WinStorm (STORM DRAIN DESIGN) Version 3.05, Jan. 25, 2002
Run @ 5/28/2008 11:06:09 AM

PROJECT NAME : SYSTEM E
JOB NUMBER :
PROJECT DESCRIPTION :
ANALYSYS FREQUENCY : 100 Years
MEASUREMENT UNITS: ENGLISH

OUTPUT FOR ANALYSYS FREQUENCY of: 100 Years

Runoff Computation for Design Frequency.

ID	C Value	Area (acre)	Tc (min)	Tc Used (min)	Intensity (in/hr)	Supply Q (cfs)	Total Q (cfs)
E-3	0.9	0.41	10.00	10.00	9.80	0.000	3.617
E-4	0.813	0.82	10.00	10.00	9.80	0.000	6.560
	0.9	0.69	Pavement				
	0.35	0.13	Undeveloped				
E-5	0.771	0.81	10.00	10.00	9.80	0.000	6.113
	0.9	0.62	Pavement				
	0.35	0.19	Undeveloped				
E-6	0.9	0.64	10.00	10.00	9.80	0.000	5.647
E-7	0.9	0.75	10.00	10.00	9.80	0.000	6.582
E-8	0.9	0.47	10.00	10.00	9.80	0.000	4.173
E-9	0.9	0.66	10.00	10.00	9.80	0.000	5.823
E-10	0.9	0.31	10.00	10.00	9.80	0.000	2.735
E-11	0.9	0.42	10.00	10.00	9.80	0.000	3.706
E-12	0.9	0.42	10.00	10.00	9.80	0.000	3.706
OSE1	0.35	5.96	20.00	20.00	8.33	0.000	17.386
E-15	0.9	0.31	10.00	10.00	9.80	0.000	2.744
E-17	0.9	0.54	10.00	10.00	9.80	0.000	4.764
E-18	0.9	0.41	10.00	10.00	9.80	0.000	3.617
E-19	0.9	0.51	10.00	10.00	9.80	0.000	4.500
E-20	0.9	0.41	10.00	10.00	9.80	0.000	3.617
E-21	0.9	0.41	10.00	10.00	9.80	0.000	3.617
E-16	0.9	0.39	10.00	10.00	9.80	0.000	3.441
OSE2	0.9	4.31	10.00	10.00	9.80	0.000	38.027
OSE3	0.9	4.48	10.00	10.00	9.80	0.000	39.527
OSE4	0.9	4.97	10.00	10.00	9.80	0.000	43.850
OSE5	0.9	4.89	10.00	10.00	9.80	0.000	43.144
OSE6	0.9	11.55	10.00	10.00	9.80	0.000	101.905
OSE7	0.9	2.51	10.00	10.00	9.80	0.000	22.146

Cumulative Junction Discharge Computations

Node I.D.	Node Type	Weighted C-Value	Cumulat. Dr.Area (acres)	Cumulat. Tc (min)	Intens. (in/hr)	User Supply Q cfs	Additional Q in Node (cfs)	Total Disch. (cfs)
m11	Junct	0.894	28.67	12.00	9.46	0.000	0.00	242.505
m12	Junct	0.900	5.38	10.12	9.78	0.000	0.00	47.368
m13	Junct	0.894	28.13	11.54	9.54	0.000	0.00	239.802
m15	Junct	0.900	5.30	10.12	9.78	0.000	0.00	46.661
m16	Junct	0.892	22.24	11.08	9.62	0.000	0.00	190.810
E-3	Curb	0.900	0.41	10.00	9.80	0.000	0.00	3.617
E-4	Curb	0.813	0.82	10.00	9.80	0.000	0.00	6.560
E-5	Curb	0.771	0.81	10.00	9.80	0.000	0.00	6.113
OSE2	Curb	0.900	4.31	10.00	9.80	0.000	0.00	38.027
OSE3	Curb	0.900	4.48	10.00	9.80	0.000	0.00	39.527
E-6	Curb	0.900	0.64	10.00	9.80	0.000	0.00	5.647
E-7	Curb	0.900	0.75	10.00	9.80	0.000	0.00	6.582
E-8	Curb	0.900	0.47	10.00	9.80	0.000	0.00	4.173
E-9	Curb	0.900	0.66	10.00	9.80	0.000	0.00	5.823
E-10	Curb	0.900	0.31	10.00	9.80	0.000	0.00	2.735
E-11	Curb	0.900	0.42	10.00	9.80	0.000	0.00	3.706
E-12	Curb	0.900	0.42	10.00	9.80	0.000	0.00	3.706
OSE1	Curb	0.350	5.96	20.00	8.33	0.000	0.00	17.386
OSE4	Curb	0.900	4.97	10.00	9.80	0.000	0.00	43.850
OSE5	Curb	0.900	4.89	10.00	9.80	0.000	0.00	43.144
E-15	Curb	0.900	0.31	10.00	9.80	0.000	0.00	2.744
E-16	Curb	0.900	0.39	10.00	9.80	0.000	0.00	3.441
E-17	Curb	0.900	0.54	10.00	9.80	0.000	0.00	4.764
m17	Junct	0.896	16.13	10.65	9.69	0.000	0.00	140.000
m18	Junct	0.900	11.97	10.10	9.79	0.000	0.00	105.423
E-18	Curb	0.900	0.41	10.00	9.80	0.000	0.00	3.617
E-19	Curb	0.900	0.51	10.00	9.80	0.000	0.00	4.500
E-20	Curb	0.900	0.41	10.00	9.80	0.000	0.00	3.617
E-21	Curb	0.900	0.41	10.00	9.80	0.000	0.00	3.617
OSE6	Curb	0.900	11.55	10.00	9.80	0.000	0.00	101.905
OSE7	Curb	0.900	2.51	10.00	9.80	0.000	0.00	22.146
m1	Junct	0.900	1.53	10.97	9.63	0.000	0.00	13.267
m2	Junct	0.900	0.78	10.89	9.65	0.000	0.00	6.807
m3	Junct	0.900	2.17	12.27	9.42	0.000	0.00	18.393
m4	Junct	0.827	47.36	20.68	8.25	0.000	0.00	323.310
m5	Junct	0.608	11.24	20.51	8.27	0.000	0.00	56.571
m6	Junct	0.900	0.97	10.24	9.76	0.000	0.00	8.521
m8	Junct	0.895	33.95	12.32	9.41	0.000	0.00	285.914
m9	Junct	0.895	33.56	12.11	9.45	0.000	0.00	283.636
m10	Junct	0.900	4.89	10.04	9.80	0.000	0.00	43.114
m19	Junct	0.900	3.34	10.21	9.77	0.000	0.00	29.359
m20	Junct	0.900	0.41	10.00	9.80	0.000	0.00	3.617
m21	Junct	0.900	2.93	10.04	9.80	0.000	0.00	25.832
bend1	Junct	0.827	47.36	20.68	8.25	0.000	0.00	323.310
bend2	Junct	0.827	47.36	20.68	8.25	0.000	0.00	323.310
OUT	Outlt	0.827	47.36	20.68	8.25	0.000	0.00	323.310

Conveyance Configuration Data

Run#	Node I.D. US	Node I.D. DS	Flowline Elev. US (ft)	Flowline Elev. DS (ft)	Shape #	Span (ft)	Rise (ft)	Length (ft)	Slope (%)	n_value
2	m1	m3	510.50	510.05	Circ 1	0.00	2.00	330.83	0.14	0.013
3	m3	m4	510.05	510.00	Circ 1	0.00	2.00	18.50	0.27	0.013
4	m6	m5	512.50	512.47	Circ 1	0.00	2.00	6.10	0.49	0.013
5	m5	m4	511.47	511.00	Circ 1	0.00	3.00	78.00	0.60	0.013
7	m20	m19	532.88	532.29	Circ 1	0.00	2.00	58.23	1.00	0.013
8	m19	m17	531.29	529.21	Circ 1	0.00	3.00	231.75	0.90	0.013
9	m17	m16	527.00	524.50	Circ 1	0.00	4.00	299.85	0.83	0.013
10	m16	m13	520.00	518.50	Circ 1	0.00	5.00	299.30	0.50	0.013
12	m13	m11	511.50	510.11	Circ 1	0.00	5.50	298.30	0.47	0.013
13	m12	m13	521.47	521.00	Circ 1	0.00	2.50	59.39	0.79	0.013
14	m11	m9	510.11	509.68	Circ 1	0.00	5.50	76.35	0.56	0.013
15	m9	m8	509.68	508.84	Circ 1	0.00	5.50	150.74	0.56	0.013
16	m8	m4	508.84	508.50	Circ 1	0.00	5.50	53.04	0.64	0.013
17	m4	bend1	508.00	507.69	Circ 1	0.00	6.00	61.21	0.51	0.013
18	E-7	m1	517.71	517.11	Circ 1	0.00	1.50	59.88	1.00	0.013
19	E-8	m2	518.38	517.91	Circ 1	0.00	1.50	20.49	2.29	0.013
20	E-15	m2	523.82	517.91	Circ 1	0.00	1.50	330.26	1.79	0.013
21	E-6	m3	512.44	510.55	Circ 1	0.00	1.50	11.63	16.47	0.013
22	OSE2	m5	512.00	511.47	Circ 1	0.00	3.00	47.12	1.12	0.013
23	E-9	m6	513.02	512.75	Circ 1	0.00	1.50	13.20	2.05	0.013
24	E-10	m6	513.34	513.00	Circ 1	0.00	1.50	58.82	0.58	0.013
27	OSE7	m21	534.30	533.59	Circ 1	0.00	2.00	29.57	2.40	0.013
28	E-12	m21	534.79	533.85	Circ 1	0.00	1.50	21.09	4.46	0.013
29	E-3	m20	533.79	532.88	Circ 1	0.00	2.00	14.00	6.55	0.013
30	OSE6	m18	529.80	529.26	Circ 1	0.00	3.50	62.41	0.87	0.013
31	E-11	m18	531.45	530.26	Circ 1	0.00	1.50	42.70	2.79	0.013
32	E-4	m17	531.45	530.75	Circ 1	0.00	1.50	10.25	6.85	0.013
33	OSE5	m15	526.64	526.32	Circ 1	0.00	2.50	62.41	0.51	0.013
34	E-21	m15	527.73	526.82	Circ 1	0.00	1.50	42.70	2.13	0.013
35	E-5	m16	527.23	527.00	Circ 1	0.00	1.50	11.56	1.99	0.013
36	OSE4	m12	522.00	521.47	Circ 1	0.00	2.50	62.11	0.85	0.013
37	E-20	m12	523.54	521.97	Circ 1	0.00	1.50	39.67	3.96	0.013
38	E-19	m13	523.54	522.00	Circ 1	0.00	1.50	11.56	13.44	0.013
39	OSE3	m10	515.00	513.55	Circ 1	0.00	2.50	37.50	3.87	0.013
40	E-18	m10	516.06	514.05	Circ 1	0.00	1.50	23.18	8.70	0.013
41	E-17	m11	516.06	512.11	Circ 1	0.00	1.50	11.56	36.36	0.013
42	E-16	m8	512.86	510.84	Circ 1	0.00	1.50	11.56	17.75	0.013
43	m21	m19	533.60	531.79	Circ 1	0.00	2.00	95.19	1.90	0.013
44	m18	m17	529.26	528.75	Circ 1	0.00	3.50	58.50	0.87	0.013
45	m15	m16	526.32	526.00	Circ 1	0.00	2.50	58.45	0.55	0.013
46	m10	m9	513.55	511.18	Circ 1	0.00	2.50	94.12	2.52	0.013
47	OSE1	m5	514.00	511.97	Circ 1	0.00	2.50	234.30	0.87	0.013
48	bend1	bend2	507.69	507.54	Circ 1	0.00	6.00	25.00	0.60	0.013
49	bend2	OUT	507.54	507.50	Circ 1	0.00	6.00	8.00	0.50	0.013
1	m2	m1	517.91	517.11	Circ 1	0.00	1.50	37.29	2.15	0.013

Conveyance Hydraulic Computations. Tailwater = 512.000 (ft)

Run#	Hydraulic Gradeline US Elev (ft)	Hydraulic Gradeline DS Elev (ft)	Fr. Slope (%)	Depth Unif. (ft)	Depth Actual (ft)	Velocity Unif. (f/s)	Velocity Actual (f/s)	Q (cfs)	Cap (cfs)	Junc Loss (ft)
2	516.93	515.79	0.344	2.00	2.00	4.22	4.22	13.27	8.34	0.000
3	515.79	515.65	0.661	2.00	2.00	5.85	5.85	18.39	11.76	0.016
4	516.88	516.87	0.142	1.05	2.00	5.12	2.71	8.52	15.87	0.000
5	516.87	515.65	0.719	3.00	3.00	8.00	8.00	56.57	51.78	0.659
7*	533.44	533.23	0.026	0.54	0.94	5.30	2.49	3.62	22.68	0.020
8*	533.23	532.62	0.194	1.44	3.00	8.74	4.15	29.36	63.20	0.159
9	532.62	528.01	0.950	3.63	3.63	11.69	11.69	140.00	131.18	1.997
10	524.51	522.45	0.537	4.30	4.30	10.63	10.63	190.81	184.40	0.216
12	521.29	519.55	0.510	4.81	5.50	10.88	10.09	239.80	229.26	0.225
13	524.93	523.26	1.333	2.50	2.50	9.65	9.65	47.37	36.49	0.461
14*	519.55	518.70	0.521	4.30	5.50	12.18	10.21	242.50	252.05	0.444
15	518.70	516.64	0.713	5.50	5.50	11.94	11.94	283.64	250.71	0.992
16	516.64	515.65	0.725	4.98	5.50	12.63	12.03	285.91	268.90	0.597
17	515.65	514.01	0.583	5.63	6.00	11.74	11.43	323.31	301.43	1.289
18*	519.01	517.97	0.393	0.86	0.86	6.27	6.27	6.58	10.52	0.434
19*	519.44	519.30	0.158	0.52	1.39	7.58	2.44	4.17	15.91	0.108
20*	524.32	519.30	0.068	0.45	1.39	6.16	1.60	2.74	14.05	0.047
21*	516.03	515.79	0.289	0.37	1.50	16.76	3.20	5.65	42.64	0.199
22*	517.59	516.87	0.325	1.56	3.00	10.20	5.38	38.03	70.75	0.562
23*	517.13	516.88	0.307	0.65	1.50	7.97	3.30	5.82	15.03	0.211
24*	516.97	516.88	0.068	0.60	1.50	4.11	1.55	2.74	7.99	0.047
27*	537.50	536.25	0.958	1.15	2.00	11.82	7.05	22.15	35.06	0.965
28*	536.36	536.25	0.124	0.41	1.50	9.32	2.10	3.71	22.19	0.086
29*	535.22	533.44	0.026	0.34	0.56	10.26	4.98	3.62	57.90	1.043
30	537.82	535.01	1.026	3.50	3.50	10.59	10.59	101.90	93.60	2.177
31*	535.15	535.01	0.124	0.47	1.50	7.87	2.10	3.71	17.54	0.086
32*	532.93	532.62	0.390	0.50	1.50	12.77	3.71	6.56	27.49	0.267
33	531.63	529.44	1.106	2.50	2.50	8.79	8.79	43.14	29.37	1.500
34*	529.57	529.44	0.119	0.50	1.50	7.10	2.05	3.62	15.34	0.082
35*	529.14	527.67	0.339	0.67	0.67	7.99	7.99	6.11	14.82	1.239
36	527.19	524.93	1.143	2.50	2.50	8.93	8.93	43.85	37.90	1.548
37*	525.06	524.93	0.119	0.42	1.50	8.85	2.05	3.62	20.91	0.082
38*	524.01	522.35	0.183	0.35	0.35	14.57	14.57	4.50	38.52	0.126
39*	521.79	520.18	0.928	1.24	2.50	16.35	8.05	39.53	80.70	1.258
40*	520.29	520.18	0.119	0.35	1.50	11.71	2.05	3.62	30.99	0.082
41*	519.71	519.55	0.206	0.28	1.50	21.01	2.70	4.76	63.35	0.141
42*	516.72	516.64	0.107	0.28	1.50	14.83	1.95	3.44	44.26	0.074
43*	536.25	533.23	1.303	1.39	1.44	11.08	10.67	25.83	31.20	1.255
44	535.01	532.62	1.098	3.50	3.50	10.96	10.96	105.42	93.95	1.742
45	529.44	528.25	1.294	2.50	2.50	9.51	9.51	46.66	30.35	0.055
46*	520.18	518.70	1.105	1.48	2.50	14.20	8.78	43.11	65.11	0.442
47*	517.89	516.87	0.180	1.18	2.50	7.61	3.54	17.39	38.19	0.594
48*	514.01	513.17	0.583	4.88	5.63	13.14	11.74	323.31	328.10	0.739
49	513.17	513.13	0.583	5.63	5.63	11.74	11.74	323.31	299.51	0.000
1*	519.30	517.81	0.420	0.70	0.70	8.44	8.44	6.81	15.39	0.692

END

* Super critical flow.

COMPUTATION SHEETS

- COMPUTATIONS FOR OFFSITE AREAS OSE2, OSE3, OSE4, OSE5, OSE6, OSE7, OSE8, AND OSE9 ARE BASED ON PROPOSED WATERSHED CONDITIONS. COMPUTATIONS FOR OFFSITE AREA OSE1 ARE BASED ON EXISTING WATERSHED CONDITIONS.
- TIME OF CONCENTRATION IS DETERMINED ACCORDING TO CITY OF ROCKWALL CRITERIA.

RECORD DRAWING

This drawing is a compilation of the original sealed engineering drawing and modifications by addenda, change orders and information furnished by the contractor. Information shown that was provided by the contractor and others not associated with the design engineer cannot be verified for accuracy or completeness. Original sealed drawing is on file at the office of AECOM USA Group, Inc., TBPE REG. NO. F-3082

ORIGINAL DRAWING SEALED & SIGNED BY
T.H. Gaertner, P.E.
TX NO. 37124

NO.	REVISION	BY	DATE
1	WINSTORM OUTPUT	THG	5/22/08

City of Rockwall, Texas

205 BYPASS
PHASE 3

HYDRAULIC DATA
STORM SYSTEM E-100 YR FLOWS

1 OF 2

TCB | AECOM
TCB INC.
WWW.TCB.AECOM.COM
17300 DALLAS PARKWAY, SUITE 1010
DALLAS, TEXAS 75248

Unit PW-DAL-FW	Scale: Horz: AS SHOWN Vert: AS SHOWN	Date	11/23/2009
Designed	Checked TCB	Project No.	60004153
Drawn	Approved TCB	Sheet	74 of 215

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11/23/2009