5 YEAR

A. TOTAL ON SITE AREA = 3.00 AC
B. DISCHARGE (ON SITE)=CIA=(0.35)(4.90)3.00 = 5.15 CFS
C. TOTAL ON-SITE BYPASS AREAS (2,8,9, & 10) = 0.57 AC
D. DISCHARGE (ON-SITE BYPASS)=CIA=0.57x0.9x6.1=3.13
E. ALLOWABLE ON-SITE DISCHARGE (B-D)=5.15-3.13 = 2.O2 CFS
F. OFFSITE BYPASS = (1.28+.17)x.35x4.90 = 2.49 CFS

Determine Qp for On-Site Areas (2.43 ac draining to pond)

Duration	A	C	I	Qp
10	2.43	0.90	6.10	13.34
15	2.43	0.90	5.50	12.03
20	2.43	0.90	4.90	10.72
30	2.43	0.90	4.10	8.97
40	2.43	0.90	3.40	7.44
50	2.43	0.90	2.80	6.12
60	2.43	0.90	2.60	5.69
70	2.43	0.90	2.40	5.25
80	2.43	0.90	2.30	5.03
90	2.43	0.90	2.10	4.59
100	2.43	0.90	1.90	4.16
110	2.43	0.90	1.80	3.94
120	2.43	0.90	1.55	3.39

Determine Storage Volume Required for On-Site Areas
Qa= 2.02 Allow. Release
T= 10

Duration	Inflow = Duration*Qp*60	Outflow = 0.5*(Duration+T)*Qa*60	Storage
10	8004	1212	6792
15	10826	1515	9311
20	12860	1818	11042
30	16140	2424	13716
40	17846	3030	14816
50	18371	3636	14735
60	20470	4242	16228
70	22045	4848	17197
80	24144	5454	18690
90	24801	6060	18741
100	24932	6666	18266
110	25982	7272	18710
120	24407	7878	16529

Total Storage Required at 90 min. = 18,741 CF

Determine Water Surface Elev.

Pond Overflow Elevation =			73.00			
Layer Elevation	Surface Area (sf)	Average Area (sf)	Layer Volume (cf)	Cumulative Volume (cf)	5-year Volume (cf)	5-year WSEL
73.00	14446					
		13357	13357	44691		
72.00	12268					
		11245	11245	31334		
71.00	10222					
		9284	9284	20089		
70.00	8346				18741	70.85
		7489	7489	10805		
69.00	6632					
		3316	3316	3316		
68.00	0					

10 YEAR

A. TOTAL ON SITE AREA = 3.00 AC
B. DISCHARGE (ON SITE)=CIA=(0.35)(5.9)3.00 = 6.20 CFS
C. TOTAL ON-SITE BYPASS AREAS (2,8,9, & 10) = 0.57 AC
D. DISCHARGE (ON-SITE BYPASS)=CIA=0.57x0.9x7.1 = 3.64
E. ALLOWABLE ON-SITE DISCHARGE (B-D)=6.20-3.64 = 2.56 CFS
F. OFFSITE BYPASS = (1.28+.17)x.35x5.90 = 2.99 CFS

Determine Qp for On-Site Areas (2.43 ac draining to pond)

Duration	A	C	I	Qp
10	2.43	0.90	7.10	15.53
15	2.43	0.90	6.50	14.22
20	2.43	0.90	5.90	12.90
30	2.43	0.90	4.80	10.50
40	2.43	0.90	4.00	8.75
50	2.43	0.90	3.50	7.66
60	2.43	0.90	3.00	6.56
70	2.43	0.90	2.80	6.12
80	2.43	0.90	2.60	5.69
90	2.43	0.90	2.50	5.47
100	2.43	0.90	2.40	5.25
110	2.43	0.90	2.30	5.03
120	2.43	0.90	1.75	3.83

Determine Storage Volume Required for On-Site Areas
Qa= 2.56 Allow. Release
T= 10

Duration	Inflow = Duration*Qp*60	Outflow = 0.5*(Duration+T)*Qa*60	Storage
10	9317	1536	7781
15	12794	1920	10874
20	15484	2304	13180
30	18896	3072	15824
40	20995	3840	17155
50	22964	4608	18356
60	23620	5376	18244
70	25719	6144	19575
80	27294	6912	20382
90	29525	7680	21845
100	31493	8448	23045
110	33199	9216	23983
120	27556	9984	17572

Total Storage Required at 110 min. = 23,983 CF

Determine Water Surface Elev.

Pond Overflow Elevation =			73.00			
Layer Elevation	Surface Area (sf)	Average Area (sf)	Layer Volume (cf)	Cumulative Volume (cf)	10-year Volume (cf)	10-year WSEL
73.00	14446					
		13357	13357	44691		
72.00	12268					
		11245	11245	31334		
71.00	10222				23983	71.35
		9284	9284	20089		
70.00	8346					
		7489	7489	10805		
69.00	6632					
		3316	3316	3316		
68.00	0					

25 YEAR

A. TOTAL ON SITE AREA = 3.00 AC
B. DISCHARGE (ON SITE)=CIA=(0.35)(6.6)3.00 = 6.93 CFS
C. TOTAL ON-SITE BYPASS AREAS (2,8,9, & 10) = 0.57 AC
D. DISCHARGE (ON-SITE BYPASS)=CIA=0.57x0.9x8.3 = 4.26 CFS
E. ALLOWABLE ON-SITE DISCHARGE (B-D)=6.93-4.26 = 2.67 CFS
F. OFFSITE BYPASS = (1.28+.17)x.35x6.60 = 3.35 CFS

Determine Qp for On-Site Areas (2.43 ac draining to pond)

Duration	A	C	I	Qp
10	2.43	0.90	8.30	18.15
15	2.43	0.90	7.50	16.40
20	2.43	0.90	6.60	14.43
30	2.43	0.90	5.50	12.03
40	2.43	0.90	4.60	10.06
50	2.43	0.90	4.00	8.75
60	2.43	0.90	3.50	7.65
70	2.43	0.90	3.30	7.22
80	2.43	0.90	3.10	6.78
90	2.43	0.90	2.90	6.34
100	2.43	0.90	2.70	5.90
110	2.43	0.90	2.50	5.47
120	2.43	0.90	2.20	4.81

Determine Storage Volume Required for On-Site Areas
Qa= 2.67 Allow. Release
T= 10

Duration	Inflow = Duration*Qp*60	Outflow = 0.5*(Duration+T)*Qa*60	Storage
10	10891	1602	9289
15	14762	2003	12760
20	17321	2403	14918
30	21651	3204	18447
40	24144	4005	20139
50	26244	4806	21438
60	27556	5607	21949
70	30312	6408	23904
80	32543	7209	25334
90	34248	8010	26238
100	35429	8811	26618
110	36086	9612	26474
120	34642	10413	24229

Total Storage Required at 100 min. = 26,618 CF

Determine Water Surface Elev.

Pond Overflow Elevation =			73.00			
Layer Elevation	Surface Area (sf)	Average Area (sf)	Layer Volume (cf)	Cumulative Volume (cf)	25-year Volume (cf)	25-year WSEL
73.00	14446					
		13357	13357	44691		
72.00	12268					
		11245	11245	31334		
71.00	10222				26618	71.58
		9284	9284	20089		
70.00	8346					
		7489	7489	10805		
69.00	6632					
		3316	3316	3316		
68.00	0					

100 YEAR

A. TOTAL ON SITE AREA = 3.00 AC
B. DISCHARGE (ON SITE)=CIA=(0.35)(8.3)3.00 = 8.72 CFS
C. TOTAL ON-SITE BYPASS AREAS (2,8,9, & 10) = 0.57 AC
D. DISCHARGE (ON-SITE BYPASS)=CIA=0.57x0.9x9.8 = 5.03 CFS
E. ALLOWABLE ON-SITE DISCHARGE (B-D)=8.72-5.03 = 3.69 CFS
F. OFFSITE BYPASS = (1.28+.17)x.35x8.30 = 4.21CFS

Determine Qp for On-Site Areas (2.43 ac draining to pond)

Duration	A	C	I	Qp
10	2.43	0.90	9.80	21.43
15	2.43	0.90	9.00	19.68
20	2.43	0.90	8.30	18.15
30	2.43	0.90	6.90	15.09
40	2.43	0.90	5.80	12.68
50	2.43	0.90	5.00	10.94
60	2.43	0.90	4.50	9.84
70	2.43	0.90	4.00	8.75
80	2.43	0.90	3.70	8.09
90	2.43	0.90	3.50	7.65
100	2.43	0.90	3.30	7.22
110	2.43	0.90	2.90	6.34
120	2.43	0.90	2.75	6.01

Determine Storage Volume Required for On-Site Areas
Qa= 3.69 Allow. Release
T= 10

Duration	Inflow = Duration*Qp*60	Outflow = 0.5*(Duration+T)*Qa*60	Storage
10	12860	2214	10646
15	17715	2768	14947
20	21783	3321	18462
30	27163	4428	22735
40	30443	5535	24908
50	32805	6642	26163
60	35429	7749	27680
70	36742	8856	27886
80	38841	9963	28878
90	41334	11070	30264
100	43303	12177	31126
110	41859	13284	28575
120	43303	14391	28912

Total Storage Required at 100 min. = 31,126 CF

Determine Water Surface Elev.

Pond Overflow Elevation =			73.00			
Layer Elevation	Surface Area (sf)	Average Area (sf)	Layer Volume (cf)	Cumulative Volume (cf)	100-year Volume (cf)	100-year WSEL
73.00	14446					
		13357	13357	44691		
72.00	12268					
		11245	11245	31334		
71.00	10222				31126	71.98
		9284	9284	20089		
70.00	8346					
		7489	7489	10805		
69.00	6632					
		3316	3316	3316		
68.00	0					

Orifice Calculations - 5yr Q_A = 2.02 CFS   Bypass = 2.49 cfs

FLOWLINE ELEVATION			68.00	feet
ORIFICE SIZE 'L'			10" DIA	inches
ORIFICE SIZE 'H'			NA	inches
5-yr WSEL			70.85	feet
EXIT COEFFICIENT 'C'			0.60	
AREA OPENING			0.55	square feet
Q=CA(2gh)^1/2			4.22	cfs
		Total 5yr	4.22	cfs

Orifice Calculations - 10yr Q_A = 2.56 CFS   Bypass = 2.99 cfs

FLOWLINE ELEVATION			68.00	feet
ORIFICE SIZE 'L'			10" DIA	inches
ORIFICE SIZE 'H'			NA	inches
10-yr WSEL			71.35	feet
EXIT COEFFICIENT 'C'			0.60	
AREA OPENING			0.55	square feet
Q=CA(2gh)^1/2			4.61	cfs
		Total 10yr	4.61	cfs

Orifice Calculations - 25yr Q_A = 2.67 CFS   Bypass = 3.35 cfs

FLOWLINE ELEVATION		68.00/70.44	feet
ORIFICE SIZE 'L'		10" DIA	inches
ORIFICE SIZE 'H'		NA	inches
25-yr WSEL		71.58	feet
EXIT COEFFICIENT 'C'		0.60	
AREA OPENING		0.55	square feet
Q=CA(2gh)^1/2		4.78	cfs
	Total 25yr	4.78	cfs

Orifice Calculations - 100yr Q_A = 3.69 CFS   Bypass = 4.21 cfs

FLOWLINE ELEVATION		68.00/71.58	feet
ORIFICE SIZE 'L'		10" DIA/3.28 LONG	inches
ORIFICE SIZE 'H'		NA/0.4'	inches
100-yr WSEL		71.98	feet
EXIT COEFFICIENT 'C'		0.60	
AREA OPENING		0.55/1.31	square feet
Q=CA(2gh)^1/2		5.07/2.83	cfs
	Total 100yr	7.90	cfs

RECORD DRAWINGS
TO THE BEST OF OUR KNOWLEDGE BINKLEY & BARFIELD - C&P, INC., HEREBY STATES THAT THIS PLAN IS AS-BUILT. THIS INFORMATION PROVIDED IS BASED ON SURVEYING AT THE SITE AND INFORMATION PROVIDED BY THE CONTRACTOR.

DATE: 7-1-2014 SIGNATURE: ____________
BINKLEY & BARFIELD - C&P, INC.

⚠1 DRAINAGE DATA TABLE

Area ID	Area (acres)	C	Tc (min)	Intensity (in/hr.)	Q_{100} (cfs)	Comment
1	0.41	0.9	10.00	9.8	3.62	TO POND
2	0.13	0.9	10.00	9.8	1.15	TO AIRPORT ROAD
3	0.35	0.9	10.00	9.8	3.09	TO POND
4	0.20	0.9	10.00	9.8	1.76	TO POND
5	0.05	0.9	10.00	9.8	.44	TO POND
6	0.11	0.9	10.00	9.8	.97	TO POND
7	1.31	0.9	10.00	9.8	11.55	TO POND
8	0.26	0.9	10.00	9.8	1.27	TO EXISTING SWALE
9	0.04	0.9	10.00	9.8	.35	TO PROPERTY - TO EAST
10	0.02	0.9	10.00	9.8	.18	TO PROPERTY - TO EAST
11	0.12	0.9	10.00	9.8	1.06	TO CULVERT 'A'
TOTAL	3.00					
A	0.17	0.35	20.00	8.3	0.50	TO INLET #1
B	1.28	0.35	20.00	8.3	3.72	TO POND
C	0.64	0.35	20.00	8.3	1.86	TO CULVERT 'A'

0 50' 100'

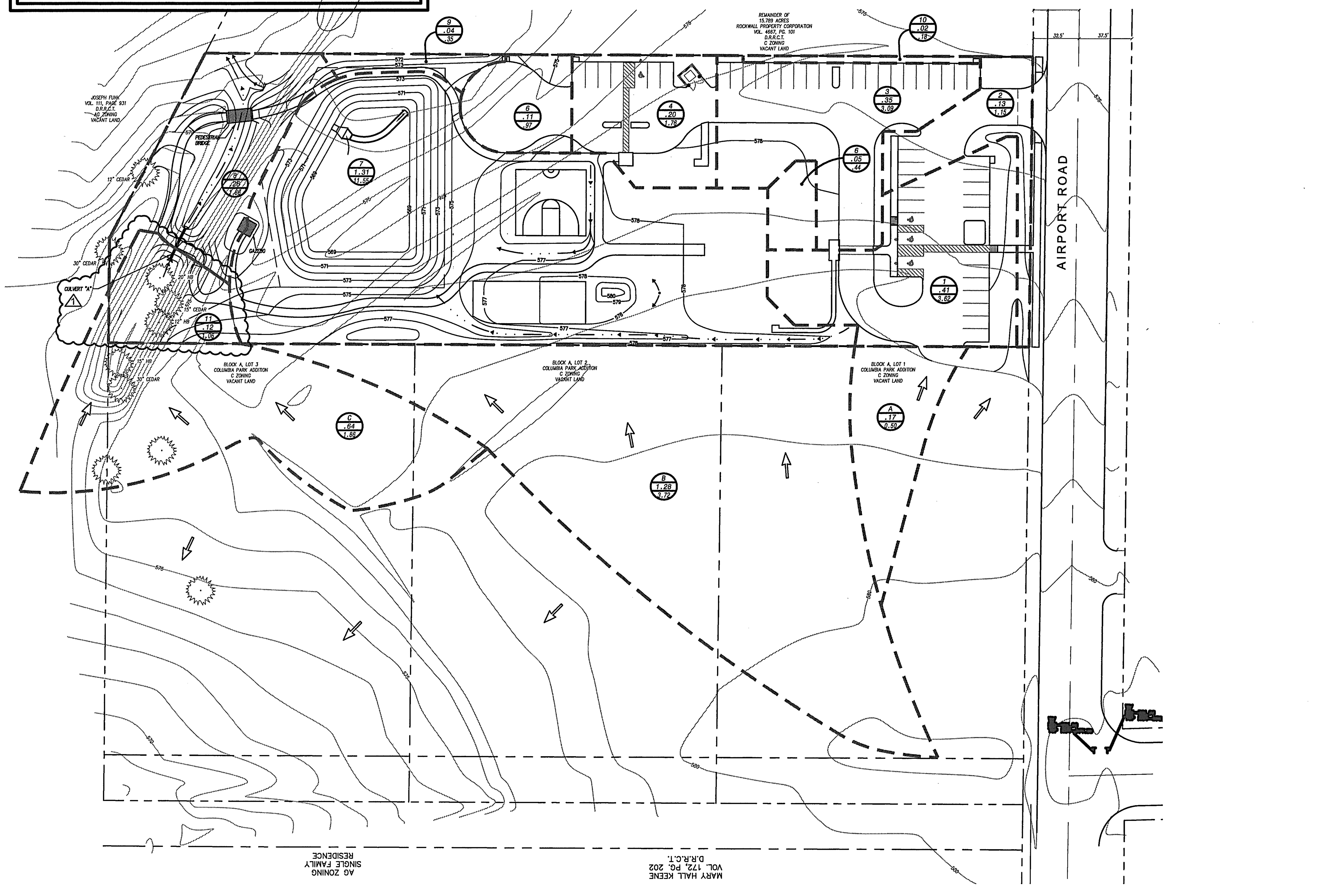
LEGEND

(5 / .14 / .68) DRAINAGE AREA I.D. / AREA SIZE (AC) / 100-YR RUNOFF (CFS)
FLOW DIRECTION
PROPOSED DRAINAGE DIVIDE

NOTES

1. C=0.90, Tc=10 Min. & I_{100}=9.80 IN/HR
2. SEE SHEET C5 FOR STORM SEWER PROFILES.

"ALL RESPONSIBILITY FOR ADEQUACY OF DESIGN REMAINS WITH THE DESIGN ENGINEER. THE CITY OF ROCKWALL, IN REVIEWING AND RELEASING PLANS FOR CONSTRUCTION, ASSUMES NO RESPONSIBILITY FOR ADEQUACY OR ACCURACY OF DESIGN"



Rev	Date	Description	App.
⚠			
⚠			
⚠			
⚠			
⚠1	9-11-13	ADDED DRAINAGE AREA 11 & REVISED DRAINAGE DATA TABLE.	T.P.J.

Designed By: RAA
Drawn By: BS
Checked By: TPJ
Approved By:

Job No.: BC12049
Date: NOV. 30, 2012
Scale: 1"=50' H (22"X34")

ARCHITECT:
JOE CREWS
28 MORRIS LN
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The seal appearing on this document was authorized by Thomas P. Jones, P.E. 58887. Alteration of a sealed document without proper notification to the responsible engineer is an offense under the Texas Engineering Practice Act. Mar. 28, 2013

STATE OF TEXAS
THOMAS P. JONES
58887
LICENSED PROFESSIONAL ENGINEER

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LAKES REGIONAL MHMR CENTER
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DRAINAGE AREA MAP
BLOCK A, LOT 4, COLUMBIA PARK ADDITION
ROCKWALL, TEXAS

LAKES REGIONAL
MENTAL HEALTH MENTAL RETARDATION CENTER
ROCKWALL, TEXAS

Sheet No: C6
of NS

S:\153000 Lakes Reg MHMR Center\C6 – 153000-DRAINAGE AREA MAP.dwg–D.A.M. Plotted Jun 25, 2014 at 3:41pm by konderson | Last Saved by: konderson