FRANKLIN CONSULTANTS, INC.
2999 E. Dublin-Granville Road
Columbus, Ohio 43231
Ph. (614) 891-6000 Fax (614) 891-6003

JOB Union Center Blvd. Interchange over E. Fork
SHEET NO 5 OF
CALCULATED BY CB DATE 7-16-96
CHECKED BY FA DATE 8-9-96
SCALE

$U Q_{25} = 265 (A)^{.76} (P-30)^{.72} (13 - BDF)^{-.37}$

$U Q_{25} = 265 (5.36)^{.76} (40-30)^{.72} (13-2)^{-.37} = 2051.61 cfs$

$U Q_{50} = 293 (5.36)^{.78} (40-30)^{.74} (13-2)^{-.35} = 2577.08 cfs$

$U Q_{100} = 321 (5.36)^{0.79} (40-30)^{.76} (13-2)^{-.33} = 3154.17 cfs$

Water Resources Study
12/16/94 OK

Sub Area (Same Area)
HEC 1 Model 3221 cfs
Regression - 3159 cfs

BASIN-DEVELOPMENT FACTOR

FIELD NOTES

STATION NAME: _____

LOCATION: Union Center Blvd over East Fork of Mill Creek I.D. NUMBER: _____

EVALUATOR: CB DATE: 7-16-96

ASPECT	THIRD	CODE	REMARKS
Channel Improvements	Lower	0	
	Middle	0	
	Upper	0	
Channel Linings	Lower	0	
	Middle	0	
	Upper	0	
Storm Sewers	Lower	0	
	Middle	0	
	Upper	1	
Curb & Gutter Streets	Lower	0	
	Middle	0	
	Upper	1	

BDF = 2

Figure 10.--Field note sheet for evaluating basin-development factor (BDF).

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JOB Union Center Blvd Interchange
SHEET NO 1 OF
CALCULATED BY JFB DATE 7-16-96
CHECKED BY FL DATE 7-19-96
SCALE

Union Center Blvd over East Fork of Mill Creek

Following are the hydraulic computations for determining the size of the structure to carry Union Center Blvd over East fork of Mill Creek located in Butler County just North East of I 275 / I 75 interchange.

Computation of Drainage Area

Drainage Area by Planimeter = 5.356 square miles

Quadrangle sheets used: GLENDALE, OHIO
MASON, OHIO

Discharge Calculations:

By the method described in Report 93-135 entitled "Estimation of Peak-Frequency Relations, Flood Hydrographs, and Volume-Duration-Frequency Relations of Ungaged small Urban Streams in Ohio."

Average Annual precipitation = 40 inches from Fig 8

Basin development factor = 2 from figure 10


MASON
HAMILTON
ROAD
Radio Tower (WLW)
Muddy
SNIDER RD.
Drive-in Theater
Western Row Sch
Socialville
Trailer Park
Sewage Disposal
MAUD
MASON
ROAD
WESTERN
Keltner Cem
FOSTER
CONRAIL
COUNTY LINE
BM 887
U S RESERVATION
VOICE OF AMERICA
Radio Towers
UNION
COX ROAD
WEST CHESTER ROAD
Pisgah
INTERCHANGE 22
TYLERSVILLE ROAD
3 LANE
Maud
PIPELINE
BARRETT ROAD
East Fork
DAYTON
Gravel Pit
INTERCHANGE
CINCINNATI
Gravel Pits
West Chester
STATION RD
West Chester Sta
DIMMICK ROAD
Creek
Golf Course
Township Sch
Gravel Pit
Quarry
Brookside Cem
TYLERSVILLE
Swan Lake
WEST CHESTER ROAD
Tylersville
Golf Course
BECKETT ROAD
ROAD
RIALTO
ALLEN
UNION

12-5-02 AS-BUILT INFO

n=0.013

STORM SEWER COMPUTATION SHEET

JOB NO.: 20011008 PROJECT: The Streets of West Chester DATE: 11/1/01

CONSULTANT: EVANS, MECHWART, HAMBLETON & TILTON, INC. BY: JDW SHEET: 1 of 1

Struct #	A Acres	ΣA Acres	c	cA Acres	ΣcA Acres	Time Et	10 Yr Rainfall Intensity	Discharge Q	Length Feet	Slope Percent	Pipe Size Inches	Mean Velocity f.p.s	Capacity c.f.s	Jump	Invert (Out)	Invert (In)	Top of Pipe	Top of Casting	Cover
13	0.3	0.3	0.75	0.2	0.2	10.0	5.15	1.2	57.00	~~1.00~~ 1.04	12	4.5	3.6		610.71	610.71	611.88	616.87	4.99
12	0.3	0.6	0.75	0.2	0.5	10.2	5.12	2.3	28.92	~~1.00~~ 2.01	12	4.5	3.6	0.10	610.04	610.14	611.21	616.87	5.66
11	2.0	2.6	0.75	1.5	2.0	10.3	5.10	10.0	132.71	~~0.50~~ 0.55	24	5.1	16.0	2.50	607.25	609.75	609.50	616.49	6.99
10	0.0	2.6	0.75	0.0	2.0	10.7	5.04	9.8	126.28	★ ~~0.50~~ 0.42	24	5.1	~~16.0~~ 14.66 ✓	0.10	606.48	606.58	608.73	614.29	5.56
9	1.0	3.6	0.75	0.8	2.7	11.2	4.98	13.4	176.38	~~1.00~~ 1.15	24	7.2	22.7	0.10	605.75	605.85	608.00	612.37	4.37
8	2.3	5.9	0.75	1.7	4.4	11.6	4.92	21.8	136.08	~~0.50~~ 0.61	30	5.9	29.1	0.50	603.49	603.99	606.28	610.29	4.01
7	8.9	14.8	0.75	6.7	11.1	12.0	4.86	54.0	150.00	~~0.20~~ 0.28	42	4.7	45.1	1.00	601.81	602.81	605.69	610.93	5.24
6	0.6	15.4	0.75	0.5	11.6	12.5	4.79	55.3	150.00	~~0.20~~ 0.24	48	5.1	64.4	0.50	601.01	601.51	605.43	610.18	4.75
5	1.1	16.5	0.75	0.8	12.4	13.0	4.73	58.5	220.00	~~0.20~~ 0.28	48	5.1	64.4	0.10	600.61	600.71	605.03	610.92	5.89
4	7.8	24.3	0.75	5.9	18.2	13.7	4.63	84.4	133.18	~~0.40~~ 0.46	48	7.2	91.0	0.10	600.07	600.17	604.49	609.48	4.99
3	0.0	24.3	0.75	0.0	18.2	14.0	4.60	83.7	145.66	★ ~~0.40~~ 0.39	48	7.2	~~91.0~~ 89.71 ✓	0.10	599.44	599.54	603.86	608.57	4.71
2	2.2	26.5	0.75	1.7	19.9	14.3	4.55	90.5	72.50	~~0.40~~ 1.01	48	7.2	91.0	0.10	598.75	598.85	603.17	607.55	4.38
1	0.0	26.5	0.75	0.0	19.9	14.5	4.53	90.1	16.00	★ ~~0.40~~ -1.13	48	7.2	91.0	0.10	598.36	598.46	602.78	607.55	4.77
EW1										↳ REPLACE PIPE						598.30			
BH10	1.5	1.5	0.75	1.1	1.1	10.0	5.15	5.8	80.00	0.40	18	3.8	6.7		607.21	607.21	608.92	614.00	5.08
22	0.0	1.5	0.75	0.0	1.1	10.4	5.10	5.7	120.04	1.00	18	6.0	10.5	0.10	606.79	606.89	608.50	613.68	5.18
21	2.0	3.5	0.75	1.5	2.6	10.7	5.05	13.2	329.73	0.50	24	5.1	16.0	0.50	605.09	605.59	607.34	612.38	5.04
20	1.7	5.2	0.75	1.3	3.9	11.8	4.89	19.1	106.00	1.00	24	7.2	22.7	5.38	598.06	603.44	600.31	610.70	10.39
EW2																597.00			
15	0.5	0.5	0.75	0.4	0.4	10.0	5.15	1.9	35.00	~~1.00~~ 1.06	12	4.5	3.6		606.13	606.13	607.30	610.32	3.03
14	0.6	1.1	0.75	0.5	0.8	10.1	5.13	4.2	17.50	~~1.00~~ 2.74	15	5.3	6.5	0.25	605.53	605.78	606.97	610.32	3.36
8																605.35			
17	0.3	0.3	0.75	0.2	0.2	10.0	5.15	1.2	35.00	★ ~~1.00~~ 0.83	12	4.5	~~3.6~~ 3.25 ✓		605.99	605.99	607.16	610.18	3.02
16	0.3	0.6	0.75	0.2	0.5	10.1	5.13	2.3	17.50	★ ~~1.00~~ 0.51	12	4.5	~~3.6~~ 2.54 ✓	0.10	605.54	605.64	606.71	610.18	3.48
6																605.36			
19	~~0.4~~ 0.66	0.4	0.75 (0.62?)	~~0.3~~ 5	0.3	10.0	5.15	~~1.5~~ 2.55	35.00	★ ~~1.00~~ 0.71	12	4.5	~~3.6~~ 3.00 ✓		603.30	603.30	604.47	607.50	3.03
18	~~0.4~~ 0.66	0.8	0.75 (0.62?)	~~0.3~~ 5	0.6	10.15	5.13	~~3.1~~ 5.13	24.61	★ ~~1.00~~ 0.53	12	4.5	~~3.6~~ 2.59	0.10	602.85	602.95	604.02	607.50	3.48
2								2.11 4.20								602.60			

STORM SEWER COMPUTATION SHEET

JOB NO.: 20011008 PROJECT: The Streets of West Chester DATE: 11/1/01

CONSULTANT: EVANS, MECHWART, HAMBLETON & TILTON, INC. BY: JDW SHEET: 1 of 1

Struct #	A Acres	ΣA Acres	c	cA Acres	ΣcA Acres	Time Et	10 Yr Rainfall Intensity	Discharge Q	Length Feet	Slope Percent	Pipe Size Inches	Mean Velocity f.p.s	Capacity c.f.s	Jump	Invert (Out)	Invert (In)	Top of Pipe	Top of Casting	Cover
BH11	1.0	1.0	0.75	0.8	0.8	10.0	5.15	3.9	22.50	0.40	15	3.3	4.1		606.71	606.71	608.15	610.00	1.85
24	0.5	1.5	0.75	0.4	1.1	10.1	5.13	5.8	35.00	0.80	15	4.7	5.8	0.10	606.52	606.62	607.96	612.77	4.81
23	0.5	2.0	0.75	0.4	1.5	10.2	5.11	7.7	20.00	1.50	15	6.5	7.9	0.10	606.14	606.24	607.58	612.77	5.19
21																605.84			
BH12	0.9	0.9	0.75	0.7	0.7	10.0	5.15	3.5	12.51	0.30	18	3.3	5.8		604.83	604.83	606.54	610.00	3.46
25	0.4	1.3	0.75	0.3	1.0	10.1	5.14	5.0	64.42	0.30	18	3.3	5.8	0.10	604.69	604.79	606.40	610.80	4.40
20																604.50			
27	0.1	0.1	0.75	0.1	0.1	10.0	5.15	0.4	25.20	1.00	12	4.5	3.6		605.70	605.70	606.87	610.20	3.33
26	0.3	0.4	0.75	0.2	0.3	10.1	5.14	1.5	16.27	1.00	12	4.5	3.6	0.10	605.35	605.45	606.52	610.20	3.68
20																605.19			
BH7	6.7	1.2	0.75	5.0	5.0	10.0	5.15	25.9	75.00	~~0.20~~ 0.15	36	4.2	~~29.9~~ 25.83		601.82	601.82	605.16	610.00	4.84
4																601.67			
BH8	7.8	1.2	0.75	5.9	5.9	10.0	5.15	30.1	75.00	~~0.30~~ ~~0.31~~ 0.25	36	5.2	~~36.6~~ 33.35		603.04	603.04	606.38	610.00	3.63
7							100 Year									602.81			
EW 3	2.9	1.2	0.75	2.2	2.2	10.0	7.32	15.9	200.00	0.15	36	3.7	25.9		605.80	605.80	609.14	-	-
EW 4																605.50			
*EW 5	19.1	1.2	0.75	14.3	14.3	10.0	7.32	104.8	112.00	0.40	54	7.8	124.6		601.00	601.00	605.96	610.00	4.04
EW 6																600.55			

* EW 5 drainage area based on upstream 48" pipe capacity of 101.8 cfs plus 0.6 acres of additional drainage area accepted at 100 year intensity.

STORM SEWER COMPUTATION SHEET

JOB NO.: 20011008 PROJECT: The Streets of West Chester DATE: 11/1/01

CONSULTANT: EVANS, MECHWART, HAMBLETON & TILTON, INC. BY: JDW SHEET: 1 of 1

Struct #	A Acres	ΣA Acres	c	cA Acres	Σ⊂A Acres	Time Et	10 Yr Rainfall Intensity	Discharge Q	Length Feet	Slope Percent	Pipe Size Inches	Mean Velocity f.p.s	Capacity c.f.s	Jump	Invert (Out)	Invert (In)	Top of Pipe	Top of Casting	Cover
13	0.3	0.3	0.75	0.2	0.2	10.0	5.15	1.2	57.00	1.00	12	4.5	3.6		610.71	610.71	611.88	616.87	4.99
12	0.3	0.6	0.75	0.2	0.5	10.2	5.12	2.3	28.92	1.00	12	4.5	3.6	0.10	610.04	610.14	611.21	616.87	5.66
11	2.0	2.6	0.75	1.5	2.0	10.3	5.10	10.0	132.71	0.50	24	5.1	16.0	2.50	607.25	609.75	609.50	616.49	6.99
10	0.0	2.6	0.75	0.0	2.0	10.7	5.04	9.8	126.28	0.50	24	5.1	16.0	0.10	606.49	606.59	608.74	614.29	5.55
9	1.0	3.6	0.75	0.8	2.7	11.2	4.98	13.4	176.38	1.00	24	7.2	22.7	0.10	605.76	605.86	608.01	612.37	4.36
8	2.3	5.9	0.75	1.7	4.4	11.6	4.92	21.8	136.08	0.50	30	5.9	29.1	0.50	603.49	603.99	606.28	610.29	4.01
7	8.9	14.8	0.75	6.7	11.1	12.0	4.86	54.0	150.00	0.20	42	4.7	45.1	1.00	601.81	602.81	605.69	610.93	5.24
6	0.6	15.4	0.75	0.5	11.6	12.5	4.79	55.3	150.00	0.20	48	5.1	64.4	0.50	601.01	601.51	605.43	610.18	4.75
5	1.1	16.5	0.75	0.8	12.4	13.0	4.73	58.5	220.00	0.20	48	5.1	64.4	0.10	600.61	600.71	605.03	610.92	5.89
4	8.6	25.1	0.75	6.5	18.8	13.7	4.63	87.2	133.18	0.40	48	7.2	91.0	0.10	600.07	600.17	604.49	609.48	4.99
3	0.0	25.1	0.75	0.0	18.8	14.0	4.60	86.5	145.66	0.40	48	7.2	91.0	0.10	599.44	599.54	603.86	608.57	4.71
2	2.2	27.3	0.75	1.7	20.5	14.3	4.55	93.2	72.50	0.45	48	7.7	96.6	0.10	598.76	598.86	603.18	607.55	4.37
1	0.0	27.3	0.75	0.0	20.5	14.5	4.53	92.8	16.00	0.45	48	7.7	96.6	0.10	598.33	598.43	602.75	607.55	4.80
EW1																598.26			
BH10	1.5	1.5	0.75	1.1	1.1	10.0	5.15	5.8	80.00	0.40	18	3.8	6.7		607.21	607.21	608.92	614.00	5.08
22	0.0	1.5	0.75	0.0	1.1	10.4	5.10	5.7	120.04	1.00	18	6.0	10.5	0.10	606.79	606.89	608.50	613.68	5.18
21	2.0	3.5	0.75	1.5	2.6	10.7	5.05	13.2	329.73	0.50	24	5.1	16.0	0.50	605.09	605.59	607.34	612.38	5.04
20	1.7	5.2	0.75	1.3	3.9	11.8	4.89	19.1	106.00	1.00	24	7.2	22.7	5.38	598.06	603.44	600.31	610.70	10.39
EW2																597.00			
15	0.5	0.5	0.75	0.4	0.4	10.0	5.15	1.9	35.00	1.00	12	4.5	3.6		606.13	606.13	607.30	610.32	3.03
14	0.6	1.1	0.75	0.5	0.8	10.1	5.13	4.2	17.50	1.00	15	5.3	6.5	0.25	605.53	605.78	606.97	610.32	3.36
8																605.35			
17	0.3	0.3	0.75	0.2	0.2	10.0	5.15	1.2	35.00	1.00	12	4.5	3.6		605.99	605.99	607.16	610.18	3.02
16	0.3	0.6	0.75	0.2	0.5	10.1	5.13	2.3	17.50	1.00	12	4.5	3.6	0.10	605.54	605.64	606.71	610.18	3.48
6																605.36			
19	0.4	0.4	0.75	0.3	0.3	10.0	5.15	1.5	35.00	1.00	12	4.5	3.6		603.30	603.30	604.47	607.50	3.03
18	0.4	0.8	0.75	0.3	0.6	10.1	5.13	3.1	24.61	1.00	12	4.5	3.6	0.10	602.85	602.95	604.02	607.50	3.48
2																602.60			

STORM SEWER COMPUTATION SHEET

JOB NO.: 20011008 PROJECT: The Streets of West Chester DATE: 11/1/01

CONSULTANT: EVANS, MECHWART, HAMBLETON & TILTON, INC. BY: JDW SHEET: 1 of 1

Struct #	A Acres	ΣA Acres	c	cA Acres	ΣcA Acres	Time Et	10 Yr Rainfall Intensity	Discharge Q	Length Feet	Slope Percent	Pipe Size Inches	Mean Velocity f.p.s	Capacity c.f.s	Jump	Invert (Out)	Invert (In)	Top of Pipe	Top of Casting	Cover
								4.12											
BH11	1.0	1.0	0.75	0.8	0.8	10.0	5.15	3.9	22.50	0.40	15	3.3	4.1		606.71	606.71	608.15	610.00	1.85
24	0.5	1.5	0.75	0.4	1.1	10.1	5.13	5.8	35.00	0.80	15	4.7	5.8	0.10	606.52	606.62	607.96	612.77	4.81
23	0.5	2.0	0.75	0.4	1.5	10.2	5.11	7.7	20.00	1.50	15	6.5	7.9	0.10	606.14	606.24	607.58	612.77	5.19
21																605.84			
BH12	0.9	0.9	0.75	0.7	0.7	10.0	5.15	3.5	12.45	0.30	18	3.3	5.8		604.83	604.83	606.54	610.00	3.46
25	0.4	1.3	0.75	0.3	1.0	10.1	5.14	5.0	64.47	0.30	18	3.3	5.8	0.10	604.69	604.79	606.40	610.80	4.40
20																604.50			
27	0.1	0.1	0.75	0.1	0.1	10.0	5.15	0.4	26.19	1.00	12	4.5	3.6		605.71	605.71	606.88	610.20	3.32
26	0.3	0.4	0.75	0.2	0.3	10.1	5.14	1.5	15.96	1.00	12	4.5	3.6	0.10	605.35	605.45	606.52	610.20	3.68
20																605.19			
BH7	6.7	1.2	0.75	5.0	5.0	10.0	5.15	25.9	75.00	0.20	36	4.2	29.9		601.82	601.82	605.16	610.00	4.84
4																601.67			
BH8	7.8	1.2	0.75	5.9	5.9	10.0	5.15	30.1	75.00	0.30	36	5.2	36.6		603.04	603.04	606.38	610.00	3.63
7																602.81			
							100 Year												
EW 3	2.9	1.2	0.75	2.2	2.2	10.0	7.32	15.9	200.00	0.15	36	3.7	25.9		605.80	605.80	609.14	-	-
EW 4																605.50			
*EW 5	19.1	1.2	0.75	14.3	14.3	10.0	7.32	104.8	112.00	0.40	54	7.8	124.6		601.00	601.00	605.96	610.00	4.04
EW 6																600.55			

* EW 5 drainage area based on upstream 48" pipe capacity of 101.8 cfs plus 0.6 acres of additional drainage area accepted at 100 year intensity.

SANITARY SEWER COMPUTATION SHEET

JOB NO. 20011008.0 PROJECT: THE STREETS OF WESTCHESTER, BUTLER COUNTY DATE : 11/06/01
CONSULTANT : EVANS, MECHWART, HAMBLETON & TILTON, INC. BY : JPC SHEET : 1 of 1

Manhole No.	Area Acres	Total Acres	Population			Avg. San. Flow	Peak Factor	Sanitary Flow - cfs			Design	Pipe Size in.	Slope %	Velocity fps	Q cfs	Q % full
			Per. Ac.	Incr.	Total			Average	Peak	Infilt.						
11	4.9	4.9	30.0	147	147	0.000200	4.00	0.0294	0.1176	0.0045	0.1221	8	0.40	2.19	0.76	16.0
10	2.8	7.7	30.0	84	231	0.000200	4.00	0.0462	0.1848	0.0071	0.1919	8	0.40	2.19	0.76	25.1
9	1.4	9.1	30.0	42	273	0.000200	4.00	0.0546	0.2184	0.0084	0.2268	8	0.40	2.19	0.76	29.7
8	4.1	13.2	30.0	123	396	0.000200	4.00	0.0792	0.3168	0.0122	0.3290	8	0.40	2.19	0.76	43.1
7	0.0	13.2	30.0	0	396	0.000200	4.00	0.0792	0.3168	0.0122	0.3290	8	0.40	2.19	0.76	43.1
6	0.0	13.2	30.0	0	396	0.000200	4.00	0.0792	0.3168	0.0122	0.3290	8	0.40	2.19	0.76	43.1
5	0.0	13.2	30.0	0	396	0.000200	4.00	0.0792	0.3168	0.0122	0.3290	8	0.40	2.19	0.76	43.1
4	2.2	15.4	30.0	66	462	0.000200	4.00	0.0924	0.3696	0.0143	0.3839	10	0.28	2.13	1.16	33.1
3	0.0	15.4	30.0	0	462	0.000200	4.00	0.0924	0.3696	0.0143	0.3839	10	0.28	2.13	1.16	33.1
2	3.6	19.0	30.0	108	570	0.000200	4.00	0.1140	0.4560	0.0176	0.4736	10	0.60	3.11	1.70	27.9
1																
BH	1.5	1.5	30.0	45	45	0.000200	4.00	0.0090	0.0360	0.0014	0.0374	8	0.40	2.19	0.76	4.9
10																

11-21-01

STORM SEWER COMPUTATION SHEET

n = 0.013

JOB NO.: 20011008 PROJECT: The Streets of West Chester

CONSULTANT: EVANS, MECHWART, HAMBLETON & TILTON, INC. BY: JDW

Struct #	A Acres	ΣA Acres	c	cA Acres	ΣcA Acres	Time Et	10 Yr Rainfall Intensity	Discharge Q	Length Feet	Slope Percent	Pipe Size Inches	Mean Velocity f.p.s	Capacity c.f.s	Jump	Invert (Out)
13	0.3	0.3	0.75	0.2	0.2	10.0	5.15	1.2	57.00	1.00	12	4.5	3.6		610.71
12	0.3	0.6	0.75	0.2	0.5	10.2	5.12	2.3	28.92	1.00	12	4.5	3.6	0.10	610.04
11	2.0	2.6	0.75	1.5	2.0	10.3	5.10	10.0	132.71	0.50	24	5.1	16.0	2.50	607.25
10	0.0	2.6	0.75	0.0	2.0	10.7	5.04	9.8	126.28	0.50	24	5.1	16.0	0.10	606.48
9	1.0	3.6	0.75	0.8	2.7	11.2	4.98	13.4	176.38	1.00	24	7.2	22.7	0.10	605.75
8	2.3	5.9	0.75	1.7	4.4	11.6	4.92	21.8	136.08	0.50	30	5.9	29.1	0.50	603.49
7	8.9	14.8	0.75	6.7	11.1	12.0	4.86	54.0	150.00	0.20	42	4.7	45.1	1.00	601.81
6	0.6	15.4	0.75	0.5	11.6	12.5	4.79	55.3	150.00	0.20	48	5.1	64.4	0.50	601.01
5	1.1	16.5	0.75	0.8	12.4	13.0	4.73	58.5	220.00	0.20	48	5.1	64.4	0.10	600.61
4	7.8	24.3	0.75	5.9	18.2	13.7	4.63	84.4	133.18	0.40	48	7.2	91.0	0.10	600.07
3	0.0	24.3	0.75	0.0	18.2	14.0	4.60	83.7	145.66	0.40	48	7.2	91.0	0.10	599.44
2	2.2 3.0	26.5 27.3	0.75	1.7 2.25	19.9 20.5	14.3	4.55	90.5 93.05	72.50	0.40	48	7.2	91.0	0.10	598.75
1	0.0	26.5	0.75	0.0	19.9	14.5	4.53	90.1 92.87	16.00	0.40	48	7.2	91.0	0.10	598.36
EW1															
BH10	1.5	1.5	0.75	1.1	1.1	10.0	5.15	5.8	80.00	0.40	18	3.8	6.7		607.21
22	0.0	1.5	0.75	0.0	1.1	10.4	5.10	5.7	120.04	1.00	18	6.0	10.5	0.10	606.79
21 (1 SITE TRIB)	2.0	3.5	0.75	1.5	2.6	10.7	5.05	13.2	329.73	0.50	24	5.1	16.0	0.50	605.09
20	1.7	5.2	0.75	1.3	3.9	11.8	4.89	19.1	106.00	1.00	24	7.2	22.7	5.38	598.06
EW2															
15	0.5	0.5	0.75	0.4	0.4	10.0	5.15	1.9	35.00	1.00	12	4.5	3.6		606.13
14	0.6	1.1	0.75	0.5	0.8	10.1	5.13	4.2	17.50	1.00	15	5.3	6.5	0.25	605.53
8															
17	0.3	0.3	0.75	0.2	0.2	10.0	5.15	1.2	35.00	1.00	12	4.5	3.6		605.99
16	0.3	0.6	0.75	0.2	0.5	10.1	5.13	2.3	17.50	1.00	12	4.5	3.6	0.10	605.54
6															
19	0.4 .8	0.4 .8	0.75	0.3 .6	0.3 .6	10.0	5.15	1.5 3.09	35.00	1.00	12	4.5	3.6		603.30
18	0.4 .8	0.8 1.6	0.75	0.3 .6	0.6 1.2	10.1	5.13	3.1 6.16	24.61	1.00	12	4.5	3.6	0.10	602.85
2													TOO SMALL		

SAG

SAG

SAG

1> SUBREGS APPENDIX D TABLE 3
COMMERCIAL <2% C=0.75

STORM SEWER COMPUTATION SHEET

JOB NO.: 20011008 PROJECT: The Streets of West Chester

CONSULTANT: EVANS, MECHWART, HAMBLETON & TILTON, INC. BY: JDW

Struct #	A Acres	ΣA Acres	c	cA Acres	ΣcA Acres	Time Et	10 Yr Rainfall Intensity	Discharge Q	Length Feet	Slope Percent	Pipe Size Inches	Mean Velocity f.p.s	Capacity c.f.s	Jump	Invert (Out)
BH11	1.0	1.0	0.75	0.8	0.8	10.0	5.15	3.9	22.50	0.40	15	3.3	4.1		606.71
24	0.5	1.5	0.75	0.4	1.1	10.1	5.13	5.8	35.00	0.80	15	4.7	5.8	0.10	606.52
23	0.5	2.0	0.75	0.4	1.5	10.2	5.11	7.7	20.00	1.50	15	6.5	7.9	0.10	606.14
21															
BH12	0.9	0.9	0.75	0.7	0.7	10.0	5.15	3.5	12.51	0.30	18	3.3	5.8		604.83
25	0.4	1.3	0.75	0.3	1.0	10.1	5.14	5.0	64.42	0.30	18	3.3	5.8	0.10	604.69
20															
27	0.1	0.1	0.75	0.1	0.1	10.0	5.15	0.4	25.20	1.00	12	4.5	3.6		605.70
26	0.3	0.4	0.75	0.2	0.3	10.1	5.14	1.5	16.27	1.00	12	4.5	3.6	0.10	605.35
20															
BH7	6.7	1.2	0.75	5.0	5.0	10.0	5.15	25.9	75.00	0.20	36	4.2	29.9		601.82
4															
BH8	7.8	1.2	0.75	5.9	5.9	10.0	5.15	30.1	75.00	0.30	36	5.2	36.6		603.04
7															
							100 Year								
EW 3	2.9	1.2	0.75	2.2	2.2	10.0	7.32	15.9	200.00	0.15	36	3.7	25.9		605.80
EW 4															
*EW 5	19.1	1.2	0.75	14.3	14.3	10.0	7.32	104.8	112.00	0.40	54	7.8	124.6		601.00
EW 6															

* EW 5 drainage area based on upstream 48" pipe capacity of 101.8 cfs plus 0.6 acres of additional drainage area accepted at 100 year intensity.

LABELED AS B4 ON PLANS

SANITARY SEWER COMPUTATION SHEET

JOB NO. 20011008.0 PROJECT: THE STREETS OF WESTCHESTER, BUTLER COUNTY DATE : 11/06/01
CONSULTANT : EVANS, MECHWART, HAMBLETON & TILTON, INC. BY : JPC SHEET : 1 of 1

Manhole No.	Area Acres	Total Acres	Population			Avg. San. Flow	Peak Factor	Sanitary Flow - cfs			Design	Pipe Size in.	Slope %	Velocity fps	Q cfs	Q % full
			Per. Ac.	Incr.	Total			Average	Peak	Infilt.						
11	4.9	4.9	30.0	147	147	0.000200	4.00	0.0294	0.1176	0.0045	0.1221	8	0.40	2.19	0.76	16.0
10	2.8	7.7	30.0	84	231	0.000200	4.00	0.0462	0.1848	0.0071	0.1919	8	0.40	2.19	0.76	25.1
9	1.4	9.1	30.0	42	273	0.000200	4.00	0.0546	0.2184	0.0084	0.2268	8	0.40	2.19	0.76	29.7
8	4.1	13.2	30.0	123	396	0.000200	4.00	0.0792	0.3168	0.0122	0.3290	8	0.40	2.19	0.76	43.1
7	0.0	13.2	30.0	0	396	0.000200	4.00	0.0792	0.3168	0.0122	0.3290	8	0.40	2.19	0.76	43.1
6	0.0	13.2	30.0	0	396	0.000200	4.00	0.0792	0.3168	0.0122	0.3290	8	0.40	2.19	0.76	43.1
5	0.0	13.2	30.0	0	396	0.000200	4.00	0.0792	0.3168	0.0122	0.3290	8	0.40	2.19	0.76	43.1
4	2.2	15.4	30.0	66	462	0.000200	4.00	0.0924	0.3696	0.0143	0.3839	10	0.28	2.13	1.16	33.1
3	0.0	15.4	30.0	0	462	0.000200	4.00	0.0924	0.3696	0.0143	0.3839	10	0.28	2.13	1.16	33.1
2	3.6	19.0	30.0	108	570	0.000200	4.00	0.1140	0.4560	0.0176	0.4736	10	0.60	3.11	1.70	27.9
1																
BH	1.5	1.5	30.0	45	45	0.000200	4.00	0.0090	0.0360	0.0014	0.0374	8	0.40	2.19	0.76	4.9
10																

STORM SEWER COMPUTATION SHEET

JOB NO.: 20011008 PROJECT: WATERFRONT DRIVE (PRIVATE & PUBLIC) & ALLEN ROAD CONNECTOR IMPROVEMENT PLAI SHEET: 1 OF 2

CONSULTANT: EVANS, MECHWART, HAMBLETON & TILTON, INC BY: JMB DATE: 4/4/03

Struct #	A Acres	ΣA Acres	c	cA Acres	Σ⊂A Acres	Time Et	10 Yr Rainfall Intensity	Discharge Q	Length Feet	Slope Percent	Pipe Size Inches	Mean Velocity f.p.s	Capacity c.f.s
• Ex. EW	32.5	32.5	0.75	24.4	24.4	15.2	4.45	108.5	90.13	0.50	54	8.8	139.4
• 4	0.7	33.2	0.75	0.5	24.9	15.4	4.43	110.3	207.62	0.35	60	7.9	154.5
• 3	0.5	33.7	0.75	0.4	25.3	15.8	4.38	110.7	125.06	0.35	60	7.9	154.5
• 2	16.4	50.1	0.75	12.3	37.6	16.1	4.35	163.5	109.16	0.72	60	11.3	221.6
• 1	0.7	50.8	0.75	0.5	38.1	16.2	4.33	165.1	125.00	0.72	60	11.3	221.6
• EW													
• 6	0.2	0.2	0.75	0.2	0.2	10.0	5.15	0.8	26.00	2.40	12	7.0	5.5
• 5	0.3	0.5	0.75	0.2	0.4	10.1	5.14	1.9	17.00	2.40	15	8.2	10.0
4													
• 8	0.2	0.2	0.75	0.2	0.2	10.0	5.15	0.8	26.00	2.40	12	7.0	5.5
• 7	0.3	0.5	0.75	0.2	0.4	10.1	5.14	1.9	17.00	2.40	15	8.2	10.0
• 3													
Ex.EW	4.4	4.4	0.75	3.3	3.3	12.9	4.74	15.6	39.91	0.20	30	3.7	18.4
19	1.1	5.5	0.75	0.8	4.1	13.1	4.71	19.4	90.72	0.80	30	7.5	36.8
18	0.8	6.3	0.75	0.6	4.7	13.3	4.69	22.1	67.96	0.80	30	7.5	36.8
17	0.4	6.7	0.75	0.3	5.0	13.4	4.67	23.4	117.70	0.40	36	6.0	42.3
• 16	0.9	7.6	0.75	0.7	5.7	13.8	4.62	26.4	127.50	0.50	36	6.7	47.3
• 15	4.1	11.7	0.75	3.1	8.8	14.1	4.59	40.2	121.50	0.50	42	7.4	71.3
• 14	0.9	12.6	0.75	0.7	9.5	14.3	4.55	43.0	127.90	0.50	42	7.4	71.3
• 13	1.0	13.6	0.75	0.8	10.2	14.6	4.52	46.1	134.26	0.50	42	7.4	71.3
• 12	0.8	14.4	0.75	0.6	10.8	14.9	4.48	48.4	81.00	0.30	48	6.3	78.9
• 11	0.4	14.8	0.75	0.3	11.1	15.2	4.46	49.5	67.39	0.30	48	6.3	78.9
• 10	0.3	15.1	0.75	0.2	11.3	15.3	4.43	50.2	68.99	0.30	48	6.3	78.9
• 9	0.3	15.4	0.75	0.2	11.6	15.5	4.41	51.0	53.07	0.30	48	6.3	78.9
2													
21	0.3	0.3	0.75	0.2	0.2	10.0	5.15	1.2	26.00	0.60	12	3.5	2.8
20	0.3	0.6	0.75	0.2	0.5	10.1	5.13	2.3	102.59	0.40	15	3.3	4.1
19													
23	0.2	0.2	0.75	0.2	0.2	10.0	5.15	0.8	26.00	0.60	12	3.5	2.8
22	0.2	0.4	0.75	0.2	0.3	10.1	5.13	1.5	45.92	0.40	15	3.3	4.1
18													
• 25	0.2	0.2	0.75	0.2	0.2	10.0	5.15	0.8	26.00	0.60	12	3.5	2.8
• 24	0.2	0.4	0.75	0.2	0.3	10.1	5.13	1.5	45.18	0.40	15	3.3	4.1
16													

STORM SEWER COMPUTATION SHEET

JOB NO.: 20011008 PROJECT: WATERFRONT DRIVE (PRIVATE & PUBLIC) & ALLEN ROAD CONNECTOR IMPROVEMENT PLAI SHEET: 2 OF 2

CONSULTANT: EVANS, MECHWART, HAMBLETON & TILTON, INC BY: JMB DATE: 4/4/03

Struct #	A Acres	ΣA Acres	c	cA Acres	Σ⊂A Acres	Time Et	10 Yr Rainfall Intensity	Discharge Q	Length Feet	Slope Percent	Pipe Size Inches	Mean Velocity f.p.s	Capacity c.f.s
27	0.2	0.2	0.75	0.2	0.2	10.0	5.15	0.8	26.00	0.60	12	3.5	2.8
26	0.2	0.4	0.75	0.2	0.3	10.1	5.13	1.5	48.00	0.40	15	3.3	4.1
14													
29	0.4	0.4	0.75	0.3	0.3	10.0	5.15	1.5	26.00	0.60	12	3.5	2.8
28	0.4	0.8	0.75	0.3	0.6	10.1	5.13	3.1	45.88	0.60	15	4.1	5.0
13													
31	0.3	0.3	0.75	0.2	0.2	10.0	5.15	1.2	26.00	2.00	12	6.4	5.1
30	0.4	0.7	0.75	0.3	0.5	10.1	5.14	2.7	17.00	2.00	15	7.5	9.2
1													
33	0.2	0.2	0.75	0.2	0.2	10.0	5.15	0.8	26.00	2.40	12	7.0	5.5
32	0.2	0.4	0.75	0.2	0.3	10.1	5.14	1.5	17.00	2.40	12	7.0	5.5
1 (P3)													
35	0.1	0.1	0.75	0.1	0.1	10.0	5.15	0.4	39.77	0.60	12	3.5	2.8
34	0.1	0.2	0.75	0.1	0.2	10.2	5.12	0.8	12.01	0.60	12	3.5	2.8
Ex. BH2													
BH	6.5	6.5	0.75	4.9	4.9	17.2	4.23	20.6	80.00	0.50	30	5.9	29.1
36	0.4	6.9	0.75	0.3	5.2	17.4	4.21	21.8	80.00	0.60	30	6.5	31.9
EW													
38	0.2	0.2	0.75	0.2	0.2	10.0	5.15	0.8	26.00	0.60	12	3.5	2.8
37	0.2	0.4	0.75	0.2	0.3	10.1	5.13	1.5	45.31	0.60	15	4.1	5.0
36													

EVANS, MECHWART, HAMBLETON & TILTON, INC.
170 MILL STREET, GAHANNA, OHIO 43230-3036
614-471-5150 • FAX 614-471-9286

Letter of Transmittal

To: Amy Pursley, P.E.
Butler County Engineer
1921 Fairgrove Avenue (S.R. 4)
Hamilton, Ohio 45011-1999

From: Jason M. Hockstok, P.E.

Date: February 14, 2003

Job no.: 2001-1008

Re: Streets of West Chester – Retail Building 3

We are sending you herewith via: ☐ Courier ☐ U.S. Mail ☒ Fed. Ex. ☐ UPS

The following items: ☒ copies ☐ originals ☐ [other]

Copies	Date	Number of sheets	Description
1		1	Storm Sewer Tributary Map
1		1	Storm Sewer Calculations
1		1	Access Drive Exhibit

These are transmitted as checked below:

☐ for approval ☐ for your file ☐ as requested ☒ for review & comment

☐ for execution / signatures ☐ [other]

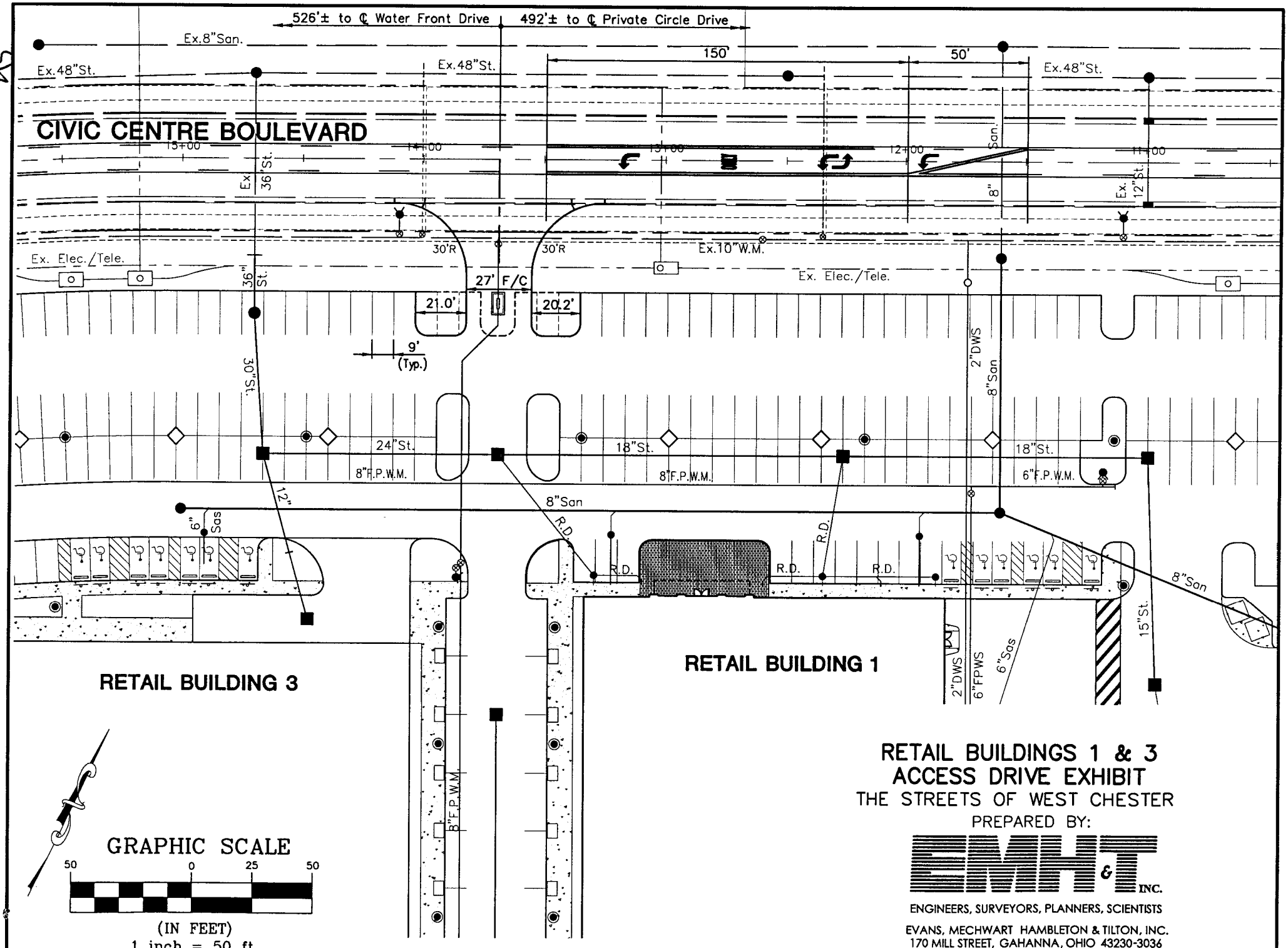
Remarks:

The attached calculations and tributary map are provided to support the submittal by Sean Cullen on Friday for Retail Building 3. I have also included a copy of the updated access drive exhibit addressing review comments made by Matt and Eric. If you should have any questions, please feel free to give me a call at (614) 470-9306.

Copies To:

Signed: Jason M. Hockstok, P.E.

If enclosures are not as noted, kindly notify us at once.



RETAIL BUILDINGS 1 & 3
ACCESS DRIVE EXHIBIT
THE STREETS OF WEST CHESTER

PREPARED BY:

EMH&T INC.
ENGINEERS, SURVEYORS, PLANNERS, SCIENTISTS
EVANS, MECHWART HAMBLETON & TILTON, INC.
170 MILL STREET, GAHANNA, OHIO 43230-3036
TEL: 614-471-5150 • FAX: 614-471-9286

3/5

From: Eric Pottenger
To: "JHockstok@emht.com".gwia.BCEO
Date: Tuesday, February 18, 2003 8:15AM
Subject: RE: Streets of West Chester

Jasaon-

Thanks for the revised drawings. However, I would like to see where the other driveway is proposed that Sean and Amy discussed. Adjacent driveways are to align and should not be offset. Please show the driveway location on the north side of Civic Centre Boulevard.

Eric J. Pottenger
Butler County Engineer's Office
Development Services
pottengere@bceo.org
Direct: 785.4121
Cell: 678.6325
Fax: 867.5849

CC: "scullen@continental-realestate.com".gwia.BCEO; Amy Pursley; Matthew Loeffler

4/5

From: "Hockstok, Jason" <JHockstok@emht.com>
To: "Eric Pottenger" <PottengerE@bceo.org>
Date: Friday, February 14, 2003 4:41PM
Subject: RE: Streets of West Chester

Eric - The attached retail entrance has been revised as requested and is resubmitted for approval. We have opened up the radii (30') and the driveway has been widened (27 F/C or 28' B/C). Please feel free to call with any comments. Have a good weekend.
Jason
<<siteentrance3.pdf>> <<siteentrance3.tif>>

-----Original Message-----
From: Eric Pottenger [mailto:PottengerE@bceo.org]
Sent: Wednesday, February 12, 2003 7:34 AM
To: Hockstok, Jason
Cc: Matthew Loeffler; Amy Pursley
Subject: Re: Streets of West Chester

Jason-

Good morning. I took a look into our file and found we have all ready determined driveway location for the parcels on the west side of Civic Center. I believe Amy Pursley sent Sean Cullen a fax of these locations. With the new drive you proposed, there is an offset of driveways. I think in order to make the proposed drive work, we will have to adjust the drive locations on the west side of Civic Center. Also, the drive width looks fairly narrow & the radii small. We recommend larger radii and an entrance more like 28' B/C.

If you have any thing else, just let me know. I also received the signal/mast arm plans Monday afternoon.

Eric J. Pottenger
Butler County Engineer's Office
Development Services
pottengere@bceo.org
Direct: 785.4121
Cell: 678.6325
Fax: 867.5849

5/5

CC: "Matthew Loeffler" <LoefflerM@bceo.org>, "Amy Pursley" <PursleyA@bceo.org>, "Sean Cullen (E-mail)" <scullen@continental-realestate.com>