	06/14/1976	152
04/05/1976	168	06/15/1976	164
04/06/1976	167	06/16/1976	168
04/07/1976	167	06/17/1976	374
04/08/1976	167	06/18/1976	385
04/09/1976	166	06/19/1976	273
04/10/1976	164	06/20/1976	248
04/11/1976	164	06/21/1976	246
04/12/1976	161	06/22/1976	248

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06/23/1976	211	09/02/1976	143
06/24/1976	291	09/03/1976	149
06/25/1976	352	09/04/1976	159
06/26/1976	271	09/05/1976	158
06/27/1976	235	09/06/1976	155
06/28/1976	356	09/07/1976	153
06/29/1976	392	09/08/1976	149
06/30/1976	326	09/09/1976	147
07/01/1976	253	09/10/1976	146
07/02/1976	207	09/11/1976	142
07/03/1976	184	09/12/1976	142
07/04/1976	186	09/13/1976	142
07/05/1976	439	09/14/1976	161
07/06/1976	740	09/15/1976	273
07/07/1976	515	09/16/1976	475
07/08/1976	350	09/17/1976	390
07/09/1976	264	09/18/1976	279
07/10/1976	270	09/19/1976	182
07/11/1976	267	09/20/1976	171
07/12/1976	194	09/21/1976	167
07/13/1976	183	09/22/1976	168
07/14/1976	172	09/23/1976	162
07/15/1976	166	09/24/1976	158
07/16/1976	161	09/25/1976	160
07/17/1976	159	09/26/1976	162
07/18/1976	162	09/27/1976	168
07/19/1976	221	09/28/1976	172
07/20/1976	242	09/29/1976	192
07/21/1976	181	09/30/1976	276
07/22/1976	165	10/01/1976	284
07/23/1976	171	10/02/1976	238
07/24/1976	223	10/03/1976	182
07/25/1976	183	10/04/1976	168
07/26/1976	166	10/05/1976	165
07/27/1976	164	10/06/1976	161
07/28/1976	176	10/07/1976	163
07/29/1976	184	10/08/1976	209
07/30/1976	170	10/09/1976	259
07/31/1976	160	10/10/1976	324
08/01/1976	158	10/11/1976	320
08/02/1976	153	10/12/1976	300
08/03/1976	150	10/13/1976	191
08/04/1976	152	10/14/1976	174
08/05/1976	148	10/15/1976	169
08/06/1976	147	10/16/1976	167
08/07/1976	149	10/17/1976	194
08/08/1976	159	10/18/1976	261
08/09/1976	158	10/19/1976	271
08/10/1976	153	10/20/1976	297
08/11/1976	149	10/21/1976	429
08/12/1976	147	10/22/1976	367
08/13/1976	148	10/23/1976	279
08/14/1976	146	10/24/1976	222
08/15/1976	143	10/25/1976	205
08/16/1976	143	10/26/1976	210
08/17/1976	142	10/27/1976	209
08/18/1976	142	10/28/1976	194
08/19/1976	138	10/29/1976	184
08/20/1976	137	10/30/1976	183
08/21/1976	158	10/31/1976	188
08/22/1976	173	11/01/1976	194
08/23/1976	174	11/02/1976	190
08/24/1976	165	11/03/1976	184
08/25/1976	155	11/04/1976	182
08/26/1976	154	11/05/1976	178
08/27/1976	150	11/06/1976	176
08/28/1976	149	11/07/1976	177
08/29/1976	147	11/08/1976	179
08/30/1976	154	11/09/1976	177
08/31/1976	148	11/10/1976	174
09/01/1976	143	11/11/1976	176

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11/12/1976	182	01/22/1977	230
11/13/1976	184	01/23/1977	227
11/14/1976	186	01/24/1977	227
11/15/1976	272	01/25/1977	238
11/16/1976	414	01/26/1977	244
11/17/1976	380	01/27/1977	239
11/18/1976	300	01/28/1977	234
11/19/1976	240	01/29/1977	232
11/20/1976	213	01/30/1977	227
11/21/1976	208	01/31/1977	221
11/22/1976	203	02/01/1977	216
11/23/1976	194	02/02/1977	215
11/24/1976	190	02/03/1977	213
11/25/1976	187	02/04/1977	215
11/26/1976	187	02/05/1977	216
11/27/1976	209	02/06/1977	212
11/28/1976	243	02/07/1977	209
11/29/1976	328	02/08/1977	209
11/30/1976	382	02/09/1977	209
12/01/1976	326	02/10/1977	209
12/02/1976	268	02/11/1977	208
12/03/1976	229	02/12/1977	209
12/04/1976	209	02/13/1977	210
12/05/1976	202	02/14/1977	210
12/06/1976	202	02/15/1977	206
12/07/1976	259	02/16/1977	204
12/08/1976	338	02/17/1977	200
12/09/1976	318	02/18/1977	200
12/10/1976	266	02/19/1977	201
12/11/1976	234	02/20/1977	205
12/12/1976	396	02/21/1977	202
12/13/1976	695	02/22/1977	199
12/14/1976	569	02/23/1977	199
12/15/1976	393	02/24/1977	217
12/16/1976	448	02/25/1977	255
12/17/1976	396	02/26/1977	263
12/18/1976	330	02/27/1977	234
12/19/1976	287	02/28/1977	244
12/20/1976	269	03/01/1977	255
12/21/1976	262	03/02/1977	234
12/22/1976	252	03/03/1977	209
12/23/1976	236	03/04/1977	212
12/24/1976	232	03/05/1977	242
12/25/1976	231	03/06/1977	261
12/26/1976	269	03/07/1977	311
12/27/1976	336	03/08/1977	354
12/28/1976	311	03/09/1977	306
12/29/1976	272	03/10/1977	256
12/30/1976	247	03/11/1977	236
12/31/1976	230	03/12/1977	231
01/01/1977	224	03/13/1977	263
01/02/1977	219	03/14/1977	332
01/03/1977	224	03/15/1977	315
01/04/1977	249	03/16/1977	272
01/05/1977	266	03/17/1977	239
01/06/1977	256	03/18/1977	212
01/07/1977	256	03/19/1977	206
01/08/1977	271	03/20/1977	217
01/09/1977	266	03/21/1977	253
01/10/1977	402	03/22/1977	393
01/11/1977	499	03/23/1977	508
01/12/1977	382	03/24/1977	373
01/13/1977	304	03/25/1977	293
01/14/1977	275	03/26/1977	253
01/15/1977	278	03/27/1977	235
01/16/1977	278	03/28/1977	227
01/17/1977	265	03/29/1977	235
01/18/1977	247	03/30/1977	256
01/19/1977	239	03/31/1977	255
01/20/1977	232	04/01/1977	244
01/21/1977	232	04/02/1977	231

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04/03/1977	226	06/13/1977	140
04/04/1977	221	06/14/1977	147
04/05/1977	230	06/15/1977	184
04/06/1977	255	06/16/1977	212
04/07/1977	235	06/17/1977	205
04/08/1977	206	06/18/1977	218
04/09/1977	197	06/19/1977	200
04/10/1977	195	06/20/1977	194
04/11/1977	191	06/21/1977	225
04/12/1977	190	06/22/1977	201
04/13/1977	186	06/23/1977	167
04/14/1977	186	06/24/1977	155
04/15/1977	184	06/25/1977	150
04/16/1977	182	06/26/1977	149
04/17/1977	183	06/27/1977	148
04/18/1977	181	06/28/1977	144
04/19/1977	178	06/29/1977	141
04/20/1977	179	06/30/1977	141
04/21/1977	181	07/01/1977	147
04/22/1977	177	07/02/1977	144
04/23/1977	178	07/03/1977	143
04/24/1977	192	07/04/1977	142
04/25/1977	188	07/05/1977	137
04/26/1977	178	07/06/1977	135
04/27/1977	171	07/07/1977	135
04/28/1977	167	07/08/1977	134
04/29/1977	165	07/09/1977	132
04/30/1977	167	07/10/1977	130
05/01/1977	172	07/11/1977	129
05/02/1977	172	07/12/1977	128
05/03/1977	169	07/13/1977	130
05/04/1977	167	07/14/1977	140
05/05/1977	165	07/15/1977	138
05/06/1977	160	07/16/1977	132
05/07/1977	157	07/17/1977	129
05/08/1977	155	07/18/1977	134
05/09/1977	155	07/19/1977	135
05/10/1977	152	07/20/1977	131
05/11/1977	152	07/21/1977	129
05/12/1977	152	07/22/1977	128
05/13/1977	152	07/23/1977	130
05/14/1977	150	07/24/1977	130
05/15/1977	149	07/25/1977	126
05/16/1977	147	07/26/1977	128
05/17/1977	149	07/27/1977	135
05/18/1977	148	07/28/1977	136
05/19/1977	146	07/29/1977	144
05/20/1977	150	07/30/1977	170
05/21/1977	150	07/31/1977	168
05/22/1977	150	08/01/1977	186
05/23/1977	154	08/02/1977	233
05/24/1977	153	08/03/1977	368
05/25/1977	167	08/04/1977	305
05/26/1977	208	08/05/1977	230
05/27/1977	217	08/06/1977	185
05/28/1977	208	08/07/1977	165
05/29/1977	176	08/08/1977	150
05/30/1977	162	08/09/1977	145
05/31/1977	156	08/10/1977	145
06/01/1977	161	08/11/1977	145
06/02/1977	155	08/12/1977	145
06/03/1977	147	08/13/1977	145
06/04/1977	143	08/14/1977	150
06/05/1977	140	08/15/1977	160
06/06/1977	135	08/16/1977	165
06/07/1977	136	08/17/1977	165
06/08/1977	141	08/18/1977	175
06/09/1977	140	08/19/1977	180
06/10/1977	137	08/20/1977	175
06/11/1977	137	08/21/1977	165
06/12/1977	137	08/22/1977	160

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08/23/1977	160
08/24/1977	160
08/25/1977	165
08/26/1977	165
08/27/1977	180
08/28/1977	185
08/29/1977	180
08/30/1977	180
08/31/1977	175
09/01/1977	170
09/02/1977	170
09/03/1977	175
09/04/1977	185
09/05/1977	190
09/06/1977	190
09/07/1977	190
09/08/1977	186
09/09/1977	187
09/10/1977	183
09/11/1977	177
09/12/1977	170
09/13/1977	164
09/14/1977	162
09/15/1977	161
09/16/1977	165
09/17/1977	187
09/18/1977	201
09/19/1977	179
09/20/1977	167
09/21/1977	161
09/22/1977	156
09/23/1977	155
09/24/1977	153
09/25/1977	154
09/26/1977	158
09/27/1977	173
09/28/1977	174
09/29/1977	169
09/30/1977	168

## GILLS CREEK AT COLUMBIA

```
# US GEOLOGICAL SURVEY
# DAILY MEAN DISCHARGE DATA
#
# Station name : Gills Creek At Columbia, Sc
# Station number: 02169570
# latitude (ddmmss)..... 335922
# longitude (dddmmss)..... 0805828
# state code..... 45
# county..... Richland
# hydrologic unit code..... 03050110
# basin name..... Congaree
# drainage area (square miles)..... 59.6
# contributing drainage area (square miles).....
# gage datum (feet above NGVD)..... 137.38
# base discharge (cubic ft/sec)..... 500
# WATSTORE parameter code..... 00060
# WATSTORE statistic code..... 00003
# Discharge is listed in the table in cubic feet per second.
#
# Daily mean discharge data were retrieved from the
# National Water Information System files called ADAPS.
#
# Format of table is as follows.
# Lines starting with the # character are comment lines describing the data
# included in this file. The next line is a row of tab-delimited column
# names that are Date and Discharge. The next line is a row of tab-delimited
# data type codes that describe a 10-character-wide date (10d) and an
# 8-character-wide numeric value for discharge (8n). All following lines are
# rows of tab-delimited data values of date (year.month.day) and discharge.
# A value of "E" or "e" in the Flags field indicates that the discharge for
# this day was estimated. Any other values shown in this field are irrelevant.
#
# NOTE this file was requested from the NWIS-W software package
# on Mon Dec 4 13:59:33 2000
# Dates are now in YYYY.MM.DD format.
#
# ----Date Range In File----
# 1 10/01/1975-09/30/1977
```

Date	Discharge	Flags	Date	Discharge	Flags
10s	8n	2s	10s	8n	2s
10/01/1975	47		10/27/1975	32	
10/02/1975	49		10/28/1975	32	
10/03/1975	43		10/29/1975	31	
10/04/1975	37		10/30/1975	31	
10/05/1975	35		10/31/1975	30	
10/06/1975	33		11/01/1975	30	
10/07/1975	32		11/02/1975	33	
10/08/1975	41		11/03/1975	36	
10/09/1975	74		11/04/1975	39	
10/10/1975	96		11/05/1975	43	
10/11/1975	83		11/06/1975	44	
10/12/1975	63		11/07/1975	76	
10/13/1975	50		11/08/1975	87	
10/14/1975	46		11/09/1975	81	
10/15/1975	49		11/10/1975	88	
10/16/1975	49		11/11/1975	78	
10/17/1975	53		11/12/1975	100	
10/18/1975	54		11/13/1975	276	
10/19/1975	50		11/14/1975	188	
10/20/1975	52		11/15/1975	135	
10/21/1975	51		11/16/1975	110	
10/22/1975	48		11/17/1975	102	
10/23/1975	43		11/18/1975	99	
10/24/1975	34		11/19/1975	98	
10/25/1975	32		11/20/1975	93	
10/26/1975	32		11/21/1975	87	

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11/22/1975	80	02/01/1976	117
11/23/1975	73	02/02/1976	142
11/24/1975	60	02/03/1976	128
11/25/1975	43	02/04/1976	113
11/26/1975	41	02/05/1976	102
11/27/1975	40	02/06/1976	96
11/28/1975	40	02/07/1976	92
11/29/1975	40	02/08/1976	89
11/30/1975	39	02/09/1976	69
12/01/1975	47	02/10/1976	22
12/02/1975	47	02/11/1976	28
12/03/1975	49	02/12/1976	44
12/04/1975	50	02/13/1976	55
12/05/1975	51	02/14/1976	58
12/06/1975	52	02/15/1976	52
12/07/1975	53	02/16/1976	49
12/08/1975	55	02/17/1976	49
12/09/1975	67	02/18/1976	51
12/10/1975	71	02/19/1976	57
12/11/1975	76	02/20/1976	56
12/12/1975	75	02/21/1976	57
12/13/1975	73	02/22/1976	63
12/14/1975	74	02/23/1976	60
12/15/1975	78	02/24/1976	51
12/16/1975	81	02/25/1976	46
12/17/1975	101	02/26/1976	43
12/18/1975	97	02/27/1976	43
12/19/1975	93	02/28/1976	41
12/20/1975	92	02/29/1976	41
12/21/1975	88	03/01/1976	40
12/22/1975	83	03/02/1976	41
12/23/1975	81	03/03/1976	43
12/24/1975	75	03/04/1976	44
12/25/1975	70	03/05/1976	48
12/26/1975	94	03/06/1976	67
12/27/1975	83	03/07/1976	64
12/28/1975	83	03/08/1976	57
12/29/1975	84	03/09/1976	107
12/30/1975	121	03/10/1976	85
12/31/1975	133	03/11/1976	68
01/01/1976	146	03/12/1976	58
01/02/1976	161	03/13/1976	125
01/03/1976	133	03/14/1976	114
01/04/1976	117	03/15/1976	103
01/05/1976	109	03/16/1976	566
01/06/1976	105	03/17/1976	449
01/07/1976	126	03/18/1976	234
01/08/1976	183	03/19/1976	138
01/09/1976	207	03/20/1976	107
01/10/1976	160	03/21/1976	90
01/11/1976	130	03/22/1976	82
01/12/1976	118	03/23/1976	72
01/13/1976	112	03/24/1976	66
01/14/1976	109	03/25/1976	61
01/15/1976	103	03/26/1976	58
01/16/1976	101	03/27/1976	60
01/17/1976	99	03/28/1976	61
01/18/1976	96	03/29/1976	57
01/19/1976	92	03/30/1976	55
01/20/1976	88	03/31/1976	54
01/21/1976	85	04/01/1976	51
01/22/1976	82	04/02/1976	47
01/23/1976	75	04/03/1976	46
01/24/1976	70	04/04/1976	43
01/25/1976	67	04/05/1976	43
01/26/1976	70	04/06/1976	41
01/27/1976	138	04/07/1976	39
01/28/1976	168	04/08/1976	37
01/29/1976	223	04/09/1976	36
01/30/1976	148	04/10/1976	33
01/31/1976	118	04/11/1976	32

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04/12/1976	32	06/22/1976	123
04/13/1976	30	06/23/1976	147
04/14/1976	30	06/24/1976	139
04/15/1976	29	06/25/1976	101
04/16/1976	28	06/26/1976	98
04/17/1976	28	06/27/1976	130
04/18/1976	28	06/28/1976	182
04/19/1976	27	06/29/1976	73
04/20/1976	26	06/30/1976	51
04/21/1976	25	07/01/1976	42
04/22/1976	25	07/02/1976	37
04/23/1976	24	07/03/1976	34
04/24/1976	24	07/04/1976	47
04/25/1976	24	07/05/1976	533
04/26/1976	26	07/06/1976	509
04/27/1976	25	07/07/1976	284
04/28/1976	24	07/08/1976	172
04/29/1976	24	07/09/1976	125
04/30/1976	31	07/10/1976	121
05/01/1976	73	07/11/1976	80
05/02/1976	59	07/12/1976	66
05/03/1976	54	07/13/1976	58
05/04/1976	48	07/14/1976	32
05/05/1976	50	07/15/1976	26
05/06/1976	40	07/16/1976	23
05/07/1976	35	07/17/1976	21
05/08/1976	30	07/18/1976	24
05/09/1976	30	07/19/1976	36
05/10/1976	29	07/20/1976	49
05/11/1976	32	07/21/1976	40
05/12/1976	31	07/22/1976	34
05/13/1976	30	07/23/1976	53
05/14/1976	28	07/24/1976	42
05/15/1976	82	07/25/1976	32
05/16/1976	77	07/26/1976	29
05/17/1976	81	07/27/1976	30
05/18/1976	54	07/28/1976	31
05/19/1976	40	07/29/1976	35
05/20/1976	34	07/30/1976	49
05/21/1976	30	07/31/1976	44
05/22/1976	27	08/01/1976	38
05/23/1976	31	08/02/1976	33
05/24/1976	46	08/03/1976	31
05/25/1976	85	08/04/1976	30
05/26/1976	91	08/05/1976	28
05/27/1976	68	08/06/1976	27
05/28/1976	50	08/07/1976	25
05/29/1976	64	08/08/1976	25
05/30/1976	54	08/09/1976	24
05/31/1976	46	08/10/1976	25
06/01/1976	50	08/11/1976	26
06/02/1976	79	08/12/1976	23
06/03/1976	229	08/13/1976	22
06/04/1976	395	08/14/1976	21
06/05/1976	229	08/15/1976	21
06/06/1976	114	08/16/1976	23
06/07/1976	69	08/17/1976	20
06/08/1976	50	08/18/1976	19
06/09/1976	41	08/19/1976	18
06/10/1976	36	08/20/1976	18
06/11/1976	31	08/21/1976	20
06/12/1976	28	08/22/1976	20
06/13/1976	27	08/23/1976	19
06/14/1976	25	08/24/1976	18
06/15/1976	28	08/25/1976	20
06/16/1976	35	08/26/1976	21
06/17/1976	127	08/27/1976	20
06/18/1976	171	08/28/1976	20
06/19/1976	160	08/29/1976	31
06/20/1976	114	08/30/1976	32
06/21/1976	152	08/31/1976	22

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09/01/1976	22	11/11/1976	67
09/02/1976	41	11/12/1976	96
09/03/1976	33	11/13/1976	48
09/04/1976	27	11/14/1976	67
09/05/1976	26	11/15/1976	381
09/06/1976	24	11/16/1976	320
09/07/1976	22	11/17/1976	189
09/08/1976	19	11/18/1976	118
09/09/1976	19	11/19/1976	94
09/10/1976	20	11/20/1976	66
09/11/1976	21	11/21/1976	62
09/12/1976	24	11/22/1976	68
09/13/1976	22	11/23/1976	72
09/14/1976	55	11/24/1976	93
09/15/1976	160	11/25/1976	40
09/16/1976	81	11/26/1976	56
09/17/1976	69	11/27/1976	65
09/18/1976	54	11/28/1976	126
09/19/1976	43	11/29/1976	236
09/20/1976	37	11/30/1976	197
09/21/1976	31	12/01/1976	134
09/22/1976	28	12/02/1976	117
09/23/1976	24	12/03/1976	105
09/24/1976	22	12/04/1976	63
09/25/1976	21	12/05/1976	47
09/26/1976	20	12/06/1976	84
09/27/1976	22	12/07/1976	223
09/28/1976	20	12/08/1976	204
09/29/1976	83	12/09/1976	148
09/30/1976	132	12/10/1976	111
10/01/1976	91	12/11/1976	128
10/02/1976	62	12/12/1976	1070
10/03/1976	46	12/13/1976	743
10/04/1976	38	12/14/1976	325
10/05/1976	32	12/15/1976	318
10/06/1976	29	12/16/1976	325
10/07/1976	28	12/17/1976	254
10/08/1976	57	12/18/1976	182
10/09/1976	306	12/19/1976	143
10/10/1976	185	12/20/1976	120
10/11/1976	97	12/21/1976	113
10/12/1976	61	12/22/1976	110
10/13/1976	46	12/23/1976	98
10/14/1976	39	12/24/1976	90
10/15/1976	35	12/25/1976	93
10/16/1976	31	12/26/1976	215
10/17/1976	103	12/27/1976	183
10/18/1976	101	12/28/1976	142
10/19/1976	79	12/29/1976	115
10/20/1976	356	12/30/1976	99
10/21/1976	332	12/31/1976	88
10/22/1976	179	01/01/1977	84
10/23/1976	103	01/02/1977	79
10/24/1976	70	01/03/1977	99
10/25/1976	62	01/04/1977	117
10/26/1976	65	01/05/1977	120
10/27/1976	56	01/06/1977	121
10/28/1976	48	01/07/1977	148
10/29/1976	44	01/08/1977	90
10/30/1976	42	01/09/1977	155
10/31/1976	44	01/10/1977	670
11/01/1976	46	01/11/1977	432
11/02/1976	47	01/12/1977	230
11/03/1976	44	01/13/1977	195
11/04/1976	43	01/14/1977	157
11/05/1976	44	01/15/1977	153
11/06/1976	44	01/16/1977	141
11/07/1976	43	01/17/1977	126
11/08/1976	42	01/18/1977	122
11/09/1976	43	01/19/1977	120
11/10/1976	46	01/20/1977	122

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01/21/1977	119	04/02/1977	70
01/22/1977	90	04/03/1977	67
01/23/1977	89	04/04/1977	65
01/24/1977	85	04/05/1977	115
01/25/1977	88	04/06/1977	108
01/26/1977	85	04/07/1977	85
01/27/1977	82	04/08/1977	69
01/28/1977	79	04/09/1977	60
01/29/1977	79	04/10/1977	54
01/30/1977	74	04/11/1977	51
01/31/1977	71	04/12/1977	49
02/01/1977	68	04/13/1977	47
02/02/1977	74	04/14/1977	44
02/03/1977	107	04/15/1977	42
02/04/1977	102	04/16/1977	39
02/05/1977	66	04/17/1977	37
02/06/1977	56	04/18/1977	34
02/07/1977	42	04/19/1977	34
02/08/1977	31	04/20/1977	34
02/09/1977	33	04/21/1977	33
02/10/1977	93	04/22/1977	33
02/11/1977	58	04/23/1977	35
02/12/1977	46	04/24/1977	36
02/13/1977	34	04/25/1977	36
02/14/1977	34	04/26/1977	34
02/15/1977	37	04/27/1977	32
02/16/1977	36	04/28/1977	31
02/17/1977	34	04/29/1977	29
02/18/1977	27	04/30/1977	29
02/19/1977	24	05/01/1977	30
02/20/1977	24	05/02/1977	32
02/21/1977	61	05/03/1977	32
02/22/1977	67	05/04/1977	31
02/23/1977	52	05/05/1977	30
02/24/1977	84	05/06/1977	27
02/25/1977	87	05/07/1977	25
02/26/1977	76	05/08/1977	24
02/27/1977	74	05/09/1977	24
02/28/1977	68	05/10/1977	24
03/01/1977	56	05/11/1977	23
03/02/1977	48	05/12/1977	22
03/03/1977	42	05/13/1977	22
03/04/1977	51	05/14/1977	21
03/05/1977	58	05/15/1977	20
03/06/1977	100	05/16/1977	20
03/07/1977	214	05/17/1977	23
03/08/1977	160	05/18/1977	24
03/09/1977	106	05/19/1977	23
03/10/1977	82	05/20/1977	22
03/11/1977	78	05/21/1977	21
03/12/1977	77	05/22/1977	21
03/13/1977	217	05/23/1977	21
03/14/1977	171	05/24/1977	20
03/15/1977	120	05/25/1977	30
03/16/1977	89	05/26/1977	29
03/17/1977	74	05/27/1977	28
03/18/1977	67	05/28/1977	27
03/19/1977	64	05/29/1977	25
03/20/1977	96	05/30/1977	32
03/21/1977	141	05/31/1977	42
03/22/1977	559	06/01/1977	41
03/23/1977	361	06/02/1977	30
03/24/1977	192	06/03/1977	24
03/25/1977	122	06/04/1977	21
03/26/1977	95	06/05/1977	20
03/27/1977	82	06/06/1977	19
03/28/1977	75	06/07/1977	19
03/29/1977	116	06/08/1977	19
03/30/1977	114	06/09/1977	20
03/31/1977	100	06/10/1977	18
04/01/1977	80	06/11/1977	17

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06/12/1977	16	08/22/1977	27
06/13/1977	16	08/23/1977	25
06/14/1977	42	08/24/1977	26
06/15/1977	45	08/25/1977	24
06/16/1977	99	08/26/1977	29
06/17/1977	78	08/27/1977	109
06/18/1977	97	08/28/1977	159
06/19/1977	61	08/29/1977	90
06/20/1977	210	08/30/1977	54
06/21/1977	162	08/31/1977	38
06/22/1977	81	09/01/1977	31
06/23/1977	118	09/02/1977	27
06/24/1977	61	09/03/1977	24
06/25/1977	40	09/04/1977	27
06/26/1977	31	09/05/1977	28
06/27/1977	31	09/06/1977	28
06/28/1977	28	09/07/1977	37
06/29/1977	25	09/08/1977	61
06/30/1977	24	09/09/1977	57
07/01/1977	28	09/10/1977	46
07/02/1977	34	09/11/1977	36
07/03/1977	32	09/12/1977	30
07/04/1977	25	09/13/1977	26
07/05/1977	21	09/14/1977	24
07/06/1977	20	09/15/1977	28
07/07/1977	18	09/16/1977	105
07/08/1977	21	09/17/1977	191
07/09/1977	20	09/18/1977	128
07/10/1977	16	09/19/1977	74
07/11/1977	14	09/20/1977	54
07/12/1977	13	09/21/1977	46
07/13/1977	13	09/22/1977	39
07/14/1977	13	09/23/1977	32
07/15/1977	12	09/24/1977	29
07/16/1977	12	09/25/1977	26
07/17/1977	12	09/26/1977	27
07/18/1977	12	09/27/1977	25
07/19/1977	12	09/28/1977	26
07/20/1977	12	09/29/1977	24
07/21/1977	12	09/30/1977	23
07/22/1977	12		
07/23/1977	13		
07/24/1977	12		
07/25/1977	12		
07/26/1977	15		
07/27/1977	15		
07/28/1977	12		
07/29/1977	21		
07/30/1977	20		
07/31/1977	20		
08/01/1977	40		
08/02/1977	340		
08/03/1977	530		
08/04/1977	352		
08/05/1977	168		
08/06/1977	94		
08/07/1977	59		
08/08/1977	41		
08/09/1977	35		
08/10/1977	30		
08/11/1977	28		
08/12/1977	26		
08/13/1977	24		
08/14/1977	28		
08/15/1977	28		
08/16/1977	25		
08/17/1977	24		
08/18/1977	24		
08/19/1977	26		
08/20/1977	27		
08/21/1977	29		

## APPENDIX B

CASE 1

Continuity lines expanded to include mid-side nodes

```

LINE= 1      1      2      3      4      5      6      7
LINE= 2      11157 11503 11502 11868 11867 12243 12242 12568 12246 12250
          12249 12542 12541 12545 12544 12801 12581 12580 12264 12268
          12267 12270 11899 11904 11903 11908 11907 12273 12272 12585
          12584
LINE= 3      3831 3830 3828 3827 3826
LINE= 4      7884 7883 7741 7740 7739
LINE= 5      10501 10852 10853 11220 11217
LINE= 6      3732 3736 3735 3741 3740 3747 3746
LINE= 7      3749 3966 3967 4232 4233 4524 4525
LINE= 8      5154 5455 5454 5465 5464 5768 5767 5780 5779 6099
          6098 6389 6388 6398 6397
LINE= 9      6412 6418 6417 6640 6423 6422 6161
LINE= 10     5279 5278 5277 5284 5283 5287 5286 5290 5289 5291
          5009 5008 5007
LINE= 11     4727 5014 5013 5020 4741 4740 4739 4745 4744
LINE= 12     357 365 364 484 483 487 486 488 411
RMA2 TITLE =CASE 1 - BREACH AT THE NORTH SIDE
    
```

FLUX ESTIMATES FOR LINE NUMBER= 1

```

TIME          WATER FLUX
(HR)          (FT3/SEC)  CUMMULATIVE Ave
-----
0.00         292000.    292000.
STATISTICS FOR LINE NO. 1
          MINIMUM          MEAN          MAXIMUM
WATER FLUX 292000.00    292000.00    292000.00
    
```

FLUX ESTIMATES FOR LINE NUMBER= 2

```

TIME          WATER FLUX
(HR)          (FT3/SEC)  CUMMULATIVE Ave
-----
0.00         292018.    292018.
STATISTICS FOR LINE NO. 2
          MINIMUM          MEAN          MAXIMUM
WATER FLUX 292018.44    292018.44    292018.44
    
```

FLUX ESTIMATES FOR LINE NUMBER= 3

```

TIME          WATER FLUX
(HR)          (FT3/SEC)  CUMMULATIVE Ave
-----
0.00         2.          2.
STATISTICS FOR LINE NO. 3
          MINIMUM          MEAN          MAXIMUM
WATER FLUX 1.57         1.57         1.57
    
```

FLUX ESTIMATES FOR LINE NUMBER= 4

```

TIME          WATER FLUX
(HR)          (FT3/SEC)  CUMMULATIVE Ave
    
```

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```

-----
0.00      16388.      16388.
STATISTICS FOR LINE NO. 4
              MINIMUM      MEAN      MAXIMUM
WATER FLUX   16387.86    16387.86    16387.86
    
```

FLUX ESTIMATES FOR LINE NUMBER= 5

```

-----
TIME          WATER FLUX
(HR)         (FT3/SEC)  CUMMULATIVE Ave
-----
0.00      13698.      13698.
STATISTICS FOR LINE NO. 5
              MINIMUM      MEAN      MAXIMUM
WATER FLUX   13698.09    13698.09    13698.09
    
```

FLUX ESTIMATES FOR LINE NUMBER= 6

```

-----
TIME          WATER FLUX
(HR)         (FT3/SEC)  CUMMULATIVE Ave
-----
0.00      42385.      42385.
STATISTICS FOR LINE NO. 6
              MINIMUM      MEAN      MAXIMUM
WATER FLUX   42385.12    42385.12    42385.12
    
```

FLUX ESTIMATES FOR LINE NUMBER= 7

```

-----
TIME          WATER FLUX
(HR)         (FT3/SEC)  CUMMULATIVE Ave
-----
0.00      52327.      52327.
STATISTICS FOR LINE NO. 7
              MINIMUM      MEAN      MAXIMUM
WATER FLUX   52326.81    52326.81    52326.81
    
```

FLUX ESTIMATES FOR LINE NUMBER= 8

```

-----
TIME          WATER FLUX
(HR)         (FT3/SEC)  CUMMULATIVE Ave
-----
0.00      168820.      168820.
STATISTICS FOR LINE NO. 8
              MINIMUM      MEAN      MAXIMUM
WATER FLUX   168820.17    168820.17    168820.17
    
```

FLUX ESTIMATES FOR LINE NUMBER= 9

```

-----
TIME          WATER FLUX
(HR)         (FT3/SEC)  CUMMULATIVE Ave
-----
0.00      104.      104.
STATISTICS FOR LINE NO. 9
              MINIMUM      MEAN      MAXIMUM
WATER FLUX   103.51      103.51      103.51
    
```

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---

FLUX ESTIMATES FOR LINE NUMBER= 10

TIME (HR)	WATER FLUX		
	(FT3/SEC)	CUMMULATIVE Ave	
0.00	11885.	11885.	
STATISTICS FOR LINE NO. 10			
	MINIMUM	MEAN	MAXIMUM
WATER FLUX	11884.80	11884.80	11884.80

FLUX ESTIMATES FOR LINE NUMBER= 11

TIME (HR)	WATER FLUX		
	(FT3/SEC)	CUMMULATIVE Ave	
0.00	1983.	1983.	
STATISTICS FOR LINE NO. 11			
	MINIMUM	MEAN	MAXIMUM
WATER FLUX	1983.12	1983.12	1983.12

FLUX ESTIMATES FOR LINE NUMBER= 12

TIME (HR)	WATER FLUX		
	(FT3/SEC)	CUMMULATIVE Ave	
0.00	8308.	8308.	
STATISTICS FOR LINE NO. 12			
	MINIMUM	MEAN	MAXIMUM
WATER FLUX	8307.72	8307.72	8307.72

**CASE 2**

Continuity lines expanded to include mid-side nodes

```

LINE= 1      1      2      3      4      5      6      7
LINE= 2      9627  9832  9831 10075 10074 10342 10341 10632 10345 10349
          10348 10606 10605 10609 10608 10907 10645 10644 10363 10367

          10366 10369 10106 10111 10110 10115 10114 10372 10371 10649

          10648
LINE= 3      357   365   364   411   410   414   413
LINE= 4      2831  2830  2828  2827  2826
LINE= 5      9537  9536  9349  9348  9347
LINE= 6      9275  9484  9485  9690  9687
LINE= 7      2732  2736  2735  2741  2740  2747  2746
LINE= 8      2749  2867  2868  2998  2999  3142  3143
LINE= 9      3532  3740  3739  3750  3749  3989  3988  4001  4000  4250
          4249  4493  4492  4502  4501
LINE= 10     6672  6678  6677  6972  6683  6682  6357
LINE= 11     6381  6385  6384  6389  6388  6392  6391  6395  6394  6398
          6397  6401  6400
LINE= 12     6716  7010  7009  7016  6730  6729  6728  6734  6733
RMA2 TITLE =CASE 2 - BREACH BEHIND HEATHWOOD HALL
    
```

FLUX ESTIMATES FOR LINE NUMBER= 1

```

TIME          WATER FLUX
(HR)          (FT3/SEC)  CUMMULATIVE Ave
-----
0.00          292000.    292000.
STATISTICS FOR LINE NO. 1
          MINIMUM          MEAN          MAXIMUM
WATER FLUX  292000.03    292000.03    292000.03
    
```

FLUX ESTIMATES FOR LINE NUMBER= 2

```

TIME          WATER FLUX
(HR)          (FT3/SEC)  CUMMULATIVE Ave
-----
0.00          292018.    292018.
STATISTICS FOR LINE NO. 2
          MINIMUM          MEAN          MAXIMUM
WATER FLUX  292018.19    292018.19    292018.19
    
```

FLUX ESTIMATES FOR LINE NUMBER= 3

```

TIME          WATER FLUX
(HR)          (FT3/SEC)  CUMMULATIVE Ave
-----
0.00          489.    489.
STATISTICS FOR LINE NO. 3
          MINIMUM          MEAN          MAXIMUM
WATER FLUX  489.03    489.03    489.03
    
```

FLUX ESTIMATES FOR LINE NUMBER= 4

```

TIME          WATER FLUX
(HR)          (FT3/SEC)  CUMMULATIVE Ave
    
```

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```

-----
0.00      20184.      20184.
STATISTICS FOR LINE NO. 4
           MINIMUM      MEAN      MAXIMUM
WATER FLUX 20184.06    20184.06    20184.06
    
```

FLUX ESTIMATES FOR LINE NUMBER= 5

```

-----
TIME      WATER FLUX
(HR)      (FT3/SEC) CUMMULATIVE Ave
-----
0.00      23694.      23694.
STATISTICS FOR LINE NO. 5
           MINIMUM      MEAN      MAXIMUM
WATER FLUX 23693.73    23693.73    23693.73
    
```

FLUX ESTIMATES FOR LINE NUMBER= 6

```

-----
TIME      WATER FLUX
(HR)      (FT3/SEC) CUMMULATIVE Ave
-----
0.00      20826.      20826.
STATISTICS FOR LINE NO. 6
           MINIMUM      MEAN      MAXIMUM
WATER FLUX 20825.53    20825.53    20825.53
    
```

FLUX ESTIMATES FOR LINE NUMBER= 7

```

-----
TIME      WATER FLUX
(HR)      (FT3/SEC) CUMMULATIVE Ave
-----
0.00      40722.      40722.
STATISTICS FOR LINE NO. 7
           MINIMUM      MEAN      MAXIMUM
WATER FLUX 40722.15    40722.15    40722.15
    
```

FLUX ESTIMATES FOR LINE NUMBER= 8

```

-----
TIME      WATER FLUX
(HR)      (FT3/SEC) CUMMULATIVE Ave
-----
0.00      50527.      50527.
STATISTICS FOR LINE NO. 8
           MINIMUM      MEAN      MAXIMUM
WATER FLUX 50527.41    50527.41    50527.41
    
```

FLUX ESTIMATES FOR LINE NUMBER= 9

```

-----
TIME      WATER FLUX
(HR)      (FT3/SEC) CUMMULATIVE Ave
-----
0.00      165137.     165137.
STATISTICS FOR LINE NO. 9
           MINIMUM      MEAN      MAXIMUM
WATER FLUX 165137.34    165137.34    165137.34
    
```

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---

FLUX ESTIMATES FOR LINE NUMBER= 10

TIME (HR)	WATER FLUX		
	(FT3/SEC)	CUMMULATIVE Ave	
0.00	352.	352.	
STATISTICS FOR LINE NO. 10			
	MINIMUM	MEAN	MAXIMUM
WATER FLUX	352.03	352.03	352.03

FLUX ESTIMATES FOR LINE NUMBER= 11

TIME (HR)	WATER FLUX		
	(FT3/SEC)	CUMMULATIVE Ave	
0.00	17344.	17344.	
STATISTICS FOR LINE NO. 11			
	MINIMUM	MEAN	MAXIMUM
WATER FLUX	17343.92	17343.92	17343.92

FLUX ESTIMATES FOR LINE NUMBER= 12

TIME (HR)	WATER FLUX		
	(FT3/SEC)	CUMMULATIVE Ave	
0.00	3298.	3298.	
STATISTICS FOR LINE NO. 12			
	MINIMUM	MEAN	MAXIMUM
WATER FLUX	3298.21	3298.21	3298.21



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0.00 27733. 27733.  
 STATISTICS FOR LINE NO. 4  
 MINIMUM MEAN MAXIMUM  
 WATER FLUX 27733.27 27733.27 27733.27

FLUX ESTIMATES FOR LINE NUMBER= 5

TIME WATER FLUX  
 (HR) (FT3/SEC) CUMMULATIVE Ave  
 -----  
 0.00 24821. 24821.  
 STATISTICS FOR LINE NO. 5  
 MINIMUM MEAN MAXIMUM  
 WATER FLUX 24821.45 24821.45 24821.45

FLUX ESTIMATES FOR LINE NUMBER= 6

TIME WATER FLUX  
 (HR) (FT3/SEC) CUMMULATIVE Ave  
 -----  
 0.00 39645. 39645.  
 STATISTICS FOR LINE NO. 6  
 MINIMUM MEAN MAXIMUM  
 WATER FLUX 39645.36 39645.36 39645.36

FLUX ESTIMATES FOR LINE NUMBER= 7

TIME WATER FLUX  
 (HR) (FT3/SEC) CUMMULATIVE Ave  
 -----  
 0.00 49536. 49536.  
 STATISTICS FOR LINE NO. 7  
 MINIMUM MEAN MAXIMUM  
 WATER FLUX 49535.79 49535.79 49535.79

FLUX ESTIMATES FOR LINE NUMBER= 8

TIME WATER FLUX  
 (HR) (FT3/SEC) CUMMULATIVE Ave  
 -----  
 0.00 163296. 163296.  
 STATISTICS FOR LINE NO. 8  
 MINIMUM MEAN MAXIMUM  
 WATER FLUX 163296.28 163296.28 163296.28

FLUX ESTIMATES FOR LINE NUMBER= 9

TIME WATER FLUX  
 (HR) (FT3/SEC) CUMMULATIVE Ave  
 -----  
 0.00 528. 528.  
 STATISTICS FOR LINE NO. 9  
 MINIMUM MEAN MAXIMUM  
 WATER FLUX 528.09 528.09 528.09

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---

FLUX ESTIMATES FOR LINE NUMBER= 10

TIME (HR)	WATER FLUX		
	(FT3/SEC)	CUMMULATIVE Ave	
0.00	20035.	20035.	
STATISTICS FOR LINE NO. 10			
	MINIMUM	MEAN	MAXIMUM
WATER FLUX	20034.94	20034.94	20034.94

FLUX ESTIMATES FOR LINE NUMBER= 11

TIME (HR)	WATER FLUX		
	(FT3/SEC)	CUMMULATIVE Ave	
0.00	4173.	4173.	
STATISTICS FOR LINE NO. 11			
	MINIMUM	MEAN	MAXIMUM
WATER FLUX	4172.53	4172.53	4172.53

FLUX ESTIMATES FOR LINE NUMBER= 12

TIME (HR)	WATER FLUX		
	(FT3/SEC)	CUMMULATIVE Ave	
0.00	7975.	7975.	
STATISTICS FOR LINE NO. 12			
	MINIMUM	MEAN	MAXIMUM
WATER FLUX	7975.27	7975.27	7975.27

**CASE 4**

Continuity lines expanded to include mid-side nodes

```

LINE= 1      1      2      3      4      5      6      7
LINE= 2      10758 11102 11101 11478 11477 11831 11830 12175 11834 11838
          11837 12149 12148 12152 12151 12481 12188 12187 11852 11856

          11855 11858 11509 11514 11513 11518 11517 11861 11860 12192

          12191
LINE= 3      3904 3903 3901 3900 3899
LINE= 4      8159 8158 7974 7973 7972
LINE= 5      10869 11223 11224 11594 11591
LINE= 6      3805 3809 3808 3814 3813 3820 3819
LINE= 7      3822 4048 4049 4336 4337 4648 4649
LINE= 8      5312 5623 5622 5633 5632 5942 5941 5954 5953 6264
          6263 6553 6552 6562 6561
LINE= 9      6576 6582 6581 6828 6587 6586 6326
LINE= 10     5437 5436 5435 5442 5441 5445 5444 5448 5447 5449
          5157 5156 5155
LINE= 11     4851 5162 5161 5168 4865 4864 4863 4869 4868
LINE= 12     357 365 364 484 483 487 486 488 411
RMA2 TITLE =CASE 4 - CASE 3 WITH NO 12TH STREET
    
```

FLUX ESTIMATES FOR LINE NUMBER= 1

```

TIME          WATER FLUX
(HR)          (FT3/SEC)  CUMMULATIVE Ave
-----
0.00         292000.    292000.
STATISTICS FOR LINE NO. 1
          MINIMUM          MEAN          MAXIMUM
WATER FLUX 291999.97    291999.97    291999.97
    
```

FLUX ESTIMATES FOR LINE NUMBER= 2

```

TIME          WATER FLUX
(HR)          (FT3/SEC)  CUMMULATIVE Ave
-----
0.00         292014.    292014.
STATISTICS FOR LINE NO. 2
          MINIMUM          MEAN          MAXIMUM
WATER FLUX 292013.50    292013.50    292013.50
    
```

FLUX ESTIMATES FOR LINE NUMBER= 3

```

TIME          WATER FLUX
(HR)          (FT3/SEC)  CUMMULATIVE Ave
-----
0.00         12236.    12236.
STATISTICS FOR LINE NO. 3
          MINIMUM          MEAN          MAXIMUM
WATER FLUX 12235.56    12235.56    12235.56
    
```

FLUX ESTIMATES FOR LINE NUMBER= 4

```

TIME          WATER FLUX
(HR)          (FT3/SEC)  CUMMULATIVE Ave
-----
    
```

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0.00            27267.        27267.  
 STATISTICS FOR LINE NO. 4  
                   MINIMUM            MEAN            MAXIMUM  
 WATER FLUX    27266.60    27266.60    27266.60

FLUX ESTIMATES FOR LINE NUMBER= 5

TIME            WATER FLUX  
 (HR)            (FT3/SEC)    CUMMULATIVE Ave  
 -----  
 0.00            24364.        24364.  
 STATISTICS FOR LINE NO. 5  
                   MINIMUM            MEAN            MAXIMUM  
 WATER FLUX    24364.12    24364.12    24364.12

FLUX ESTIMATES FOR LINE NUMBER= 6

TIME            WATER FLUX  
 (HR)            (FT3/SEC)    CUMMULATIVE Ave  
 -----  
 0.00            40690.        40690.  
 STATISTICS FOR LINE NO. 6  
                   MINIMUM            MEAN            MAXIMUM  
 WATER FLUX    40690.43    40690.43    40690.43

FLUX ESTIMATES FOR LINE NUMBER= 7

TIME            WATER FLUX  
 (HR)            (FT3/SEC)    CUMMULATIVE Ave  
 -----  
 0.00            48445.        48445.  
 STATISTICS FOR LINE NO. 7  
                   MINIMUM            MEAN            MAXIMUM  
 WATER FLUX    48444.99    48444.99    48444.99

FLUX ESTIMATES FOR LINE NUMBER= 8

TIME            WATER FLUX  
 (HR)            (FT3/SEC)    CUMMULATIVE Ave  
 -----  
 0.00            158670.       158670.  
 STATISTICS FOR LINE NO. 8  
                   MINIMUM            MEAN            MAXIMUM  
 WATER FLUX    158670.22   158670.22   158670.22

FLUX ESTIMATES FOR LINE NUMBER= 9

TIME            WATER FLUX  
 (HR)            (FT3/SEC)    CUMMULATIVE Ave  
 -----  
 0.00            506.           506.  
 STATISTICS FOR LINE NO. 9  
                   MINIMUM            MEAN            MAXIMUM  
 WATER FLUX    506.14       506.14       506.14

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FLUX ESTIMATES FOR LINE NUMBER= 10

TIME (HR)	WATER FLUX		
	(FT3/SEC)	CUMMULATIVE Ave	
0.00	19717.	19717.	
STATISTICS FOR LINE NO. 10			
	MINIMUM	MEAN	MAXIMUM
WATER FLUX	19717.45	19717.45	19717.45

FLUX ESTIMATES FOR LINE NUMBER= 11

TIME (HR)	WATER FLUX		
	(FT3/SEC)	CUMMULATIVE Ave	
0.00	4078.	4078.	
STATISTICS FOR LINE NO. 11			
	MINIMUM	MEAN	MAXIMUM
WATER FLUX	4077.86	4077.86	4077.86

FLUX ESTIMATES FOR LINE NUMBER= 12

TIME (HR)	WATER FLUX		
	(FT3/SEC)	CUMMULATIVE Ave	
0.00	7837.	7837.	
STATISTICS FOR LINE NO. 12			
	MINIMUM	MEAN	MAXIMUM
WATER FLUX	7837.00	7837.00	7837.00

**CASE 5**

Continuity lines expanded to include mid-side nodes

LINE=	1	1	2	3	4	5	6	7											
LINE=	2	9600	9770	9769	9960	9959	10148	10147	10330	10151	10155								
		10154	10304	10303	10307	10306	10474	10343	10342	10169	10173								
		10172	10175	9991	9996	9995	10000	9999	10178	10177	10347								
		10346																	
LINE=	3	2831	2830	2828	2827	2826													
LINE=	4	9275	9479	9480	9663	9660													
LINE=	5	2732	2736	2735	2741	2740	2747	2746											
LINE=	6	2749	2867	2868	2998	2999	3142	3143											
LINE=	7	3532	3740	3739	3750	3749	3989	3988	4001	4000	4250								
		4249	4493	4492	4502	4501													
LINE=	8	6672	6678	6677	6972	6683	6682	6357											
LINE=	9	6381	6385	6384	6389	6388	6392	6391	6395	6394	6398								
		6397	6401	6400															
LINE=	10	6716	7010	7009	7016	6730	6729	6728	6734	6733									

RMA2 TITLE =CASE 5 - BREACH BEHIND HEATHWOOD HALL

FLUX ESTIMATES FOR LINE NUMBER= 1

TIME (HR)	WATER FLUX (FT3/SEC)	CUMMULATIVE Ave		
0.00	259000.	259000.		
STATISTICS FOR LINE NO. 1				
	MINIMUM	MEAN	MAXIMUM	
WATER FLUX	259000.00	259000.00	259000.00	

FLUX ESTIMATES FOR LINE NUMBER= 2

TIME (HR)	WATER FLUX (FT3/SEC)	CUMMULATIVE Ave		
0.00	259033.	259033.		
STATISTICS FOR LINE NO. 2				
	MINIMUM	MEAN	MAXIMUM	
WATER FLUX	259033.42	259033.42	259033.42	

FLUX ESTIMATES FOR LINE NUMBER= 3

TIME (HR)	WATER FLUX (FT3/SEC)	CUMMULATIVE Ave		
0.00	-101.	-101.		
STATISTICS FOR LINE NO. 3				
	MINIMUM	MEAN	MAXIMUM	
WATER FLUX	-100.96	-100.96	-100.96	

FLUX ESTIMATES FOR LINE NUMBER= 4

TIME (HR)	WATER FLUX (FT3/SEC)	CUMMULATIVE Ave		
0.00	-820.	-820.		
STATISTICS FOR LINE NO. 4				
	MINIMUM	MEAN	MAXIMUM	
WATER FLUX	-820.42	-820.42	-820.42	

FLUX ESTIMATES FOR LINE NUMBER= 5

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TIME (HR)	WATER FLUX (FT3/SEC) CUMMULATIVE Ave		
0.00	38102.	38102.	
STATISTICS FOR LINE NO. 5			
	MINIMUM	MEAN	MAXIMUM
WATER FLUX	38102.18	38102.18	38102.18

FLUX ESTIMATES FOR LINE NUMBER= 6

TIME (HR)	WATER FLUX (FT3/SEC) CUMMULATIVE Ave		
0.00	48099.	48099.	
STATISTICS FOR LINE NO. 6			
	MINIMUM	MEAN	MAXIMUM
WATER FLUX	48099.35	48099.35	48099.35

FLUX ESTIMATES FOR LINE NUMBER= 7

TIME (HR)	WATER FLUX (FT3/SEC) CUMMULATIVE Ave		
0.00	161264.	161264.	
STATISTICS FOR LINE NO. 7			
	MINIMUM	MEAN	MAXIMUM
WATER FLUX	161264.02	161264.02	161264.02

FLUX ESTIMATES FOR LINE NUMBER= 8

TIME (HR)	WATER FLUX (FT3/SEC) CUMMULATIVE Ave		
0.00	3.	3.	
STATISTICS FOR LINE NO. 8			
	MINIMUM	MEAN	MAXIMUM
WATER FLUX	2.85	2.85	2.85

FLUX ESTIMATES FOR LINE NUMBER= 9

TIME (HR)	WATER FLUX (FT3/SEC) CUMMULATIVE Ave		
0.00	-8.	-8.	
STATISTICS FOR LINE NO. 9			
	MINIMUM	MEAN	MAXIMUM
WATER FLUX	-7.94	-7.94	-7.94

FLUX ESTIMATES FOR LINE NUMBER= 10

TIME (HR)	WATER FLUX (FT3/SEC) CUMMULATIVE Ave		
0.00	4.	4.	
STATISTICS FOR LINE NO. 10			
	MINIMUM	MEAN	MAXIMUM
WATER FLUX	4.38	4.38	4.38