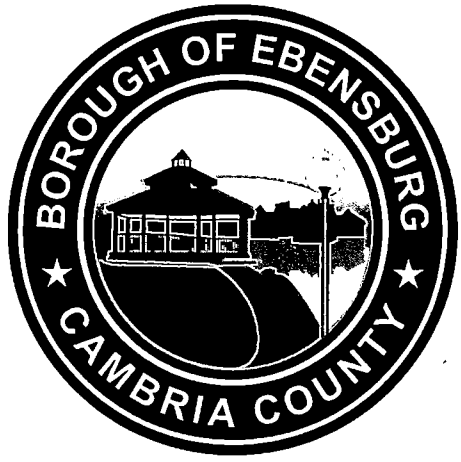
Stormwater Conveyance System Analysis Report

For

Ebensburg Borough

Prepared for

Borough of Ebensburg



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Ebensburg, PA 15931

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STORMWATER CONVEYANCE SYSTEM ANALYSIS REPORT
BOROUGH OF EBENSBURG
CAMBRIA COUNTY, PENNSYLVANIA

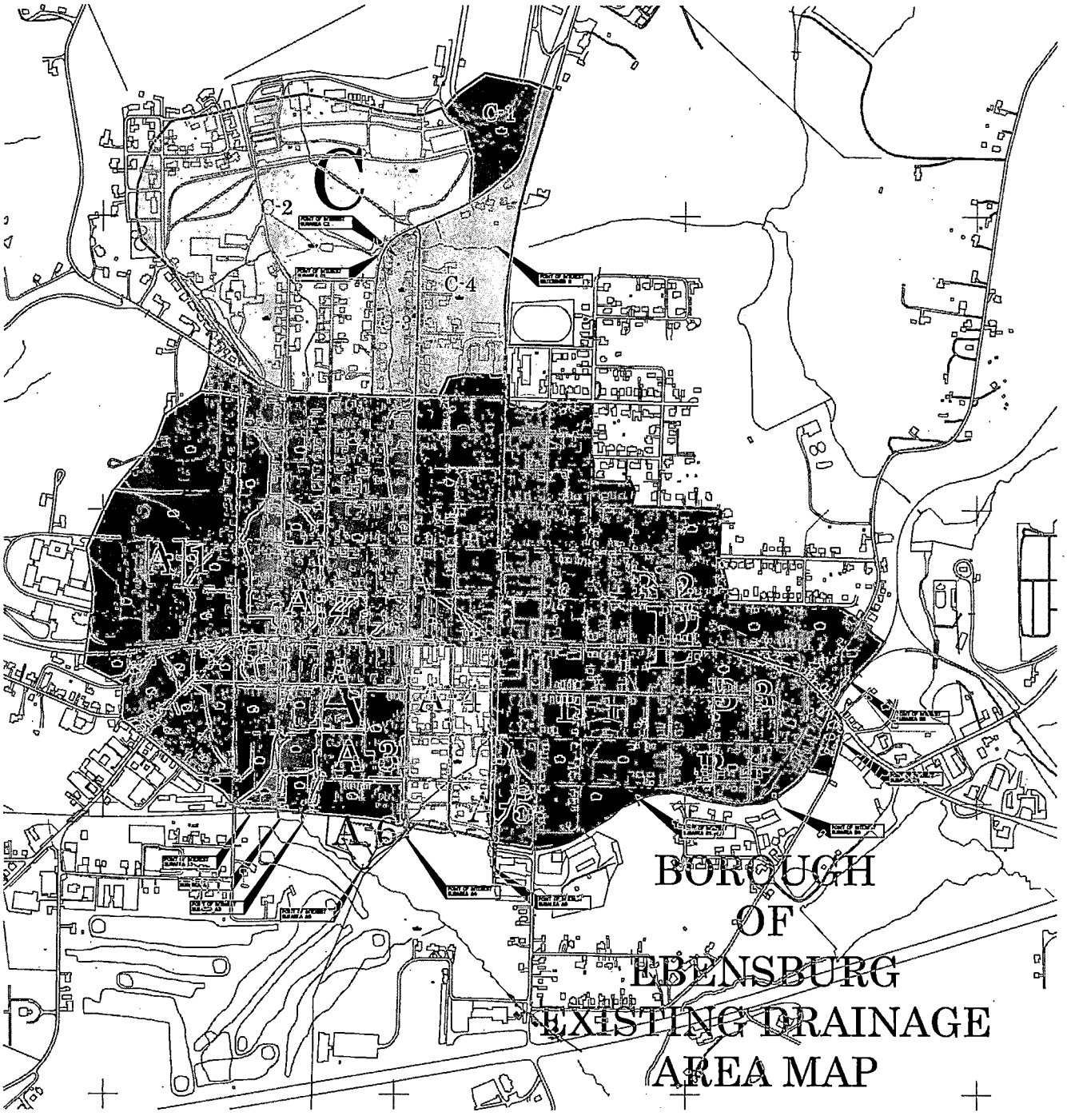
Project Description

CDI-Infrastructure, LLC dba L.R. Kimball (Kimball), was retained by the Borough of Ebensburg to prepare a stormwater conveyance system analysis for the Borough of Ebensburg, Cambria County, Pennsylvania. The goal of this study was to provide a preliminary design for future stormwater improvement throughout the borough. This report does not represent a final design of a stormwater conveyance system and should only be used as a planning tool.

The following analysis evaluated the existing pipe capacities throughout the borough and proposes a preliminary designed storm sewer conveyance system to remedy any deficiencies in the existing system. This analysis was restricted to the study of the conveyance system only and does not address outflow impacts or stormwater management. The storm sewer system within the borough is somewhat limited. The goal of this conveyance system analysis was to create a stormwater conveyance master planning tool that would provide the Borough with the information needed to make informed decisions when considering a storm sewer improvement project.

The study area was limited to the developed areas within the Borough and did not extend beyond the former Pennsylvania Railroad grade now known as the Ghost Town Trail. Analyzing the natural terrain of the borough, three watersheds were identified. Watershed A flows from Highland Avenue south and contributed to the un-named tributary flowing under Center Street in the Uni-Mart area. Watershed B flows from Highland Avenue in a southeasterly direction and contributes flows to Howells Run and Lake Rowena. Watershed C flows north from Highland Avenue to an un-named tributary the flows east and eventually finds its way to the Ebensburg water reservoir.

Information for the analysis was gathered from the best available information which included Cambria County aerial photography, borough mapping and information from past projects completed by Kimball in the area. Kimball also performed site visits to verify existing site conditions needed to complete the analysis.



BOROUGH OF EBENSBURG EXISTING DRAINAGE AREA MAP

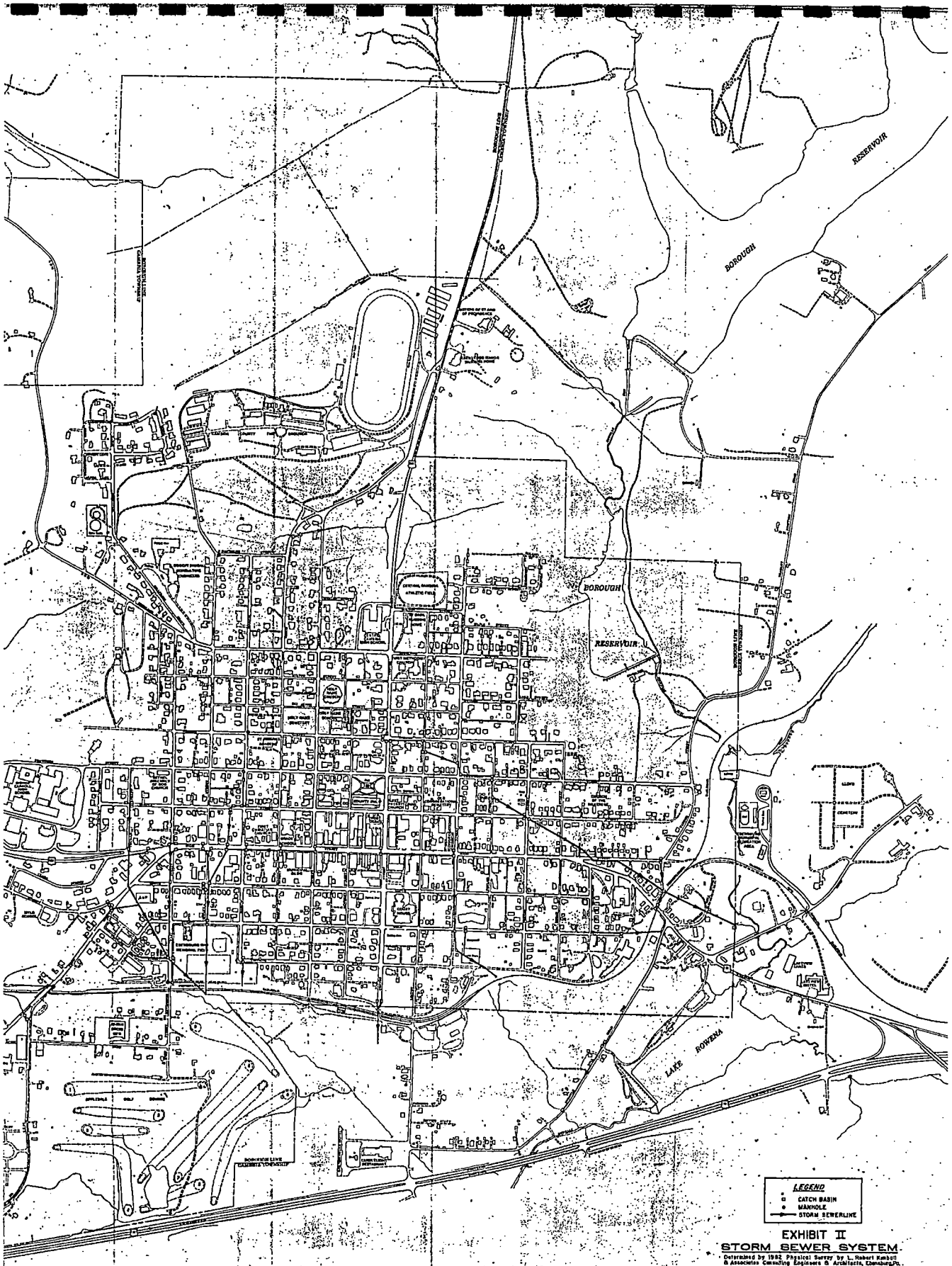


EXHIBIT II

STORM SEWER SYSTEM

Determined by 1962 Physical Survey by L. Robert Kimball & Associates Consulting Engineers & Architects, Ebensburg, Pa.

MAP OF EBENSBURG BOROUGH CAMBRIA COUNTY PENNSYLVANIA

FEBRUARY 1969

SCALE IN FEET

0 400 800 1200

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Stormwater Runoff Models

The Rational Method was used to determine pipe capacities and peak runoff flows for this analysis. The analysis was performed for the 10 year storm event using the PADOT IDF curves for Region 4 for rainfall intensities. The runoff coefficients used were based on published engineering data for residential and commercial lots. A zoning map of the Borough was used to determine residential and commercial areas and the appropriate runoff coefficients for each. The Rational Method is conservative and generally accepted for sizing pipe. The Rational Method is used by the Pennsylvania Department of Transportation for their pipe calculations. The Rational Method should not be used to determine the total stormwater runoff from a watershed. For Stormwater management in large watersheds, the SCS TR-55 Method should be employed to determine the outflow rate. This analysis is only conducted for sizing storm conveyance systems and not stormwater management and employs the Rational Method for that purpose only.

Hydrology and Hydraulics

The digital terrain model used to rectify the county's digital orthographic photography was used to develop contouring of the borough. Three drainage areas were determined to collect runoff from the Borough; Area A draining to the south towards the intersection of State Route 0022 and South Center Street, Area B draining to the southeast towards Lake Rowena, and Area C to the northeast the reservoir. Each of the three main drainage areas were then broken into subareas for each discharge point of interest within the main area. The SCS Segmental Method was used to determine the time of concentrations for the large, mostly vegetated subareas located in Drainage Area A. A time of concentration of 5 minutes was used for the remaining subareas due to the amount of impervious surface coverage and collecting and conveying the stormwater via a storm sewer system.

Assumptions/Results

The proposed storm sewers 24" in diameter and smaller not lying within a state highway right of way are to be high density polyethylene smooth lined corrugated plastic pipe (SLCPP). All storm sewers located within the state highway right of ways or 30" diameter and larger are to be reinforced concrete pipe (RCP). The appropriate roughness coefficients, 0.11 for SLCPP and 0.12 for RCP, were used in determining the sizes of the proposed pipes, changing of the pipe materials would result in the need for the system to be reevaluated.

The conveyance system was laid out in a manner to keep the depths of the proposed storm sewer structures as shallow as possible while maintaining a minimum cover of 1.5 feet over the storm sewer piping and utilizing as much of the existing system as possible. To minimize the expense of oversized and extra depth inlets, the conveyance system was designed as a main trunk system with laterals joining at the cross streets. The stormwater conveyance laterals of the cross streets were assumed to be minimum size and were not included in the calculations. The contributing flows from the laterals were determined and used to size the main trunk conveyance system. The slopes of the storm sewers were determined by the required capacity while trying to the keep the slopes low enough so that pipe anchoring would not be needed.

The locations and depths of existing utility lines (sanitary sewer, gas, and water) are unknown at his time. The slopes of the proposed storm sewers and structures will need adjusted during the final design process in order to avoid conflicts with existing utilities.

The runoff coefficients used were for residential and commercials areas and the areas very verified with the

Borough's current zoning map. The coefficients assume that each lot has the maximum amount of impervious coverage allowed by ordinance. Therefore, future development of any lot is included in this analysis.

Watershed Area A

Subarea A1 – The out fall for Subarea A1 is at the southern end of West Street where West Street crosses the Ghost Town Trail. It Includes 58 acres of both residential and commercial parcels and produces a storm flow of 167 cubic feet per second. There are very few existing storm drains within Subarea A1 and they exist in the lower reaches of the subarea. These piping systems were not adequately sized to act as a main trunk system but will remain in place as laterals to the proposed main conveyance system. The maximum pipe size of the proposed storm main is 30" and will safely convey a 10 year storm event. Because much of the upper reaches of this watershed is not presently captured in storm pipes the time it takes to concentrate the flows are longer which results in a lesser flow rate. Once the flows are captured in a piping system, the time of concentration is reduced and the flow rate increases. This results in an increased flow in Subarea A1 to 220 cubic feet per second at the outfall.

Subarea A2 – The out fall for Subarea A2 is directly south of the Memorial Field baseball park on the south side of the Ghost Town Trail. It currently includes approximately 15 acres of both residential and commercial parcels and produces a storm flow of 223 cubic feet per second. The existing storm drain system in the Memorial Park area is relatively new but is not sized to handle the entire runoff from Subarea A2. By intercepting the stormwater on Spruce Street and conveying it to Marion Street we were able to reduce the drainage area of Subarea A2 to 15.10 acres and the outflow for a 10 year storm event to 54 cubic feet per second which then could be conveyed by the existing pipe network.

Subarea A3 – The out fall for Subarea A3 is directly south of the Memorial Field baseball park on the south side of the Ghost Town Trail. It includes approximately 62 acres of both residential and commercial parcels and produces a storm flow of 37 cubic feet per second. As stated above, this study proposes to divert stormwater from Subarea A2 and convey it via a new piping network to an outfall near the outfall of Subarea A2. The result is an increased flow in Subarea A3 to 218.95 cubic feet per second at the outfall.

Subarea A4 – The out fall for Subarea A4 is located at the southern end of Julian Street, east of the YPCC. It includes approximately 17 acres of both residential and commercial parcels and produces a storm flow of 65.59 cubic feet per second. There are existing storm drains located at the southern end of the area between Julian Street and Cherry Street which can be used for the proposed system. Depending on the slopes and sizes of the existing system, the last section of the existing system may be able to be utilized resulting less proposed work and costs. The drainage area for the proposed system is similar to the existing drainage area.

Subarea A5 – The out fall for Subarea 5 is located at the southern end of South Center Street after crossing under the Ghost Town Trail. It includes approximately 5 acres of residential and commercial parcels and produces a storm flow of 18.48 cubic feet per second. There are existing storm drains located at the southern end of South Center Street, some of which are to be used for the proposed system. Depending on the slopes and sizes of the existing system, the last section of the existing system also may be able to be utilized resulting less proposed work and costs. The drainage area for the proposed system is similar to the existing drainage area.

Subarea A6 – The storm sewer system within this subarea is relatively new and was sized to convey the design storm. This analysis does not propose improvements to this system.

Watershed Area B

Subarea B1 – The out fall for Subarea B1 is at the southern side of East Triumph Street where it crosses the Ghost Town Trail. It includes approximately 26 acres of residential and commercial parcels and produces a flow of 84.76 cubic feet per second. There are existing storm drains and a conveyance system which only collects runoff from a portion of the subarea and is not appropriately sized for what is collected. The existing system along High Street is sized appropriately and can be used for future use. The existing system will need replaced with an appropriately sized system from the intersection of South Caroline Street and East Lloyd Street to the outfall.

Subarea B2 – The out fall for Subarea B2 is at the eastern side of Tanner Street east of the Lions Little League field where it crosses the existing railroad bed. It includes approximately 74 acres of residential and commercial parcels and produces a flow of 258.44 cubic feet per second. There are existing storm drains in the area to the east of North Center Street but the conveyance system in not sized properly for the main trunk. Some existing drains and portions of the existing system in place can be used as laterals to the main trunk. Some of the existing system runs through private properties and the proposed system was designed to move as much of the proposed system out of the private properties and into the Borough owned streets. There are no storm drains located in the area to the west side of North Center Street. A system will need installed in this area and tied into the system on the east side of North Center Street.

Subarea B3 – The out fall for Subarea B3 is the existing storm sewer recently constructed along East High Street near the Ebensburg Animal Hospital and discharges into Lake Rowena. It includes approximately 13 acres of residential and commercial parcels and produces a flow of 42.78 cubic feet per second. There are existing storm drains and conveyance system located in the south east area and can be tied into the proposed system. The lower portion of the system collecting runoff from the southeast area crosses some privately owned property and can be rerouted out to East High Street.

The area draining towards East High Street does not currently have a system in place and a system will need to be constructed along East High Street. This area is within the State Right or Way for the roadway.

Subarea B4 – The out fall for Subarea B4 is at between the Ghost Town Trail and Lakeview Road west of the former Smith's Batting Cages. It includes 6 acres of residential and commercial parcels and produces a flow of 18.68 cubic feet per second. The only existing storm system facility in this area is the storm culvert crossing under the Ghost Town Trail which may need replaced if it is inadequately sized. A new system will need to be installed in this area.

Watershed Area C

Subarea C1 – The out fall of this area is on the south side of Beech Street south of the Cambria County Fairgrounds. There is no existing storm system in this area except for the culvert under Beech Street. The existing culvert is filled with debris and the size is unknown. The minimum pipe size should be a 21" SLCPP at a slope of 3.3%. The existing culvert size and slope should be verified and

replaced if necessary.

Subarea C2 – C3 – Subareas C2 and C3 were combined for the analysis. The outfall for these areas is located on the west side of North Julian Street. The areas include approximately 74 acres of residential parcels producing a flow of 244.23 cubic feet per second. Subarea C2 has a few existing undersized storm drains which will need replaced. Subarea C3 has some existing storm drains which will be used for the proposed system located at the north end of North Beech Street and North Julian Street. There is a large diameter storm sewer carrying runoff from the west side of North Beech Street to the east side of North Julian Street. This storm sewer travels through privately owned property. This analysis reroutes this storm sewer out of the privately owned property into the Borough owned streets.

Subarea C4 – The runoff from this area has either been rerouted to Subarea C3 or is conveyed via overland flow. This analysis does not propose improvements to these systems.

Preparer's Experience and Training

This information was prepared by Matthew A. Koenigsberg, PE CPESC and Gary L. Hoover, PLS, PE of L.R. Kimball, 615 West Highland Avenue, Ebensburg, PA 15931, 814-472-7700.

Calculations and Supporting Documentation

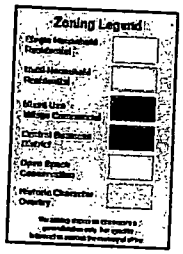
Appendix A

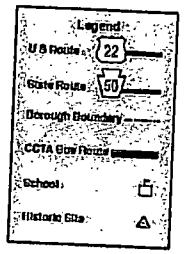
Click on the Map to Zoom in.

Borough of

Ebensburg

Cambria County, Pennsylvania





Map Legends

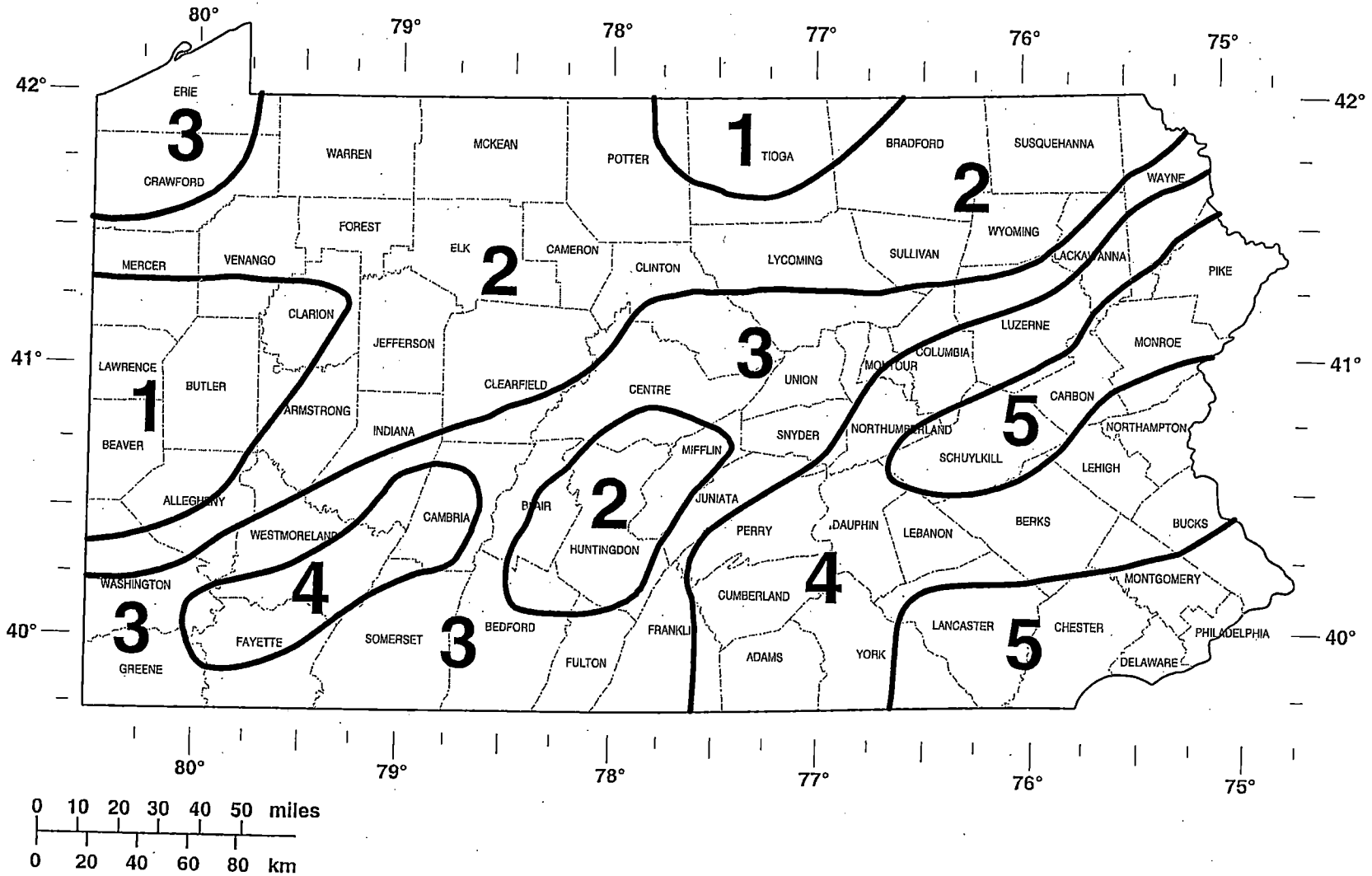


FIGURE 10.2.1
Delineated Regions With Uniform Intensity

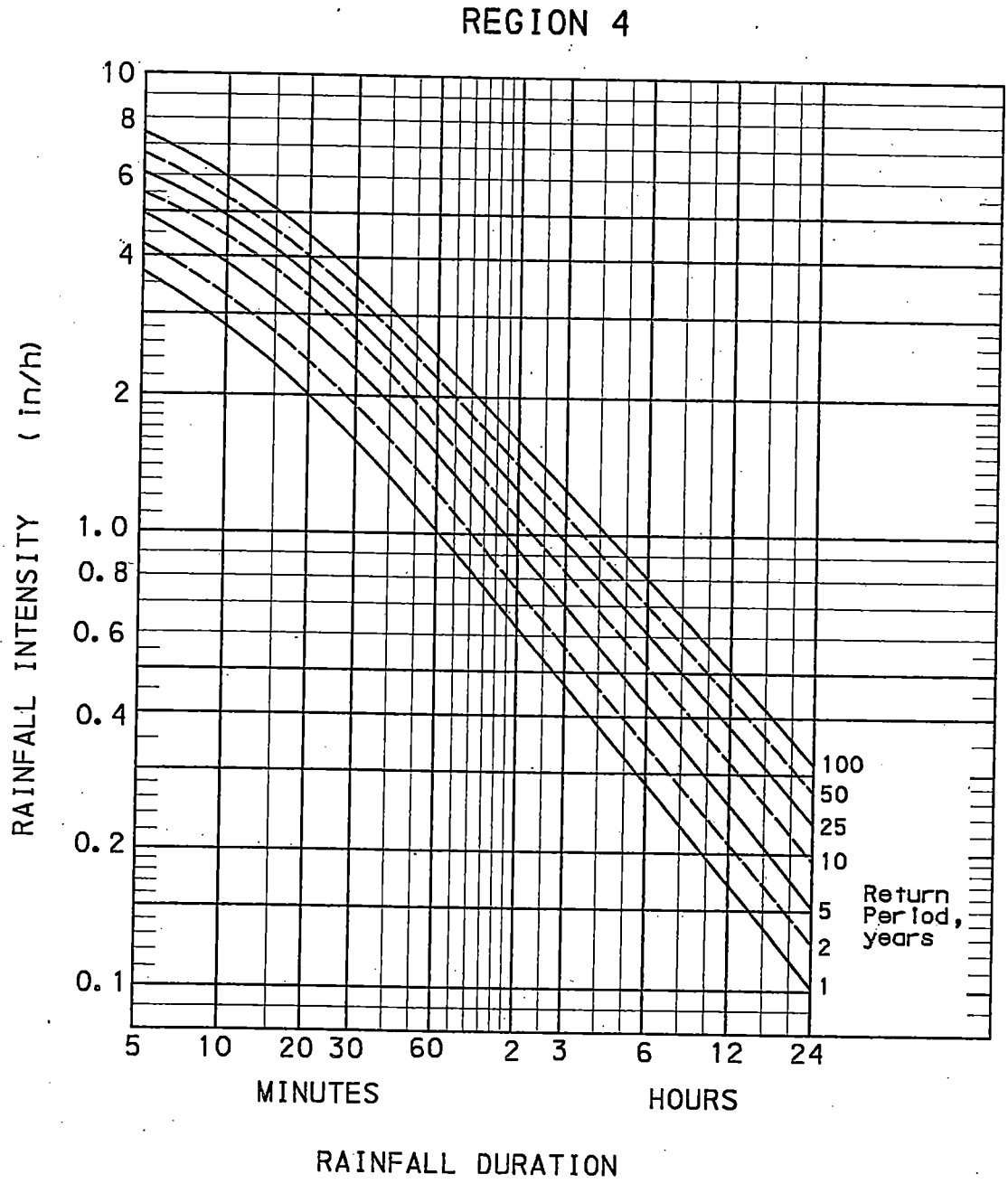


FIGURE 10.2.5 (ENGLISH)
STORM INTENSITY - DURATION - FREQUENCY
CURVES FOR REGION 4

APPENDIX 20.A
Rational Method Runoff C-Coefficients

categorized by surface	
forested	0.059–0.2
asphalt	0.7–0.95
brick	0.7–0.85
concrete	0.8–0.95
shingle roof	0.75–0.95
lawns, well-drained (sandy soil)	
up to 2% slope	0.05–0.1
2% to 7% slope	0.10–0.15
over 7% slope	0.15–0.2
lawns, poor drainage (clay soil)	
up to 2% slope	0.13–0.17
2% to 7% slope	0.18–0.22
over 7% slope	0.25–0.35
driveways, walkways	0.75–0.85
categorized by use	
farmland	0.05–0.3
pasture	0.05–0.3
unimproved	0.1–0.3
parks	0.1–0.25
cemeteries	0.1–0.25
railroad yards	0.2–0.35
playgrounds (except asphalt or concrete)	0.2–0.35
business districts	
neighborhood	0.5–0.7
city (downtown)	0.7–0.95
residential	
single family	0.3–0.5
multiplexes, detached	0.4–0.6
multiplexes, attached	0.6–0.75
suburban	0.25–0.4
apartments, condominiums	0.5–0.7
industrial	
light	0.5–0.8
heavy	0.6–0.9

Support Material

APPENDIX 19.A
Manning's Roughness Coefficient[a,b]
(design use)

channel material	n
plastic (PVC and ABS)	0.009
clean, uncoated cast iron	0.013–0.015
clean, coated cast iron	0.012–0.014
dirty, tuberculated cast iron	0.015–0.035
riveted steel	0.015–0.017
lock-bar and welded steel pipe	0.012–0.013
galvanized iron	0.015–0.017
brass and glass	0.009–0.013
wood stave	
small diameter	0.011–0.012
large diameter	0.012–0.013
concrete	
average value used	0.013
typical commercial, ball and spigot rubber gasketed end connections	
– full (pressurized and wet)	0.010
– partially full	0.0085
with rough joints	0.016–0.017
dry mix, rough forms	0.015–0.016
wet mix, steel forms	0.012–0.014
very smooth, finished	0.011–0.012
vitrified sewer	0.013–0.015
common-clay drainage tile	0.012–0.014
asbestos	0.011
planed timber (flume)	0.012 (0.010–0.014)
canvas	0.012
unplaned timber (flume)	0.013 (0.011–0.015)
brick	0.016
rubble masonry	0.017
smooth earth	0.018
firm gravel	0.023
corrugated metal pipe (CMP)	0.024 (see App. 17.F)
natural channels, good condition	0.025
rip rap	0.035
natural channels with stones and weeds	0.035
very poor natural channels	0.060

[a]Compiled from various sources.
[b]Values outside these ranges have been observed, but these values are typical.

Support Material

EXISTING CONDITIONS WATERSHED STORM RUNNOFF ANALYSIS
RATIONAL METHOD, 10 YEAR STORM EVENT

Drainage Subarea	A		Zoning	C	Travel	I	Q
	S.F	Acres		Factor	Time	Intensity	C.F.S.
A1.1	413,470	9.49	R1	0.6	18.36	3.37	19.19
A1.2	308,029	7.07	R1	0.6	12.86	3.96	16.80
A1.3	198,247	4.55	R1	0.6	17.7	3.43	9.36
A1.4	392,340	9.01	R1	0.6	24.43	2.92	15.79
A1.5	77,423	1.78	R1	0.6	5	5.5	5.87
A1.6	48,199	1.11	R1	0.6	5	5.5	3.66
A1.7	70,702	1.62	R1	0.6	5	5.5	5.35
A1.8	147,088	3.38	R1	0.6	5	5.5	11.15
A1.9	7,759	0.18	R1	0.6	5	5.5	0.59
A1.10	55,059	1.26	C	0.8	5	5.5	5.54
A1.11	22,030	0.51	C	0.8	5	5.5	2.24
A1.12	5,804	0.13	C	0.8	5	5.5	0.57
A1.13	15,036	0.35	C	0.8	5	5.5	1.54
A1.14	797	0.02	C	0.8	5	5.5	0.09
A1.15	5,295	0.12	C	0.8	5	5.5	0.53
A1.16	3,751	0.09	C	0.8	5	5.5	0.40
A1.17	2,351	0.05	C	0.8	5	5.5	0.22
A1.18	1,612	0.04	C	0.8	5	5.5	0.18
A1.19	25,377	0.58	C	0.8	5	5.5	2.55
A1.20	9,810	0.23	C	0.8	5	5.5	1.01
A1.21	37,807	0.87	C	0.8	5	5.5	3.83
A1.22	4,810	0.11	C	0.8	5	5.5	0.48
A1.23	102,148	2.34	C	0.8	5	5.5	10.30
A1.24	1,917	0.04	C	0.8	5	5.5	0.18
A1.25	10,973	0.25	C	0.8	5	5.5	1.10
A1.26	12,480	0.29	C	0.8	5	5.5	1.28
A1.27	75,314	1.73	C	0.8	5	5.5	7.61
A1.28	53,522	1.23	C	0.8	5	5.5	5.41
A1.29	101,979	2.34	R2	0.6	5	5.5	7.72
A1.30	51,717	1.19	R2	0.6	5	5.5	3.93
A1.31	38,799	0.89	C	0.8	5	5.5	3.92
A1.32	129,513	2.97	R2	0.6	5	5.5	9.80
A1.33	64,693	1.49	R2	0.6	5	5.5	4.92
A1.34	53,316	1.22	R2	0.6	5	5.5	4.03
Total SubWatershed A-1		**58.53**					**167.13**
A2.1	276,698	6.35	R1	0.6	5 Min.	5.5	20.96
A2.2	206,340	4.74	R1	0.6	5 Min.	5.5	15.64
A2.3	301,784	6.93	R2	0.6	5 Min.	5.5	22.87
A2.4	37,803	0.87	R1	0.6	5 Min.	5.5	2.87
A2.5	54,399	1.25	R1	0.6	5 Min.	5.5	4.13
A2.6	488,884	11.2	R2	0.6	5 Min.	5.5	36.96
A2.7	150,425	3.45	R2	0.6	5 Min.	5.5	11.39

EXISTING CONDITIONS WATERSHED STORM RUNNOFF ANALYSIS
RATIONAL METHOD, 10 YEAR STORM EVENT

A2.8	3,549	0.08	R2	0.6	5 Min.	5.5	0.26
A2.9	3,928	0.09	R2	0.6	5 Min.	5.5	0.30
A2.10	5,160	0.12	R2	0.6	5 Min.	5.5	0.40
A2.11	9,930	0.23	R2	0.6	5 Min.	5.5	0.76
A2.12	56,886	1.31	R2	0.6	5 Min.	5.5	4.32
A2.13	126,089	2.89	R2	0.6	5 Min.	5.5	9.54
A2.14	101,442	2.33	C	0.8	5 Min.	5.5	10.25
A2.15	40,904	0.94	C	0.8	5 Min.	5.5	4.14
A2.16	129,432	2.97	C	0.8	5 Min.	5.5	13.07
A2.17	18,508	0.42	C	0.8	5 Min.	5.5	1.85
A2.18	6,717	0.15	C	0.8	5 Min.	5.5	0.66
A2.19	12,933	0.3	C	0.8	5 Min.	5.5	1.32
A2.20	9,675	0.22	C	0.8	5 Min.	5.5	0.97
A2.21	10,138	0.23	C	0.8	5 Min.	5.5	1.01
A2.22	6,063	0.14	C	0.8	5 Min.	5.5	0.62
A2.23	5,304	0.12	C	0.8	5 Min.	5.5	0.53
A2.24	1,147	0.03	C	0.8	5 Min.	5.5	0.13
A2.25	28,603	0.66	C	0.8	5 Min.	5.5	2.90
A2.26	39,942	0.92	C	0.8	5 Min.	5.5	4.05
A2.27	10,898	0.25	C	0.8	5 Min.	5.5	1.10
A2.28	230,652	5.3	C	0.8	5 Min.	5.5	23.32
A2.29	110,002	2.53	R2	0.6	5 Min.	5.5	8.35
A2.30	7,857	0.18	R2	0.6	5 Min.	5.5	0.59
A2.31	6,163	0.14	R2	0.6	5 Min.	5.5	0.46
A2.32	7,804	0.18	R2	0.6	5 Min.	5.5	0.59
A2.33	77,754	1.78	R2	0.6	5 Min.	5.5	5.87
A2.34	6,594	0.15	R2	0.6	5 Min.	5.5	0.50
A2.35	4,340	0.1	R2	0.6	5 Min.	5.5	0.33
A2.36	69,588	1.6	R2	0.6	5 Min.	5.5	5.28
A2.37	49,680	1.14	R2	0.6	5 Min.	5.5	3.76
A2.38	9,311	0.21	R2	0.6	5 Min.	5.5	0.69
Total SubWatershed A-2		**62.5**					**222.73**
A3.1	266,803	6.12	R2	0.6	6.09 Min.	5.13	18.84
A3.2	5,286	0.12	R2	0.6	5 Min.	5.5	0.40
A3.3	13,093	0.3	R2	0.6	5 Min.	5.5	0.99
A3.4	55,857	1.28	R2	0.6	5 Min.	5.5	4.22
A3.5	160,292	3.68	R2	0.6	5 Min.	5.5	12.14
Total SubWatershed A-3		**11.5**					**36.59**
A4.1	476,281	10.9	$C_{50}/R2_{50}$	0.7	19.3 Min.	3.29	25.10
A4.2	13,624	0.31	R2	0.6	5 Min.	5.5	1.02
A4.3	105,702	2.43	R2	0.6	5 Min.	5.5	8.02
A4.4	132,554	3.04	R2	0.6	5 Min.	5.5	10.03
Total SubWatershed A-4		**16.68**					**44.18**

EXISTING CONDITIONS WATERSHED STORM RUNNOFF ANALYSIS
RATIONAL METHOD, 10 YEAR STORM EVENT

A5.1	38,294	0.88	$C_{50}/R2_{50}$	0.7	5 Min.	5.5	3.39
A5.2	90,700	2.08	R2	0.6	5 Min.	5.5	6.86
A5.3	109,026	2.5	R2	0.6	5 Min.	5.5	8.25
Total SubWatershed A-5		**5.46**					**18.50**
A6	123,165	**2.83**	C	0.8	5 Min.	5.5	**12.45**
B1.1	34,871	0.8	C	0.8	5 Min.	5.5	3.52
B1.2	3,552	0.08	C	0.8	5 Min.	5.5	0.35
B1.3	14,418	0.33	C	0.8	5 Min.	5.5	1.45
B1.4	8,706	0.2	C	0.8	5 Min.	5.5	0.88
B1.5	2,734	0.06	C	0.8	5 Min.	5.5	0.26
B1.6	332,566	7.63	$C_{50}/R2_{50}$	0.7	5 Min.	5.5	29.38
B1.7	324,274	7.44	R2	0.6	5 Min.	5.5	24.55
B1.8	91,698	2.11	R2	0.6	5 Min.	5.5	6.96
B1.9	163,979	3.76	R2	0.6	5 Min.	5.5	12.41
B1.10	286,938	6.59	R2	0.6	5 Min.	5.5	21.75
Total SubWatershed B-1		**29.00**					**101.51**
B2.1	334,735	7.68	R2	0.6	5 Min.	5.5	25.34
B2.2	464,702	10.6	R2	0.6	5 Min.	5.5	34.98
B2.3	26,818	0.62	R2	0.6	5 Min.	5.5	2.05
B2.4	100,293	2.3	R2	0.6	5 Min.	5.5	7.59
B2.5	21,948	0.5	R2	0.6	5 Min.	5.5	1.65
B2.6	461,968	10.6	R2	0.6	5 Min.	5.5	34.98
B2.7	7,368	0.17	R2	0.6	5 Min.	5.5	0.56
B2.8	9,057	0.21	R2	0.6	5 Min.	5.5	0.69
B2.9	4,101	0.09	R2	0.6	5 Min.	5.5	0.30
B2.10	95,349	2.19	R2	0.6	5 Min.	5.5	7.23
B2.11	145,567	3.34	R2	0.6	5 Min.	5.5	11.02
B2.12	119,603	2.75	C	0.8	5 Min.	5.5	12.10
B2.13	6,092	0.14	R2	0.6	5 Min.	5.5	0.46
B2.14	199,752	4.59	R2	0.6	5 Min.	5.5	15.15
B2.15	106,315	2.44	R2	0.6	5 Min.	5.5	8.05
B2.16	76,434	1.75	R2	0.6	5 Min.	5.5	5.78
B2.17	355,726	8.17	$C_{75}/R2_{25}$	0.68	5 Min.	5.5	30.56
B2.18	162,061	3.72	R2	0.6	5 Min.	5.5	12.28
B2.19	30,652	0.7	R1	0.6	5 Min.	5.5	2.31
B2.20	162,254	3.72	R1	0.6	5 Min.	5.5	12.28
B2.21	110,173	2.53	R1	0.6	5 Min.	5.5	8.35
B2.22	1,111	0.03	R1	0.6	5 Min.	5.5	0.10

EXISTING CONDITIONS WATERSHED STORM RUNNOFF ANALYSIS
RATIONAL METHOD, 10 YEAR STORM EVENT

B2.23	17,605	0.4	R2	0.6	5 Min.	5.5	1.32
B2.24	73,891	1.7	$R1_{50}/R2_{50}$	0.6	5 Min.	5.5	5.61
B2.25	62,868	1.44	R2	0.6	5 Min.	5.5	4.75
B2.26	17,911	0.41	R2	0.6	5 Min.	5.5	1.35
Total SubWatershed B-2		**72.79**					**246.83**
B3.1	319,787	7.34	$C_{50}/R2_{50}$	0.7	5 Min.	5.5	28.26
B3.2	176,420	4.05	R2	0.6	5 Min.	5.5	13.37
B3.3	17,513	0.04	R2	0.6	5 Min.	5.5	0.13
B3.4	17,513	0.4	C	0.8	5 Min.	5.5	1.76
B3.5	13,872	0.32	C	0.8	5 Min.	5.5	1.41
B3.6	5,873	0.13	C	0.8	5 Min.	5.5	0.57
B3.7	29,926	0.69	C	0.8	5 Min.	5.5	3.04
Total SubWatershed B-3		**12.97**					**48.53**
B4	289,763	6.65	$C_{25}/R2_{75}$	0.43	5 Min.	5.5	**15.73**
TOTAL WATERSHED B		**121.41**					**412.60**
C1	334,775	7.69	C	0.8	5 Min.	5.5	**33.84**
C2.1	719,907	16.5	C	0.8	5 Min.	5.5	72.60
C2.2	2,015,909	46.28	$C_{60}/R2_{40}$	0.72	5 Min.	5.5	183.27
C2.3	431,428	9.9	$C_{50}/R2_{50}$	0.7	5 Min.	5.5	38.12
Total SubWatershed C-1		**72.68**					**293.98**
C3.1	6,848	0.16	R1	0.6	5 Min.	5.5	0.53
C3.2	100,600	2.31	R1	0.6	5 Min.	5.5	7.62
C3.3	48,025	1.1	R1	0.6	5 Min.	5.5	3.63
C3.4	48,025	1.1	R1	0.6	5 Min.	5.5	3.63
		4.67					
C4	828,372	19.02	R1	0.6	5 Min.	5.5	62.77
Total Watershed C		**104.06**					

Total A-1

Travel Time

Summary for Travel Time Calculations with 7 segments:

Segment 1: SCS Segmental (TR55) - Concentrated Flow

Paved surface
Length = 51.43 feet
Slope = 0.024 ft/ft

Travel Time for Segment = 0.27 minutes

Segment 2: SCS Segmental (TR55) - Concentrated Flow

Paved surface
Length = 47 feet
Slope = 0.06 ft/ft

Travel Time for Segment = 0.16 minutes

Segment 3: SCS Segmental (TR55) - Concentrated Flow

Paved surface
Length = 24 feet
Slope = 0.03 ft/ft

Travel Time for Segment = 0.11 minutes

Segment 4: SCS Segmental (TR55) - Concentrated Flow

Paved surface
Length = 847.4 feet
Slope = 0.06 ft/ft

Travel Time for Segment = 2.84 minutes

Segment 5: SCS Segmental (TR55) - Concentrated Flow

Paved surface
Length = 49.53 feet
Slope = 0.025 ft/ft

Travel Time for Segment = 0.26 minutes

Segment 6: SCS Segmental (TR55) - Concentrated Flow

Paved surface
Length = 187.7 feet
Slope = 0.007 ft/ft

Travel Time for Segment = 1.84 minutes

Segment 7: SCS Segmental (TR55) - Concentrated Flow

Paved surface
Length = 102.69 feet
Slope = 0.011 ft/ft

Travel Time for Segment = 0.80 minutes

Composite Travel Time = 6.28 minutes

+17.7

Total A-1 23.98 min

Rational Formula Hydrograph
PDT-IDF Storm Intensity Chart

10 Year Storm in PA. Region 4 at A-1
Time of Concentration: 23.98 min.
Drainage Area: 58.5300 acres.
Weighted 'C' Factor: 0.7100

Time (min)	Rainfall Incr. (inches)	Rainfall Total (inches)	Rainfall Intensity (in/hr)	Flow (cfs)
0	0.00	0.00	0.00	0.00
24	0.14	0.14	0.34	14.06
48	0.23	0.36	0.57	23.49
72	**1.18**	**1.54**	**2.95**	**122.62**
96	0.39	1.93	0.98	40.59
120	0.19	2.12	0.47	19.71
144	0.16	2.28	0.39	16.35
168	0.12	2.40	0.30	12.40
192	0.11	2.50	0.27	11.14
216	0.10	2.60	0.24	10.13
240	0.09	2.69	0.22	9.29

At time = 600 minutes, the flow is 4.43 CFS.

Travel Time

Summary for Travel Time Calculations with 6 segments:

Segment 1: SCS Segmental (TR55) - Sheet Flow

Length = 30.4 feet
Slope = 0.11 ft/ft
Roughness Coefficient = 0.15
2 Year - 24 Hour Rainfall = 2.8 inches

Travel Time for Segment = 2.04 minutes

Segment 2: SCS Segmental (TR55) - Concentrated Flow

Unpaved surface
Length = 201.7 feet
Slope = 0.1 ft/ft

Travel Time for Segment = 0.66 minutes

Segment 3: SCS Segmental (TR55) - Concentrated Flow

Paved surface
Length = 55.9 feet
Slope = 0.16 ft/ft

Travel Time for Segment = 0.11 minutes

Segment 4: SCS Segmental (TR55) - Concentrated Flow

Paved surface
Length = 143.2 feet
Slope = 0.03 ft/ft

Travel Time for Segment = 0.68 minutes

Segment 5: SCS Segmental (TR55) - Concentrated Flow

Paved surface
Length = 305.2 feet
Slope = 0.07 ft/ft

Travel Time for Segment = 0.95 minutes

Segment 6: SCS Segmental (TR55) - Concentrated Flow

Paved surface
Length = 285.1 feet
Slope = 0.02 ft/ft

Travel Time for Segment = 1.65 minutes

Composite Travel Time = 6.09 minutes

Rational Formula Hydrograph
PDT-IDF Storm Intensity Chart

10 Year Storm in PA. Region 4 at A3.1
Time of Concentration: 6.09 min.
Drainage Area: 6.1200 acres.
Weighted 'C' Factor: 0.6000

Time (min)	Rainfall Incr. (inches)	Rainfall Total (inches)	Rainfall Intensity (in/hr)	Flow (cfs)
0	0.00	0.00	0.00	0.00
6	0.10	0.10	1.02	3.74
12	0.21	0.31	2.06	7.56
18	**0.52**	**0.83**	**5.13**	**18.84**
24	0.30	1.13	2.96	10.86
30	0.16	1.29	1.56	5.73
37	0.13	1.42	1.24	4.56
43	0.09	1.50	0.86	3.14
49	0.07	1.58	0.73	2.68
55	0.06	1.64	0.63	2.32
61	0.06	1.70	0.58	2.11

At time = 152 minutes, the flow is 1.14 CFS.

Travel Time

Summary for Travel Time Calculations with 7 segments:

Segment 1: SCS Segmental (TR55) - Sheet Flow

Length = 130.3 feet
Slope = 0.015 ft/ft
Roughness Coefficient = 0.15
2 Year - 24 Hour Rainfall = 2.8 inches

Travel Time for Segment = 14.52 minutes

Segment 2: SCS Segmental (TR55) - Concentrated Flow

Unpaved surface
Length = 197.3 feet
Slope = 0.08 ft/ft

Travel Time for Segment = 0.72 minutes

Segment 3: SCS Segmental (TR55) - Concentrated Flow

Paved surface
Length = 62.4 feet
Slope = 0.059 ft/ft

Travel Time for Segment = 0.21 minutes

Segment 4: SCS Segmental (TR55) - Concentrated Flow

Paved surface
Length = 24 feet
Slope = 0.096 ft/ft

Travel Time for Segment = 0.06 minutes

Segment 5: SCS Segmental (TR55) - Concentrated Flow

Paved surface
Length = 267.9 feet
Slope = 0.042 ft/ft

Travel Time for Segment = 1.07 minutes

Segment 6: SCS Segmental (TR55) - Concentrated Flow

Paved surface
Length = 749 feet
Slope = 0.085 ft/ft

Travel Time for Segment = 2.11 minutes

Segment 7: SCS Segmental (TR55) - Concentrated Flow

Paved surface
Length = 150.7 feet
Slope = 0.041 ft/ft

Travel Time for Segment = 0.61 minutes

Composite Travel Time = 19.30 minutes

Rational Formula Hydrograph
PDT-IDF Storm Intensity Chart

10 Year Storm in PA. Region 4 at A4.1
Time of Concentration: 19.3 min.
Drainage Area: 10.9000 acres.
Weighted 'C' Factor: 0.7000

Time (min)	Rainfall Incr. (inches)	Rainfall Total (inches)	Rainfall Intensity (in/hr)	Flow (cfs)
0	0.00	0.00	0.00	0.00
19	0.13	0.13	0.40	3.04
39	0.22	0.35	0.69	5.29
58	**1.06**	**1.41**	**3.29**	**25.13**
77	0.39	1.80	1.21	9.23
97	0.17	1.97	0.53	4.01
116	0.15	2.12	0.46	3.52
135	0.11	2.23	0.35	2.68
154	0.10	2.33	0.32	2.41
174	0.09	2.42	0.29	2.19
193	0.08	2.51	0.26	2.02

At time = 483 minutes, the flow is 0.97 CFS.

Travel Time

Summary for Travel Time Calculations with 3 segments:

Segment 1: SCS Segmental (TR55) - Sheet Flow

Length = 75 feet
Slope = 0.01 ft/ft
Roughness Coefficient = 0.24
2 Year - 24 Hour Rainfall = 2.8 inches

Travel Time for Segment = 15.99 minutes

Segment 2: SCS Segmental (TR55) - Concentrated Flow

Unpaved surface
Length = 309 feet
Slope = 0.045 ft/ft

Travel Time for Segment = 1.50 minutes

Segment 3: SCS Segmental (TR55) - Concentrated Flow

Unpaved surface
Length = 234 feet
Slope = 0.077 ft/ft

Travel Time for Segment = 0.87 minutes

Composite Travel Time = 18.36 minutes

Rational Formula Hydrograph
PDT-IDF Storm Intensity Chart

10 Year Storm in PA. Region 4 at A1.1
Time of Concentration: 18.36 min.
Drainage Area: 9.4800 acres.
Weighted 'C' Factor: 0.6000

Time (min)	Rainfall Incr. (inches)	Rainfall Total (inches)	Rainfall Intensity (in/hr)	Flow (cfs)
0	0.00	0.00	0.00	0.00
18	0.13	0.13	0.41	2.35
37	0.22	0.35	0.73	4.18
55	**1.03**	**1.38**	**3.37**	**19.19**
73	0.39	1.77	1.27	7.21
92	0.16	1.93	0.53	3.04
110	0.15	2.08	0.48	2.73
129	0.11	2.19	0.36	2.08
147	0.10	2.29	0.33	1.86
165	0.09	2.38	0.30	1.70
184	0.08	2.47	0.27	1.56

At time = 459 minutes, the flow is 0.75 CFS.

Travel Time

Summary for Travel Time Calculations with 5 segments:

Segment 1: SCS Segmental (TR55) - Sheet Flow

Length = 82 feet
Slope = 0.01 ft/ft
Roughness Coefficient = 0.13
2 Year - 24 Hour Rainfall = 2.8 inches

Travel Time for Segment = 10.52 minutes

Segment 2: SCS Segmental (TR55) - Concentrated Flow

Unpaved surface
Length = 216 feet
Slope = 0.04 ft/ft

Travel Time for Segment = 1.12 minutes

Segment 3: SCS Segmental (TR55) - Concentrated Flow

Unpaved surface
Length = 261 feet
Slope = 0.17 ft/ft

Travel Time for Segment = 0.65 minutes

Segment 4: SCS Segmental (TR55) - Concentrated Flow

Unpaved surface
Length = 48 feet
Slope = 0.1 ft/ft

Travel Time for Segment = 0.16 minutes

Segment 5: SCS Segmental (TR55) - Concentrated Flow

Paved surface
Length = 71 feet
Slope = 0.02 ft/ft

Travel Time for Segment = 0.41 minutes

Composite Travel Time = 12.86 minutes

Rational Formula Hydrograph
PDT-IDF Storm Intensity Chart

10 Year Storm in PA. Region 4 at A1.2
Time of Concentration: 12.86 min.
Drainage Area: 7.0700 acres.
Weighted 'C' Factor: 0.6000

Time (min)	Rainfall Incr. (inches)	Rainfall Total (inches)	Rainfall Intensity (in/hr)	Flow (cfs)
0	0.00	0.00	0.00	0.00
13	0.11	0.11	0.54	2.27
26	0.23	0.34	1.07	4.55
39	**0.85**	**1.19**	**3.96**	**16.78**
51	0.37	1.56	1.73	7.34
64	0.16	1.72	0.75	3.17
77	0.12	1.84	0.55	2.32
90	0.10	1.94	0.47	2.01
103	0.09	2.03	0.43	1.81
116	0.08	2.12	0.39	1.65
129	0.08	2.19	0.36	1.52

At time = 322 minutes, the flow is 0.74 CFS.

Travel Time

Summary for Travel Time Calculations with 3 segments:

Segment 1: SCS Segmental (TR55) - Sheet Flow

Length = 75 feet
Slope = 0.019 ft/ft
Roughness Coefficient = 0.24
2 Year - 24 Hour Rainfall = 2.8 inches

Travel Time for Segment = 12.37 minutes

Segment 2: SCS Segmental (TR55) - Concentrated Flow

Unpaved surface
Length = 183 feet
Slope = 0.017 ft/ft

Travel Time for Segment = 1.45 minutes

Segment 3: SCS Segmental (TR55) - Concentrated Flow

Paved surface
Length = 1207 feet
Slope = 0.065 ft/ft

Travel Time for Segment = 3.88 minutes

Composite Travel Time = 17.70 minutes

Rational Formula Hydrograph
PDT-IDF Storm Intensity Chart

10 Year Storm in PA. Region 4 at
Time of Concentration: 17.7 min.
Drainage Area: 4.5500 acres.
Weighted 'C' Factor: 0.6000

Time (min)	Rainfall Incr. (inches)	Rainfall Total (inches)	Rainfall Intensity (in/hr)	Flow (cfs)
0	0.00	0.00	0.00	0.00
18	0.13	0.13	0.42	1.16
35	0.23	0.35	0.77	2.09
53	**1.01**	**1.36**	**3.43**	**9.37**
71	0.39	1.75	1.31	3.58
89	0.16	1.91	0.54	1.48
106	0.15	2.06	0.49	1.34
124	0.11	2.17	0.38	1.02
142	0.10	2.27	0.34	0.92
159	0.09	2.36	0.31	0.84
177	0.08	2.44	0.28	0.77

At time = 443 minutes, the flow is 0.37 CFS.

Travel Time

Summary for Travel Time Calculations with 8 segments:

Segment 1: SCS Segmental (TR55) - Sheet Flow

Length = 107.6 feet
Slope = 0.004 ft/ft
Roughness Coefficient = 0.15
2 Year - 24 Hour Rainfall = 2.8 inches

Travel Time for Segment = 21.14 minutes

Segment 2: SCS Segmental (TR55) - Concentrated Flow

Unpaved surface
Length = 69 feet
Slope = 0.087 ft/ft

Travel Time for Segment = 0.24 minutes

Segment 3: SCS Segmental (TR55) - Concentrated Flow

Unpaved surface
Length = 92 feet
Slope = 0.065 ft/ft

Travel Time for Segment = 0.37 minutes

Segment 4: SCS Segmental (TR55) - Concentrated Flow

Paved surface
Length = 127 feet
Slope = 0.031 ft/ft

Travel Time for Segment = 0.59 minutes

Segment 5: SCS Segmental (TR55) - Concentrated Flow

Paved surface
Length = 128 feet
Slope = 0.031 ft/ft

Travel Time for Segment = 0.60 minutes

Segment 6: SCS Segmental (TR55) - Concentrated Flow

Paved surface
Length = 163 feet
Slope = 0.191 ft/ft

Travel Time for Segment = 0.31 minutes

Rational Formula Hydrograph
PDT-IDF Storm Intensity Chart

10 Year Storm in PA. Region 4 at A1.4
Time of Concentration: 24.43 min.
Drainage Area: 9.0100 acres.
Weighted 'C' Factor: 0.6000

Time (min)	Rainfall Incr. (inches)	Rainfall Total (inches)	Rainfall Intensity (in/hr)	Flow (cfs)
0	0.00	0.00	0.00	0.00
24	0.14	0.14	0.33	1.80
49	0.23	0.36	0.56	3.02
73	**1.19**	**1.55**	**2.92**	**15.80**
98	0.39	1.94	0.96	5.18
122	0.19	2.13	0.47	2.53
147	0.16	2.29	0.39	2.10
171	0.12	2.41	0.29	1.59
195	0.11	2.52	0.26	1.43
220	0.10	2.62	0.24	1.30
244	0.09	2.71	0.22	1.19

At time = 611 minutes, the flow is 0.57 CFS.

PROPOSED CONDITIONS WATERSHED STORMWATER RUNNOFF ANALYSIS
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Drainage Subarea	A		Zoning	C	Travel	I	Q
	S.F	Acres		Factor	Time	Intensity	C.F.S.
A1 MH 10	101,659	2.33	R2	0.6	5	5.5	7.70
A1 MH 9	153,305	3.52	R2	0.6	5	5.5	11.61
A1 MH 8	65,631	1.51	R2	0.6	5	5.5	4.97
A1 MH 7	35,524	0.82	R2	0.6	5	5.5	2.69
A1 HW 38	188,002	4.32	R2	0.6	5	5.5	14.24
A1 MH 42	307,373	7.06	R2	0.6	5	5.5	23.29
A1 MH 43	190,026	4.36	R2	0.6	5	5.5	14.40
A1 MH 44	619,664	14.23	R2	0.6	5	5.5	46.94
A1 MH 46	11,447	0.26	C	0.8	5	5.5	1.16
A1 MH 6	31,800	0.73	R2	0.6	5	5.5	2.41
A1 MH 3	60,653	1.39	C	0.8	5	5.5	6.13
A1 MH 5	58,024	1.33	C	0.8	5	5.5	5.86
A1 MH 4	13,067	0.30	C	0.8	5	5.5	1.32
A1 MH 11	156,779	3.60	R2	0.6	5	5.5	11.88
A1 MH 2	139038	3.19	R2	0.6	5	5.5	10.53
A1 MH 5	139174	3.19	C	0.8	5	5.5	14.06
A1 EX4	77,035	1.77	C	0.8	5	5.5	7.78
A1 EX3	53,418	1.23	C	0.8	5	5.5	5.40
A1 EX2	127,793	2.93	C	0.8	5	5.5	12.91
A1 EX1	158,758	3.64	C	0.8	5	5.5	16.04
Total SubWatershed A-1		**61.71**					**221.31**
A2.12	21,856	0.50	R2	0.6	5 Min.	5.5	1.66
A2.13	126,089	2.89	R2	0.6	5 Min.	5.5	9.55
A2.22	6,063	0.14	C	0.8	5 Min.	5.5	0.61
A2.23	5,304	0.12	C	0.8	5 Min.	5.5	0.54
A2.24	1,147	0.03	C	0.8	5 Min.	5.5	0.12
A2.25	28,603	0.66	C	0.8	5 Min.	5.5	2.89
A2.26	39,942	0.92	C	0.8	5 Min.	5.5	4.03
A2.27	10,898	0.25	C	0.8	5 Min.	5.5	1.10
A2.28	68,634	1.58	C	0.8	5 Min.	5.5	6.93
A2.29	110,002	2.53	R2	0.6	5 Min.	5.5	8.33
A2.30	7,857	0.18	R2	0.6	5 Min.	5.5	0.60
A2.31	6,163	0.14	R2	0.6	5 Min.	5.5	0.47
A2.32	7,804	0.18	R2	0.6	5 Min.	5.5	0.59
A2.33	77,754	1.78	R2	0.6	5 Min.	5.5	5.89
A2.34	6,594	0.15	R2	0.6	5 Min.	5.5	0.50
A2.35	4,340	0.10	R2	0.6	5 Min.	5.5	0.33
A2.36	69,588	1.60	R2	0.6	5 Min.	5.5	5.27
A2.37	49,680	1.14	R2	0.6	5 Min.	5.5	3.76
A2.38	9,311	0.21	R2	0.6	5 Min.	5.5	0.71
Total SubWatershed A-2		**15.10**					**53.88**

PROPOSED CONDITIONS WATERSHED STORMWATER RUNNOFF ANALYSIS
RATIONAL METHOD, 10 YEAR STORM EVENT

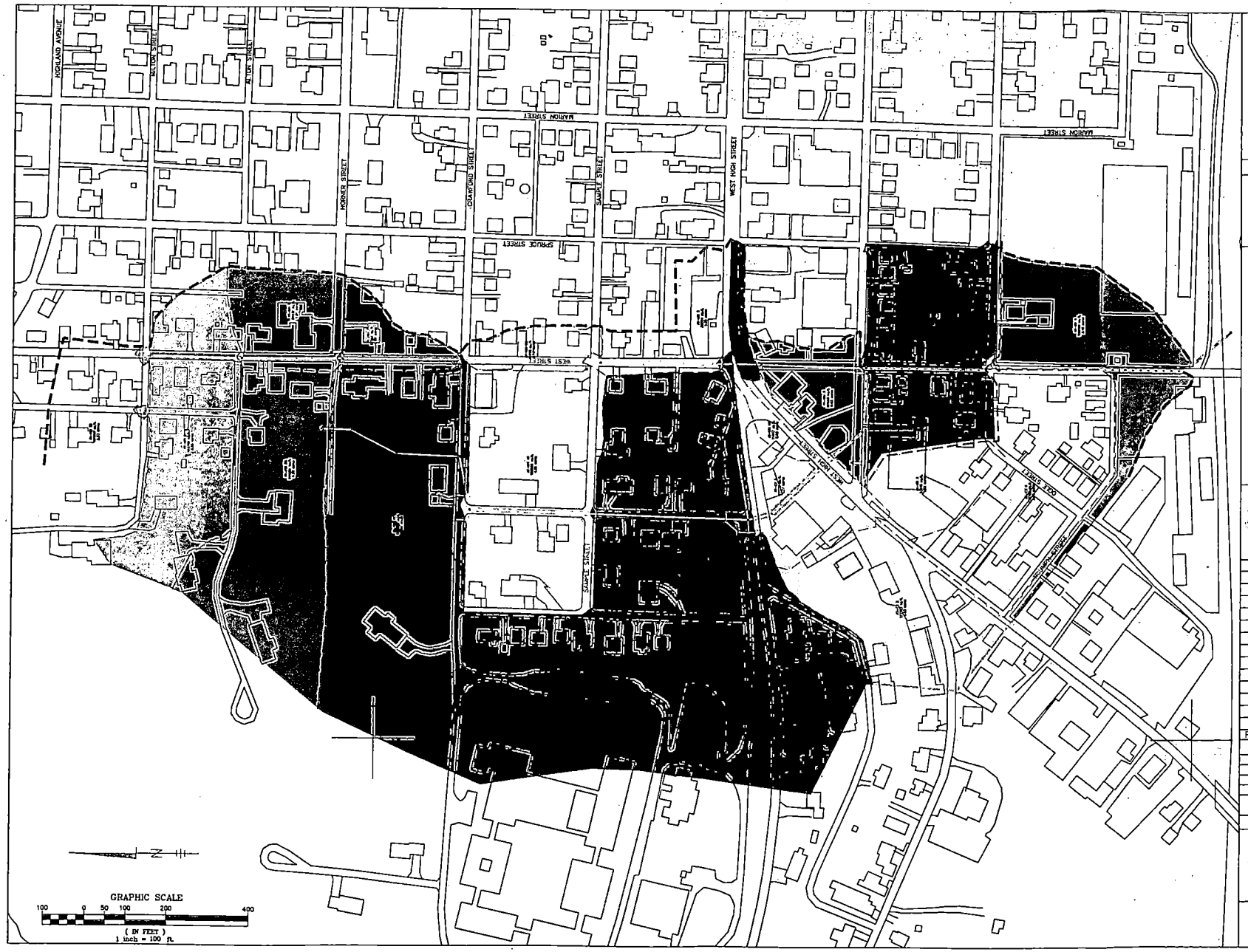
A3 MH 11	367,913	8.45	R2	0.6	5 Min.	5.5	27.87
A3 MH 10	218,032	5.01	R2	0.6	5 Min.	5.5	16.52
A3 MH 9	260,160	5.97	R2	0.6	5 Min.	5.5	19.71
A3 MH 8	353,604	8.12	R2	0.6	5 Min.	5.5	26.79
A3 MH 7	377,859	8.67	R2	0.6	5 Min.	5.5	28.63
A3 MH 6	348,618	8.00	C	0.8	5 Min.	5.5	35.21
A3 MH 5	192,223	4.41	C	0.8	5 Min.	5.5	19.42
A3 MH 4	195,559	4.49	R2	0.6	5 Min.	5.5	14.82
A3 MH 3	183,560	4.21	R2	0.6	5 Min.	5.5	13.91
A3 MH 2	212,359	4.88	R2	0.6	5 Min.	5.5	16.09
Total SubWatershed A-3		**62.21**					**218.95**
A4-CB 416	11,037	0.25	C	0.8	5 Min.	5.5	1.11
A4-CB 415	13,178	0.30	C	0.8	5 Min.	5.5	1.33
A4-MH 414	158,475	3.64	C	0.8	5 Min.	5.5	16.01
A4- CB 413	5,138	0.12	C	0.8	5 Min.	5.5	0.52
A4-CB 412	6,308	0.14	C	0.8	5 Min.	5.5	0.64
A4-CB 411	12,891	0.30	C	0.8	5 Min.	5.5	1.30
A4-MH 410	159,298	3.66	R2	0.6	5 Min.	5.5	12.07
A4-CB 409	6,193	0.14	R2	0.6	5 Min.	5.5	0.47
A4-CB 408	12,101	0.28	R2	0.6	5 Min.	5.5	0.92
A4-CB 407	11,434	0.26	R2	0.6	5 Min.	5.5	0.87
A4-MH 406	154,350	3.54	R2	0.6	5 Min.	5.5	11.69
A4-CB 405	10,325	0.24	R2	0.6	5 Min.	5.5	0.78
A4-CB 403	35,222	0.81	R2	0.6	5 Min.	5.5	2.67
A4-MH 402	150,601	3.46	R2	0.8	5 Min.	5.5	15.21
Total SubWatershed A-4		**17.14**					**65.59**
A5-CB 513	3,686	0.08	C	0.8	5 Min.	5.5	0.37
A5-CB 512	3,722	0.09	C	0.8	5 Min.	5.5	0.38
A5-CB 511	7,347	0.17	C	0.8	5 Min.	5.5	0.74
A5-CB 510	9,904	0.23	C	0.8	5 Min.	5.5	1.00
A5-CB 509	9,190	0.21	C	0.8	5 Min.	5.5	0.93
A5-CB 508	12,952	0.30	R2	0.6	5 Min.	5.5	0.98
A5-CB 507	9,790	0.22	R2	0.6	5 Min.	5.5	0.74
A5-CB 506	45,016	1.03	R2	0.6	5 Min.	5.5	3.41
A5-CB 505	9,242	0.21	R2	0.6	5 Min.	5.5	0.70
A5-MH 504	20,551	0.47	R2	0.6	5 Min.	5.5	1.56
A5-MH 503	101,260	2.32	R2	0.6	5 Min.	5.5	7.67
A5-MH 502	0	0.00	R2	0.6	5 Min.	5.5	0.00
Total SubWatershed A-5		**5.34**					**18.48**
B2-MH 217	205,995	4.73	R2	0.6	5 Min.	5.5	15.61
B2-MH 216	426,105	9.78	C	0.8	5 Min.	5.5	43.04

PROPOSED CONDITIONS WATERSHED STORMWATER RUNNOFF ANALYSIS
RATIONAL METHOD, 10 YEAR STORM EVENT

B2-MH 215	325,529	7.47	R2	0.6	5 Min.	5.5	24.66
B2-MH 214	195,802	4.49	R2	0.6	5 Min.	5.5	14.83
B2-MH 213	84,742	1.95	R2	0.6	5 Min.	5.5	6.42
B2-MH 212	339,368	7.79	R2	0.6	5 Min.	5.5	25.71
B2-MH 211	203,365	4.67	R2	0.6	5 Min.	5.5	15.41
B2-MH 210	156,336	3.59	R2	0.6	5 Min.	5.5	11.84
B2-MH 209	79,654	1.83	C	0.8	5 Min.	5.5	8.05
B2-MH 208	0	0.00	R2	0.6	5 Min.	5.5	0.00
B2-MH 207	589,648	13.54	R2	0.6	5 Min.	5.5	44.67
B2-MH 206	96,567	2.22	R2	0.8	5 Min.	5.5	9.75
B2-MH 205	98,630	2.26	R2	0.6	5 Min.	5.5	7.47
B2-MH 204	107,186	2.46	R2	0.6	5 Min.	5.5	8.12
B2-MH 203	183,791	4.22	R2	0.6	5 Min.	5.5	13.92
B2-MH 202	117,875	2.71	R2	0.6	5 Min.	5.5	8.93
B2-MH 201	0	0.00	R2	0.6	5 Min.	5.5	0.00
Total SubWatershed B-2		**73.71**					**258.44**
B3-CB 171	8,421	0.19	C	0.8	5 Min.	5.5	0.85
B3-CB 170	22,577	0.52	C	0.8	5 Min.	5.5	2.28
B3-CB 169	37,551	0.86	R2	0.6	5 Min.	5.5	2.84
B3-CB 168	86,737	1.99	R2	0.6	5 Min.	5.5	6.57
B3-CB 167	117,126	2.69	R2	0.6	5 Min.	5.5	8.87
B3-CB 166	48,219	1.11	R2	0.6	5 Min.	5.5	3.65
B3-CB 165	8,977	0.21	C	0.8	5 Min.	5.5	0.91
B3-CB 164	7,977	0.18	C	0.8	5 Min.	5.5	0.81
B3-CB 163	176,536	4.05	R2	0.6	5 Min.	5.5	13.37
B3-CB 162	23,790	0.55	C	0.8	5 Min.	5.5	2.40
B3-CB 161	2,189	0.05	C	0.8	5 Min.	5.5	0.22
Total SubWatershed B-3		**12.40**					**42.78**
B4-CB 146	1,375	0.03	C	0.8	5 Min.	5.5	0.14
B4-CB 145	27,970	0.64	R2	0.6	5 Min.	5.5	2.12
B4-CB 144	13,315	0.31	R2	0.6	5 Min.	5.5	1.01
B4-CB 143	118,533	2.72	R2	0.6	5 Min.	5.5	8.98
B4-CB 142	84,974	1.95	R2	0.6	5 Min.	5.5	6.44
B4-CB 141	0	0.00	R2	0.6	5 Min.	5.5	0.00
Total SubWatershed B-4		**5.65**					**18.68**
C2-CB 326	292,640	6.72	R2	0.6	5 Min.	5.5	22.17
C2-CB 325	137,819	3.16	R2	0.6	5 Min.	5.5	10.44
C2-CB 309	203,535	4.67	R2	0.6	5 Min.	5.5	15.42
C2/3-CB 308	27,296	0.63	R2	0.6	5 Min.	5.5	2.07
C2/3-CB 307	59,580	1.37	R2	0.6	5 Min.	5.5	4.51
C2/3-CB 306	78,552	1.80	R2	0.6	5 Min.	5.5	5.95

PROPOSED CONDITIONS WATERSHED STORMWATER RUNNOFF ANALYSIS
RATIONAL METHOD, 10 YEAR STORM EVENT

C2/3-CB 305	16,231	0.37	R2	0.6	5 Min.	5.5	1.23
C2-CB 304	110,280	2.53	R2	0.6	5 Min.	5.5	8.35
C2-CB 303B	677,732	15.56	R2	0.6	5 Min.	5.5	51.34
C2-CB 303A	16,962	0.39	R2	0.6	5 Min.	5.5	1.29
C2-MH 303	1,603,213	36.80	R2	0.6	5 Min.	5.5	121.46
C2-MH 302	0	0.00	R2	0.6	5 Min.	5.5	0.00
C2-MH 301	0	0.00	R2	0.6	5 Min.	5.5	0.00
Total SubWatershed C-2/3		**74.01**					**244.23**



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CONSULTANTS:

PROJECT NAME:

PRELIMINARY STORM SYSTEM LAYOUT

BOROUGH OF EBENSBURG
CAMBRIA COUNTY, PA

OWNER:

BOROUGH OF EBENSBURG

300 WEST HIGH STREET
EBENSBURG, PA 15931

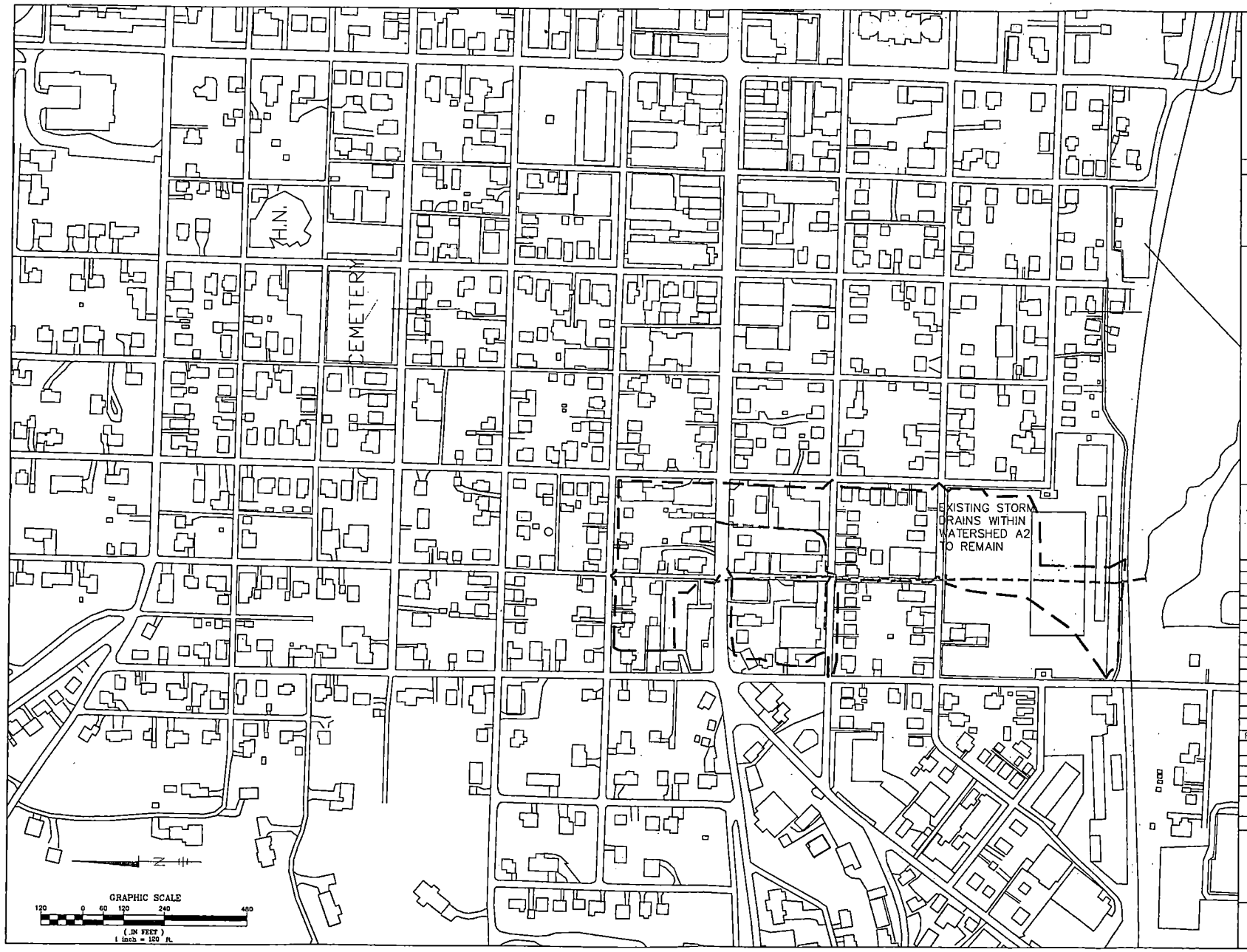
REV.	DATE	DESCRIPTION

ISSUE:	9/3/2013
PROJECT NO:	10-1300-0002
SCALE:	1"=100'
DRAWN BY:	MAK
CHECKED BY:	GLH

SHEET TITLE

WATERSHED AREA A1

A1.00



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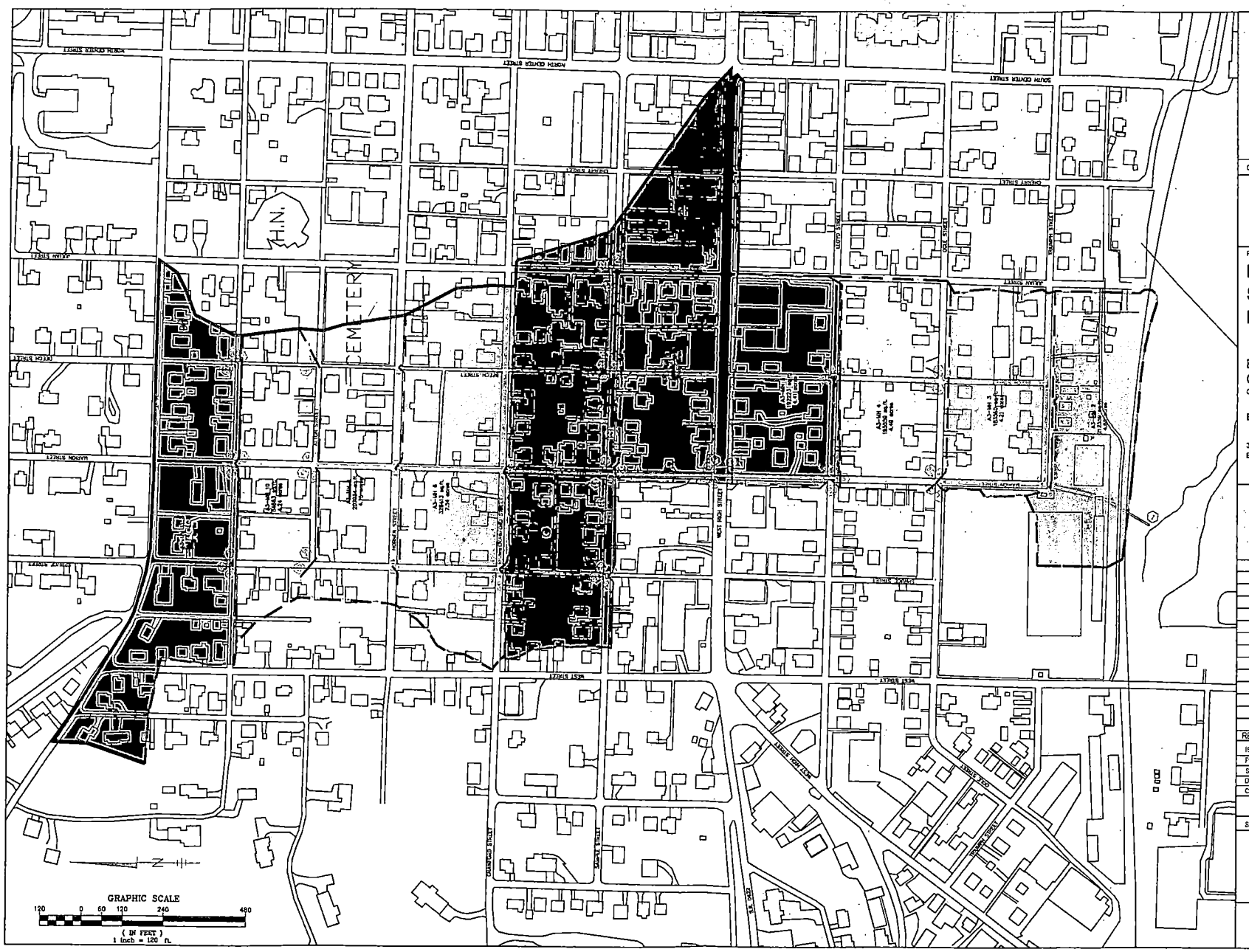
EBENSBURG, PA 15931

REV.	DATE	DESCRIPTION
ISSUE:		9/3/2013
PROJECT NO:		10-1300-0002
SCALE:		1"=50'
DRAWN BY:		MAK
CHECKED BY:		GLH

SHEET TITLE

WATERSHED AREA A2

A2.00



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BOROUGH OF EBENSBURG
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300 WEST HIGH STREET
EBENSBURG, PA 15931

REV.	DATE	DESCRIPTION

ISSUE:	9/3/2013
PROJECT NO:	10-1300-0002
SCALE:	1"=50'
DRAWN BY:	MAK
CHECKED BY:	GLH

SHEET TITLE

WATERSHED AREA A3

A3.00

ACo	=	AC (Contributing Surface Flow Between Inlets)	R2	=	Multi Family Res	=	0.60
ACb	=	AC (Bypassing Flow From Previous Inlet)	C	=	Commercial	=	0.80
ACi	=	AC (Entering Inlet)	R1	=	Sigle Family Res	=	0.60
C	=	Runoff Factor					

Project Name: Ebensburg Wathershed A1
Main Storm Sewer Design
Project Number: 10-1300-0002
Date: 6/20/2011
Calculated By: Gary L. Hoover
Revised:
Checked By:

Rainfall Region: 4
Storm Intensity: 10 year
Storm Duration: 5 minutes

Inlet Number	Cover Type		Drainage Area							Time		(I)	(Q)	Length of Pipe	Slope of Pipe	Type of Pipe	Mannings N Values	Size of Pipe	Mean Velocity	Pipe Capacity Flowing Full	Remarks
			ΔA	C	ΔACo	ΔACb	ΔACo + ΔACb	ΔACi	ΣACI	ΔT	ΣT	Rainfall Intensity	Discharge								
		(SF)	(Acres)		(Acres)	(Acres)	(Acres)	(Acres)	(Acres)	(Min)	(Min)	(In/Hr)	(CFS)	(Feet)	(Ft/Ft)			(In)	(FPS)	(CFS)	
A1-MH 10	R2	101659	2.334	0.600	1.400			1.400	1.400												
									1.400	5		5.50	7.70								
														215.50	0.0342	RCP	0.012	18	9.23	21.04	OK
A1-MH 9	R2	153305	3.519	0.600	2.112			2.112	2.112												
									3.512	5		5.50	19.31								
														240.90	0.0251	RCP	0.012	24	10.48	38.83	OK
A1-MH 8	R2	65631	1.507	0.600	0.904			0.904	0.904												
									4.416	5		5.50	24.29								
														215.50	0.0176	RCP	0.012	24	9.88	32.51	OK
A1-MH 7	R2	35524	0.816	0.600	0.489			0.489	0.489												
									4.905	5		5.50	26.98								
														233.50	0.1242	RCP	0.012	24	20.33	86.37	OK
A1-MH 41																					
A1-HW 38	R2	188001	4.316	0.600	2.590			2.590	2.590												
									2.590	5		5.50	14.24								
														64.50	0.1970	RCP	0.012	18	20.51	50.51	OK
A1-HW 37	R2								2.590												
									2.590	5		5.50	14.24								
														121.20	0.0704	RCP	0.012	18	14.26	30.19	OK
A1-HW 36	R2								2.590												
									2.590	5		5.50	14.24								
														152.10	0.0229	RCP	0.012	18	9.59	17.22	OK
A1-MH 41	R2							2.590	2.590												
						Fr A1-MH7		4.905	7.495	5		5.50	41.22								
														128.10	0.0376	RCP	0.012	24	15.09	47.52	OK
A1-MH 42	R2	307373	7.056	0.600	4.234			4.234	4.234												
									11.728	5		5.50	64.51								
														305.90	0.0798	RCP	0.012	24	22.46	69.23	OK
A1-MH 43	R2	190026	4.362	0.600	2.617			2.617	2.617												
									14.346	5		5.50	78.90								
														367.60	0.0356	RCP	0.012	30	17.45	83.84	OK
A1-MH 44	R2	619664	14.226	0.600	8.535			8.535	8.535												
									22.881	5		5.50	125.85								
														54.70	0.1178	RCP	0.012	30	30.55	152.51	OK
A1-MH 45																					

ACo	=	AC (Contributing Surface Flow Between Inlets)	RF	=	Roof	=	1.00	**Project Name:**	William Street Redevelopment Phase I		
ACb	=	AC (Bypassing Flow From Previous Inlet)	IMP	=	Impervious	=	0.90		Post-Development Storm Sewer Design		
ACI	=	AC (Entering Inlet)	URB	=	Urban	=	0.48	**Project Number:**	08-1300-0303		
C	=	Runoff Factor	GR	=	Grass	=	0.45			**Date:**	
			LW	=	Light Woods	=	0.40	**Calculated By:**	Shawn C. McDonald	12/2/2002	
Rainfall Region:		3	HW	=	Heavy Woods	=	0.30	**Revised:**			
Storm Intensity:		100 year	GV	=	Gravel	=	0.60	**Checked By:**			
Storm Duration:		5 minutes									

			Drainage Area							Time		(I)	(Q)								
Inlet Number	Cover Type		ΔA	C	ΔACo	ΔACb	ΔACo + ΔACb	ΔACI	ΣACI	ΔT	ΣT	Rainfall Intensity	Discharge	Length of Pipe	Slope of Pipe	Type of Pipe	Mannings N Values	Size of Pipe	Mean Velocity	Pipe Capacity Flowing Full	Remarks
		(SF)	(Acres)		(Acres)	(Acres)	(Acres)	(Acres)	(Acres)	(Min)	(Min)	(In/Hr)	(CFS)	(Feet)	(Ft/Ft)			(In)	(FPS)	(CFS)	
A1-MH 45	R2								22.881												
									22.881	5		5.50	125.85								
														152.50	0.0172	RCP	0.012	42	14.89	142.94	OK
A1-MH 46	C	11447	0.263	0.800	0.210			0.210	0.210												
									23.091	5		5.50	127.00								
														137.70	0.0298	RCP	0.012	42	18.13	188.15	OK
A1-MH 47	C								23.091												
									23.091	5		5.50	127.00								
A1-MH 3														151.90	0.0117	RCP	0.012	48	12.83	168.32	OK
A1-MH 6	R2	31800	0.730	0.600	0.438			0.438	0.438												
									0.438	5		5.50	2.41								
														297.70	0.1346	RCP	0.012	18	10.57	41.75	OK
A1-MH 5	C	58024	1.332	0.800	1.066			1.066	1.066												
									1.504	5		5.50	8.27								
														89.90	0.0498	RCP	0.012	18	10.76	25.39	OK
A1-MH 4	C	13067	0.300	0.800	0.240			0.240	0.240												
									1.744	5		5.50	9.59								
														251.80	0.0675	RCP	0.012	18	12.51	29.57	OK
A1-MH 3	C	60653	1.392	0.800	1.114			1.114	1.114												
						Fr A1-MH 47		22.881	25.739	5		5.50	141.56								
														320.00	0.0608	RCP	0.012	48	23.71	383.71	OK
A1-MH 11	R2	156779	3.599	0.600	2.159			2.159	2.159												
									27.898	5		5.50	153.44								
														292.30	0.0310	RCP	0.012	48	19.14	273.99	OK
A1-MH 84																					
A1-EX1,2,3,4,5	C	556042	12.765	0.800	10.212			10.212	10.212												
												Existing Pipe Network Not Calculated									
A1-MH 84																					
						Fr A1-MH 11		27.898	38.110	5		5.50	209.61								
														154.50	0.0114	RCP	0.012	54	14.53	227.46	OK
A1-MH 2	R2	139038	3.192	0.600	1.915			1.915	1.915												
									40.025	5		5.50	220.14								
														142.50	0.0118	RCP	0.012	54	14.92	231.42	OK
A1-HW1																					

ACo	=	AC (Contributing Surface Flow Between Inlets)	R2	=	Multi Family Res	=	0.60	**Project Name:**	Ebensburg Wathershed A3		
ACb	=	AC (Bypassing Flow From Previous Inlet)	C	=	Commercial	=	0.80		Main Storm Sewer Design		
ACi	=	AC (Entering Inlet)	R1	=	Sigle Family Res	=	0.60	**Project Number:**	10-1300-0002		
C	=	Runoff Factor								**Date:**	
								Calculated By:	Gary L. Hoover	6/22/2011	
Rainfall Region:		4						**Revised:**			
Storm Intensity:		10 year						**Checked By:**			
Storm Duration:		5 minutes									

			Drainage Area							Time		(I)	(Q)								
Inlet Number	Cover Type		ΔA	C	ΔACo	ΔACb	ΔACo + ΔACb	ΔACi	ΣACi	ΔT	ΣT	Rainfall Intensity	Discharge	Length of Pipe	Slope of Pipe	Type of Pipe	Mannings N Values	Size of Pipe	Mean Velocity	Pipe Capacity Flowing Full	Remarks
		(SF)	(Acres)		(Acres)	(Acres)	(Acres)	(Acres)	(Acres)	(Min)	(Min)	(In/Hr)	(CFS)	(Feet)	(Ft/Ft)			(In)	(FPS)	(CFS)	
A3-MH 11	R2	367913	8.446	0.600	5.068			5.068	5.068												
									5.068	5		5.50	27.87								
														225.40	0.0446	RCP	0.012	24	14.30	51.76	OK
A3-MH 10	R2	218032	5.005	0.600	3.003			3.003	3.003												
									8.071	5		5.50	44.39								
														240.70	0.0553	RCP	0.012	24	17.68	57.63	OK
A3-MH9	R2	260160	5.972	0.600	3.583			3.583	3.583												
									11.654	5		5.50	64.10								
														314.20	0.0751	RCP	0.012	24	21.94	67.16	OK
A3-MH8	R2	353604	8.118	0.600	4.871			4.871	4.871												
									16.525	5		5.50	90.89								
														299.10	0.0159	RCP	0.012	36	13.40	91.11	OK
A3-MH7	R2	377859	8.674	0.600	5.205			5.205	5.205												
									21.730	5		5.50	119.51								
														350.80	0.0440	RCP	0.012	36	20.81	151.57	OK
A3-MH6	C	348618	8.003	0.800	6.403			6.403	6.403												
									28.132	5		5.50	154.73								
														297.40	0.0640	RCP	0.012	36	25.62	182.80	OK
A3-MH5	C	192223	4.413	0.800	3.530			3.530	3.530												
									31.662	5		5.50	174.14								
														311.10	0.0656	RCP	0.012	36	26.76	185.07	OK
A3-MH4	R2	195559	4.489	0.600	2.694			2.694	2.694												
									34.356	5		5.50	188.96								
														281.50	0.0488	RCP	0.012	42	24.25	240.78	OK
A3-MH3	R2	183560	4.214	0.600	2.528			2.528	2.528												
									36.884	5		5.50	202.86								
														181.60	0.0347	RCP	0.012	42	21.95	203.03	OK
A3-MH2	R2	212359	4.875	0.600	2.925			2.925	2.925												
									39.809	5		5.50	218.95								
														152.10	0.1003	RCP	0.012	42	32.67	345.19	OK
A3-EW1																					

ACo	=	AC (Contributing Surface Flow Between Inlets)	R2	=	Multi Family Res	=	0.60
ACb	=	AC (Bypassing Flow From Previous Inlet)	C	=	Commercial	=	0.80
ACi	=	AC (Entering Inlet)	R1	=	Sigle Family Res	=	0.60
C	=	Runoff Factor					

Project Name: Ebensburg Wathershed A1
Main Storm Sewer Design
Project Number: 10-1300-0002
Date: 6/20/2011
Calculated By: Gary L. Hoover
Revised:
Checked By:

Rainfall Region: 4
Storm Intensity: 10 year
Storm Duration: 5 minutes

Inlet Number	Cover Type		Drainage Area							Time		(I)	(Q)	Length of Pipe	Slope of Pipe	Type of Pipe	Mannings N Values	Size of Pipe	Mean Velocity	Pipe Capacity Flowing Full	Remarks
			ΔA	C	ΔACo	ΔACb	ΔACo + ΔACb	ΔACi	ΣACi	ΔT	ΣT	Rainfall Intensity	Discharge								
		(SF)	(Acres)		(Acres)	(Acres)	(Acres)	(Acres)	(Acres)	(Min)	(Min)	(In/Hr)	(CFS)	(Feet)	(Ft/Ft)			(In)	(FPS)	(CFS)	
A4-CB 416	C	11037	0.253	0.800	0.203			0.203	0.203												
									0.203	5		5.50	1.11								
														113.20	0.1344	SLCPP	0.011	15	9.11	27.99	OK
A4-CB 415	C	13178	0.303	0.800	0.242			0.242	0.242												
									0.445	5		5.50	2.45								
														32.50	0.0727	SLCPP	0.011	15	9.32	20.58	OK
A4-MH 414	C	158475	3.638	0.800	2.910			2.910	2.910												
									3.355	5		5.50	18.45								
														80.90	0.0960	SLCPP	0.011	15	18.65	23.65	OK
A4-CB 413	C	5138	0.118	0.800	0.094			0.094	0.094												
									3.450	5		5.50	18.97								
														88.70	0.1041	SLCPP	0.011	15	19.34	24.63	OK
A4-CB 412	C	6308	0.145	0.800	0.116			0.116	0.116												
									3.565	5		5.50	19.61								
														89.90	0.0948	SLCPP	0.011	15	18.90	23.51	OK
A4-CB 411	C	12891	0.296	0.800	0.237			0.237	0.237												
									3.802	5		5.50	20.91								
														38.50	0.0760	SLCPP	0.011	15	17.81	21.05	OK
A4-MH 410	C	159298	3.657	0.800	2.926			2.926	2.926												
									6.728	5		5.50	37.00								
														70.90	0.0890	SLCPP	0.011	18	21.80	37.04	OK
A4-CB 409	R2	6193	0.142	0.600	0.085			0.085	0.085												
									6.813	5		5.50	37.47								
														95.30	0.0912	SLCPP	0.011	18	22.07	37.49	OK
A4-CB 408	R2	12101	0.278	0.600	0.167			0.167	0.167												
									6.980	5		5.50	38.39								
														99.20	0.0855	SLCPP	0.011	24	21.02	78.18	OK
A4-CB 407	R2	11434	0.262	0.600	0.157			0.157	0.157												
									7.137	5		5.50	39.25								
														33.10	0.0444	SLCPP	0.011	24	16.78	56.34	OK
A4-MH 406	R2	154350	3.543	0.600	2.126			2.126	2.126												
									9.263	5		5.50	50.95								
														122.40	0.0631	SLCPP	0.011	24	20.51	67.16	OK
A4-CB 405	R2	10325	0.237	0.600	0.142			0.142	0.142												
									9.405	5		5.50	51.73								
														136.50	0.0455	SLCPP	0.011	24	18.35	57.03	OK
A4-CB 403	R2	35222	0.809	0.600	0.485			0.485	0.485												
									9.891	5		5.50	54.40								
														18.30	0.0180	RCP	0.012	30	12.30	59.62	OK
A4-MH 402	R2	150601	3.457	0.600	2.074			2.074	2.074												
									11.965	5		5.50	65.81								
														89.70	0.0165	RCP	0.012	36	12.35	92.82	OK

ACo	=	AC (Contributing Surface Flow Between Inlets)	R2	=	Multi Family Res	=	0.60
ACb	=	AC (Bypassing Flow From Previous Inlet)	C	=	Commercial	=	0.80
ACi	=	AC (Entering Inlet)	R1	=	Sigle Family Res	=	0.60
C	=	Runoff Factor					

Project Name: Ebensburg Wathershed A1
Main Storm Sewer Design
Project Number: 10-1300-0002
Date: 6/20/2011
Calculated By: Gary L. Hoover
Revised:
Checked By:

Rainfall Region: 4
Storm Intensity: 10 year
Storm Duration: 5 minutes

Inlet Number	Cover Type		Drainage Area							Time		(I)	(Q)	Length of Pipe	Slope of Pipe	Type of Pipe	Mannings N Values	Size of Pipe	Mean Velocity	Pipe Capacity Flowing Full	Remarks
			ΔA	C	ΔACo	ΔACb	ΔACo + ΔACb	ΔACi	ΣACi	ΔT	ΣT	Rainfall Intensity	Discharge								
		(SF)	(Acres)		(Acres)	(Acres)	(Acres)	(Acres)	(Acres)	(Min)	(Min)	(In/Hr)	(CFS)	(Feet)	(Ft/Ft)			(In)	(FPS)	(CFS)	
A5-CB 513	C	3686	0.085	0.800	0.068			0.068	0.068												
									0.068	5		5.50	0.37								
														33.60	0.0660	RCP	0.012	15	4.75	17.98	OK
A5-CB 512	C	3722	0.085	0.800	0.068			0.068	0.068												
									0.136	5		5.50	0.75								
														118.10	0.0115	RCP	0.012	15	3.23	7.50	OK
A5-CB 511	C	7347	0.169	0.800	0.135			0.135	0.135												
									0.271	5		5.50	1.49								
														166.30	0.0185	RCP	0.012	15	4.68	9.52	OK
A5-CB 510	C	9904	0.227	0.800	0.182			0.182	0.182												
									0.453	5		5.50	2.49								
														150.50	0.0479	RCP	0.012	15	7.61	15.32	OK
A5-CB 509	C	9190	0.211	0.800	0.169			0.169	0.169												
									0.622	5		5.50	3.42								
														171.50	0.1048	RCP	0.012	15	11.01	22.65	OK
A5-CB 508	R2	12952	0.297	0.600	0.178			0.178	0.178												
									0.800	5		5.50	4.40								
														127.60	0.1303	RCP	0.012	15	12.81	25.26	OK
A5-CB 507	R2	9790	0.225	0.600	0.135			0.135	0.135												
									0.935	5		5.50	5.14								
														42.60	0.1321	RCP	0.012	15	13.48	25.44	OK
A5-CB 506	R2	45016	1.033	0.600	0.620			0.620	0.620												
									1.555	5		5.50	8.55								
														113.90	0.1446	RCP	0.012	15	16.17	26.61	OK
A5-CB 505	R2	9242	0.212	0.600	0.127			0.127	0.127												
									1.682	5		5.50	9.25								
														166.30	0.1395	RCP	0.012	15	16.34	26.14	OK
A5-MH 504	R2	20551	0.472	0.600	0.283			0.283	0.283												
									1.965	5		5.50	10.81								
														86.50	0.0779	RCP	0.012	15	13.92	19.53	OK
A5-MH 503	R2	101260	2.325	0.600	1.395			1.395	1.395												
									3.360	5		5.50	18.48								
														86.10	0.0700	RCP	0.012	15	15.69	18.52	OK
A5-MH 502	R2	0	0.000	0.600	0.000			0.000	0.000												
									3.360	5		5.50	18.48								
														209.80	0.0807	SLCPP	0.011	15	17.54	21.69	OK

ACo	=	AC (Contributing Surface Flow Between Inlets)	R2	=	Multi Family Res	=	0.60	**Project Name:**	Ebensburg Wathershed A1
ACb	=	AC (Bypassing Flow From Previous Inlet)	C	=	Commercial	=	0.60		Main Storm Sewer Design
ACi	=	AC (Entering Inlet)	R1	=	Sigle Family Res	=	0.60	**Project Number:**	10-1300-0002
C	=	Runoff Factor							**Date:**
								Calculated By: Gary L. Hoover	6/20/2011
Rainfall Region:		4						**Revised:**	
Storm Intensity:		10 year						**Checked By:**	
Storm Duration:		5 minutes							

Inlet Number	Cover Type		Drainage Area							Time		(I) Rainfall Intensity	(Q) Discharge	Length of Pipe	Slope of Pipe	Type of Pipe	Mannings N Values	Size of Pipe	Mean Velocity	Pipe Capacity Flowing Full	Remarks
			ΔA	C	ΔACo	ΔACb	ΔACo + ΔACb	ΔACi	ΣACi	ΔT	ΣT										
		(SF)	(Acres)		(Acres)	(Acres)	(Acres)	(Acres)	(Acres)	(Min)	(Min)	(In/Hr)	(CFS)	(Feet)	(Ft/Ft)			(In)	(FPS)	(CFS)	
B1-MH 107	R2	365105	8.382	0.600	5.029			5.029	5.029												
									5.029	5		5.50	27.66								
														311.20	0.0864	SLCPP	0.011	18	19.81	36.49	OK
B1-MH 106	R2	404854	9.294	0.600	5.577			5.577	5.577												
									10.606	5		5.50	58.33								
														181.20	0.0162	RCP	0.012	36	11.85	91.97	OK
B1-MH-105	R2	103172	2.369	0.600	1.421			1.421	1.421												
									12.027	5		5.50	66.15								
														99.90	0.0159	RCP	0.012	36	12.21	91.11	OK
B1-MH-104	R2	0	0.000	0.600	0.000			0.000	0.000												
									12.027	5		5.50	66.15								
														129.50	0.1327	RCP	0.012	36	25.83	263.22	OK
B1-MH-103	R2	0	0.000	0.600	0.000			0.000	0.000												
									12.027	5		5.50	66.15								
														139.10	0.0086	RCP	0.012	36	9.82	67.01	OK
B1-MH-102	R2	11570	0.266	0.600	0.159			0.159	0.159												
									12.186	5		5.50	67.02								
														73.70	0.0130	RCP	0.012	36	11.41	82.39	OK
B1-MH-101	R2	232893	5.346	0.600	3.208			3.208	3.208												
									15.394	5		5.50	84.67								
														40.70	0.0075	RCP	0.012	42	9.89	94.39	OK

ACo	=	AC (Contributing Surface Flow Between Inlets)	R2	=	Multi Family Res	=	0.60	**Project Name:**	Ebensburg Wathershed A1
ACb	=	AC (Bypassing Flow From Previous Inlet)	C	=	Commercial	=	0.80		Main Storm Sewer Design
ACi	=	AC (Entering Inlet)	R1	=	Sigle Family Res	=	0.60	**Project Number:**	10-1300-0002
C	=	Runoff Factor							**Date:**
								Calculated By: Gary L. Hoover	6/20/2011

Rainfall Region: 4
Storm Intensity: 10 year
Storm Duration: 5 minutes

Revised:
Checked By:

Inlet Number	Cover Type		Drainage Area							Time		(I)	(Q)	Length of Pipe	Slope of Pipe	Type of Pipe	Mannings N Values	Size of Pipe	Mean Velocity	Pipe Capacity Flowing Full	Remarks
			ΔA	C	ΔACo	ΔACb	ΔACo + ΔACb	ΔACI	ΣACI	ΔT	ΣT	Rainfall Intensity	Discharge								
		(SF)	(Acres)		(Acres)	(Acres)	(Acres)	(Acres)	(Acres)	(Min)	(Min)	(In/Hr)	(CFS)	(Feet)	(Ft/Ft)			(In)	(FPS)	(CFS)	
B2-MH 217	R2	205995	4.729	0.600	2.837			2.837	2.837												
									2.837	5		5.50	15.61								
														284.10	0.0453	SLCPP	0.011	18	13.33	26.42	OK
B2-MH 216	C	426105	9.782	0.800	7.826			7.826	7.826												
									10.663	5		5.50	58.65								
														30.50	0.1049	RCP	0.012	24	24.06	79.38	OK
B2-MH-215	R2	325529	7.473	0.600	4.484			4.484	4.484												
									15.147	5		5.50	83.31								
														280.60	0.0648	RCP	0.012	30	21.92	113.11	OK
B2-MH-214	R2	195802	4.495	0.600	2.697			2.697	2.697												
									17.844	5		5.50	98.14								
														122.50	0.0592	RCP	0.012	30	22.27	108.12	OK
B2-MH-213	R2	84742	1.945	0.600	1.167			1.167	1.167												
									19.011	5		5.50	104.56								
														307.50	0.0450	RCP	0.012	36	20.17	153.28	OK
B2-MH-212	R2	339368	7.791	0.600	4.674			4.674	4.674												
									23.686	5		5.50	130.27								
														90.60	0.0293	RCP	0.012	42	18.16	186.57	OK
B2-MH-211	R2	203365	4.669	0.600	2.801			2.801	2.801												
									26.487	5		5.50	145.68								
														289.70	0.0250	RCP	0.012	42	17.74	172.33	OK
B2-MH 210	R2	156336	3.589	0.600	2.153			2.153	2.153												
									28.640	5		5.50	157.52								
														129.70	0.0209	RCP	0.012	42	17.04	157.57	OK
B2-MH 209	C	79654	1.829	0.800	1.463			1.463	1.463												
									30.103	5		5.50	165.57								
														108.10	0.0465	RCP	0.012	42	22.94	235.03	OK
B2-MH-208	R2	0	0.000	0.600	0.000			0.000	0.000												
									30.103	5		5.50	165.57								
														249.60	0.0160	RCP	0.012	48	15.49	196.84	OK
B2-MH-207	R2	589648	13.536	0.600	8.122			8.122	8.122												
									38.225	5		5.50	210.24								
														288.20	0.0197	RCP	0.012	48	17.88	218.41	OK
B2-MH-206	R2	96567	2.217	0.600	1.330			1.330	1.330												
									39.555	5		5.50	217.55								
														142.80	0.0399	RCP	0.012	48	23.18	310.84	OK
B2-MH-205	R2	98630	2.264	0.600	1.359			1.359	1.359												
									40.914	5		5.50	225.02								
														458.30	0.0427	RCP	0.012	48	23.98	321.56	OK
B2-MH-204	R2	107186	2.461	0.600	1.476			1.476	1.476												
									42.390	5		5.50	233.14								
														419.10	0.5750	RCP	0.012	48	60.68	1180.00	OK
B2-MH-203	R2	183791	4.219	0.600	2.532			2.532	2.532												

									44.922	5		5.50	247.07								
														251.20	0.0600	RCP	0.012	48	27.79	381.17	OK
B2-MH-202	R2	117875	2.706	0.600	1.624			1.624	1.624												
									46.545	5		5.50	256.00								
														47.60	0.0707	RCP	0.012	48	29.76	413.77	OK
B2-MH-201	R2	0	0.000	0.600	0.000			0.000	0.000												
									46.545	5		5.50	256.00								
														72.70	0.0145	RCP	0.012	54	16.77	256.53	OK

ACo	=	AC (Contributing Surface Flow Between Inlets)	R2	=	Multi Family Res	=	0.60	**Project Name:**	Ebensburg Wathershed A1		
ACb	=	AC (Bypassing Flow From Previous Inlet)	C	=	Commercial	=	0.80		Main Storm Sewer Design		
ACi	=	AC (Entering Inlet)	R1	=	Sigle Family Res	=	0.60	**Project Number:**	10-1300-0002		
C	=	Runoff Factor								**Date:**	
								Calculated By:	Gary L. Hoover	6/20/2011	
Rainfall Region:		4						**Revised:**			
Storm Intensity:		10 year						**Checked By:**			
Storm Duration:		5 minutes									

			Drainage Area							Time		(I)	(Q)								
Inlet Number	Cover Type		ΔA	C	ΔACo	ΔACb	ΔACo + ΔACb	ΔACI	ΣACi	ΔT	ΣT	Rainfall Intensity	Discharge	Length of Pipe	Slope of Pipe	Type of Pipe	Mannings N Values	Size of Pipe	Mean Velocity	Pipe Capacity Flowing Full	Remarks
		(SF)	(Acres)		(Acres)	(Acres)	(Acres)	(Acres)	(Acres)	(Min)	(Min)	(In/Hr)	(CFS)	(Feet)	(Ft/Ft)			(In)	(FPS)	(CFS)	
B3-CB 171	C	8421	0.193	0.800	0.155			0.155	0.155												
									0.155	5		5.50	0.85								
														292.10	0.0707	RCP	0.012	15	6.32	18.61	OK
B3-CB 170	C	22577	0.518	0.800	0.415			0.415	0.415												
									0.569	5		5.50	3.13								
														28.50	0.1000	RCP	0.012	15	10.56	22.13	OK
B3-CB 169	R2	37551	0.862	0.600	0.517			0.517	0.517												
									1.087	5		5.50	5.98								
														295.60	0.0956	RCP	0.012	15	12.58	21.64	OK
B3-CB 168	R2	86737	1.991	0.600	1.195			1.195	1.195												
									2.281	5		5.50	12.55								
														226.10	0.0736	RCP	0.012	15	14.26	18.99	OK
B3-CB 167	R2	117126	2.689	0.600	1.613			1.613	1.613												
									3.895	5		5.50	21.42								
														242.60	0.0450	RCP	0.012	18	13.72	24.14	OK
B3-CB 166	R2	48219	1.107	0.600	0.664			0.664	0.664												
									4.559	5		5.50	25.07								
														96.20	0.0800	RCP	0.012	18	17.61	32.19	OK
B3-CB 165	C	8977	0.206	0.800	0.165			0.165	0.165												
									4.724	5		5.50	25.98								
														78.80	0.0782	RCP	0.012	18	17.65	31.82	OK
B3-CB 164	C	7977	0.183	0.800	0.147			1.613	1.613												
									6.337	5		5.50	34.85								
														92.30	0.0685	RCP	0.012	21	18.04	44.93	OK
B3-CB 163	R2	176536	4.053	0.600	2.432			2.432	2.432												
									8.769	5		5.50	48.23								
														146.00	0.0500	RCP	0.012	24	17.48	54.80	OK
B3-CB 162	C	23790	0.546	0.800	0.437			0.437	0.437												
									9.205	5		5.50	50.63								
														120.00	0.1478	RCP	0.012	24	26.01	94.22	OK
B3-CB 161	C	2189	0.050	0.800	0.040			0.040	0.040												
									9.246	5		5.50	50.85								
														120.70	0.0140	RCP	0.012	30	11.03	52.58	OK

ACo	=	AC (Contributing Surface Flow Between Inlets)	R2	=	Multi Family Res	=	0.60	**Project Name:**	Ebensburg Wathershed A1
ACb	=	AC (Bypassing Flow From Previous Inlet)	C	=	Commercial	=	0.80		Main Storm Sewer Design
ACi	=	AC (Entering Inlet)	R1	=	Sigle Family Res	=	0.60	**Project Number:**	10-1300-0002
C	=	Runoff Factor							**Date:**
								Calculated By:	Gary L. Hoover 6/20/2011
Rainfall Region:		4						**Revised:**	
Storm Intensity:		10 year						**Checked By:**	
Storm Duration:		5 minutes							

			Drainage Area							Time		(I)	(Q)								
Inlet Number	Cover Type		ΔA	C	ΔACo	ΔACb	ΔACo + ΔACb	ΔACI	ΣACI	ΔT	ΣT	Rainfall Intensity	Discharge	Length of Pipe	Slope of Pipe	Type of Pipe	Mannings N Values	Size of Pipe	Mean Velocity	Pipe Capacity Flowing Full	Remarks
		(SF)	(Acres)		(Acres)	(Acres)	(Acres)	(Acres)	(Acres)	(Min)	(Min)	(In/Hr)	(CFS)	(Feet)	(Ft/Ft)			(In)	(FPS)	(CFS)	
B4-CB 146	C	1375	0.032	0.800	0.025			0.025	0.025												
									0.025	5		5.50	0.14								
														17.10	0.0100	SLCPP	0.011	15	1.93	7.63	OK
B4-CB 145	R2	27970	0.642	0.600	0.385			0.385	0.385												
									0.411	5		5.50	2.26								
														81.80	0.0500	SLCPP	0.011	15	7.98	17.07	OK
B4-CB 144	R2	13315	0.306	0.600	0.183			0.183	0.183												
									0.594	5		5.50	3.27								
														154.20	0.0580	SLCPP	0.011	15	9.38	18.39	OK
B4-CB 143	R2	118533	2.721	0.600	1.633			1.633	1.633												
									2.227	5		5.50	12.25								
														171.90	0.0415	SLCPP	0.011	15	12.29	15.55	OK
B4-CB 142	R2	84974	1.951	0.600	1.170			1.170	1.170												
									3.397	5		5.50	18.68								
														77.10	0.1688	SLCPP	0.011	15	22.85	31.37	OK
B4-CB 141	R2	0	0.000	0.600	0.000			0.000	0.000												
									3.397	5		5.50	18.68								
														12.20	0.0050	SLCPP	0.011	24	6.24	18.90	OK

ACo	=	AC (Contributing Surface Flow Between Inlets)	R2	=	Multi Family Res	=	0.60	**Project Name:**	Ebensburg Wathershed A1
ACb	=	AC (Bypassing Flow From Previous Inlet)	C	=	Commercial	=	0.80		Main Storm Sewer Design
ACi	=	AC (Entering Inlet)	R1	=	Sigle Family Res	=	0.60	**Project Number:**	10-1300-0002
C	=	Runoff Factor							**Date:**
								Calculated By: Gary L. Hoover	6/20/2011
Rainfall Region:		4						**Revised:**	
Storm Intensity:		10 year						**Checked By:**	
Storm Duration:		5 minutes							

			Drainage Area							Time		(I)	(Q)								
Inlet Number	Cover Type		ΔA	C	ΔACo	ΔACb	ΔACo + ΔACb	ΔACi	ΣACI	ΔT	ΣT	Rainfall Intensity	Discharge	Length of Pipe	Slope of Pipe	Type of Pipe	Mannings N Values	Size of Pipe	Mean Velocity	Pipe Capacity Flowing Full	Remarks
		(SF)	(Acres)		(Acres)	(Acres)	(Acres)	(Acres)	(Acres)	(Min)	(Min)	(In/Hr)	(CFS)	(Feet)	(Ft/Ft)			(In)	(FPS)	(CFS)	
C2-CB 326	R2	292640	6.718	0.600	4.031			4.031	4.031												
									4.031	5		5.50	22.17								
														87.30	0.0725	SLCPP	0.011	18	17.45	33.43	OK
C2-CB 325	R2	137819	3.164	0.600	1.898			1.898	1.898												
									5.929	5		5.50	32.61								
														61.60	0.0100	RCP	0.012	30	8.60	44.44	OK
C2-CB 309	R2	203535	4.673	0.600	2.804			2.804	2.804												
									2.804	5		5.50	15.42								
														223.70	0.0408	SLCPP	0.011	15	13.07	15.42	OK
C2/3-CB 308	R2	27296	0.627	0.600	0.376			0.376	0.376												
									3.179	5		5.50	17.49								
														150.20	0.0604	SLCPP	0.011	15	15.58	18.76	OK
C2/3-CB 307	R2	59580	1.368	0.600	0.821			0.821	0.821												
									4.000	5		5.50	22.00								
														224.50	0.0969	SLCPP	0.011	15	19.70	23.76	OK
C2/3-CB 306	R2	78552	1.803	0.600	1.082			1.082	1.082												
									5.082	5		5.50	27.95								
														148.40	0.1016	SLCPP	0.011	18	21.04	39.57	OK

Approximate Quantity Take-Offs

Appendix B

OPINION OF PROBABLE
CONSTRUCTION COST
10/18/2013

DRAINAGE AREA A1

Item	Quantity	Unit	Unit Price	Cost
15" RCP	313	LF	$ 90.00	$ 28,170.00
15" SCLPP	994	LF	$ 48.00	$ 47,712.00
18"RPC	661	LF	$ 80.25	$ 53,045.25
18" SLCPP	323	LF	$ 53.00	$ 17,119.00
24" SLCPP	1,194	LF	$ 62.70	$ 74,863.80
30" RCP	423	LF	$ 125.00	$ 52,875.00
42" RCP	291	LF	$ 225.00	$ 65,475.00
48" RCP	764	LF	$ 305.00	$ 233,020.00
54" RCP	298	LF	$ 340.00	$ 101,320.00
Concrete Headwall	1	EA	$ 4,500.00	$ 4,500.00
Type M Inlet	4	EA	$ 1,600.00	$ 6,400.00
Type C Inlet	37	EA	$ 1,600.00	$ 59,200.00
Manhole	13	EA	$ 3,000.00	$ 39,000.00
Modified Manhole	9	EA	$ 5,000.00	$ 45,000.00
End Section	1	EA	$ 1,000.00	$ 1,000.00
Rip Rap Apron	1	EA	$ 1,500.00	$ 1,500.00
Restoration	2338	SY	$ 53.00	$ 123,914.00
			TOTAL	$ 954,114.05

OPINION OF PROBABLE
CONSTRUCTION COST
10/18/2013

DRAINAGE AREA A3

Item	Quantity	Unit	Unit Price	Cost
15" SCLPP	5,473	LF	$ 48.00	$ 262,704.00
15" RCP	110	LF	$ 90.00	$ 9,900.00
18" SLCPP	1,454	LF	$ 53.00	$ 77,062.00
24" SLCPP	315	LF	$ 62.70	$ 19,750.50
36" RCP	1,542	LF	$ 192.00	$ 296,064.00
42" RCP	334	LF	$ 225.00	$ 75,150.00
Type M Inlet	1	EA	$ 1,600.00	$ 1,600.00
Type C Inlet	87	EA	$ 1,600.00	$ 139,200.00
Manhole	8	EA	$ 3,000.00	$ 24,000.00
Modified Manhole	2	EA	$ 5,000.00	$ 10,000.00
End Section	1	EA	$ 1,000.00	$ 1,000.00
Rip Rap Apron	1	EA	$ 1,500.00	$ 1,500.00
Restoration	3755	SY	$ 53.00	$ 199,015.00
			TOTAL	$ 1,116,945.50

OPINION OF PROBABLE
CONSTRUCTION COST
10/18/2013

DRAINAGE AREA A4

Item	Quantity	Unit	Unit Price	Cost
15" SCLPP	3,047	LF	$ 48.00	$ 146,256.00
18" SLCPP	167	LF	$ 53.00	$ 8,851.00
24" SLCPP	392	LF	$ 62.70	$ 24,578.40
30" RCP	19	LF	$ 125.00	$ 2,375.00
36" RCP	90	LF	$ 192.00	$ 17,280.00
Type M Inlet	1	EA	$ 1,600.00	$ 1,600.00
Type C Inlet	60	EA	$ 1,600.00	$ 96,000.00
Manhole	4	EA	$ 3,000.00	$ 12,000.00
End Section	1	EA	$ 1,000.00	$ 1,000.00
Rip Rap Apron	1	EA	$ 1,500.00	$ 1,500.00
Restoration	1,652	SY	$ 53.00	$ 87,556.00
			TOTAL	$ 398,996.40

OPINION OF PROBABLE
CONSTRUCTION COST
9/26/2013

DRAINAGE AREA A5

Item	Quantity	Unit	Unit Price	Cost
15" SCLPP	233	LF	$ 48.00	$ 11,184.00
15" RCP	1,770	LF	$ 90.00	$ 159,300.00
Type C Inlet	19	EA	$ 1,600.00	$ 30,400.00
Manhole	3	EA	$ 3,000.00	$ 9,000.00
End Section	1	EA	$ 1,000.00	$ 1,000.00
Rip Rap Apron	1	EA	$ 1,500.00	$ 1,500.00
Restoration	890	SY	$ 53.00	$ 47,170.00
			TOTAL	$ 259,554.00

OPINION OF PROBABLE
CONSTRUCTION COST
10/18/2013

DRAINAGE AREA B1

Item	Quantity	Unit	Unit Price	Cost
15" SCLPP	1,710	LF	$ 48.00	$ 82,080.00
18" SLCPP	727	LF	$ 53.00	$ 38,531.00
36" RCP	626	LF	$ 192.00	$ 120,192.00
42" RCP	97	LF	$ 225.00	$ 21,825.00
Concrete Headwall	1	EA	$ 4,500.00	$ 4,500.00
Type M Inlet	3	EA	$ 1,600.00	$ 4,800.00
Type C Inlet	27	EA	$ 1,600.00	$ 43,200.00
Manhole	6	EA	$ 3,000.00	$ 18,000.00
Modified Manhole	1	EA	$ 5,000.00	$ 5,000.00
End Section	2	EA	$ 1,000.00	$ 2,000.00
Rip Rap Apron	2	EA	$ 1,500.00	$ 3,000.00
Restoration	1404	SY	$ 53.00	$ 74,412.00
			TOTAL	$ 417,540.00

OPINION OF PROBABLE
CONSTRUCTION COST
10/18/2013

DRAINAGE AREA B2

Item	Quantity	Unit	Unit Price	
15" SCLPP	4,843	LF	$ 48.00	$ 232,464.00
15" RCP	1,033	LF	$ 90.00	$ 92,970.00
18" SLCPP	2,052	LF	$ 53.00	$ 108,756.00
18" RCP	491	LF	$ 80.25	$ 39,402.75
24" RCP	31	LF	$ 102.50	$ 3,177.50
30" RCP	712	LF	$ 125.00	$ 89,000.00
36" RCP	91	LF	$ 192.00	$ 17,472.00
42" RCP	528	LF	$ 225.00	$ 118,800.00
48" RCP	1,857	LF	$ 305.00	$ 566,385.00
54" RCP	73	LF	$ 340.00	$ 24,820.00
Type M Inlet	16	EA	$ 1,600.00	$ 25,600.00
Type C Inlet	60	EA	$ 1,600.00	$ 96,000.00
Manhole	6	EA	$ 3,000.00	$ 18,000.00
Modified Manhole	12	EA	$ 5,000.00	$ 60,000.00
End Section	1	EA	$ 1,000.00	$ 1,000.00
Rip Rap Apron	1	EA	$ 1,500.00	$ 1,500.00
Restoration	5205	SY	$ 53.00	$ 275,865.00
			TOTAL	$ 1,771,212.25

OPINION OF PROBABLE
CONSTRUCTION COST
10/18/2013

DRAINAGE AREA B3

Item	Quantity	Unit	Unit Price	Cost
15" SCLPP	490	LF	$ 48.00	$ 23,520.00
15" RCP	843	LF	$ 90.00	$ 75,870.00
18" SLCPP	586	LF	$ 53.00	$ 31,058.00
18" RCP	418	LF	$ 80.25	$ 33,544.50
21" RCP	92	LF	$ 105.00	$ 9,660.00
24" RCP	246	LF	$ 102.50	$ 25,215.00
30" RCP	121	LF	$ 125.00	$ 15,125.00
Type M Inlet	1	EA	$ 1,600.00	$ 1,600.00
Type C Inlet	15	EA	$ 1,600.00	$ 24,000.00
Manhole	5	EA	$ 3,000.00	$ 15,000.00
Restoration	1244	SY	$ 53.00	$ 65,932.00
			TOTAL	$ 320,524.50

OPINION OF PROBABLE
CONSTRUCTION COST
10/18/2013

DRAINAGE AREA B4

Item	Quantity	Unit	Unit Cost	Cost
15" SCLPP	1,140	LF	$ 48.00	$ 54,720.00
18" SLCPP	316	LF	$ 53.00	$ 16,748.00
24" SLCPP	13	LF	$ 62.70	$ 815.10
Type M Inlet	10	EA	$ 1,600.00	$ 16,000.00
Type C Inlet	2	EA	$ 1,600.00	$ 3,200.00
End Section	1	EA	$ 1,000.00	$ 1,000.00
Rip Rap Apron	1	EA	$ 1,500.00	$ 1,500.00
Restoration	653	SY	$ 53.00	$ 34,609.00
			TOTAL	$ 128,592.10

OPINION OF PROBABLE
CONSTRUCTION COST
10/18/2013

DRAINAGE AREA C

Item	Quantity	Unit	UNIT PRICE	Cost
15" SCLPP	1,619	LF	$ 48.00	$ 77,712.00
15" RCP	921	LF	$ 90.00	$ 82,890.00
18" SLCPP	631	LF	$ 47.25	$ 29,814.75
18" RCP	18	LF	$ 80.25	$ 1,444.50
21" SLCPP	71	LF	$ 105.00	$ 7,455.00
30" RCP	62	LF	$ 125.00	$ 7,750.00
54" RCP	140	LF	$ 340.00	$ 47,600.00
Concrete Headwall	2	EA	$ 4,500.00	$ 9,000.00
Type M Inlet	19	EA	$ 1,600.00	$ 30,400.00
Type C Inlet	12	EA	$ 1,600.00	$ 19,200.00
End Section	4	EA	$ 1,000.00	$ 4,000.00
Rip Rap Apron	4	EA	$ 1,500.00	$ 6,000.00
Restoration	1580	SY	$ 53.00	$ 83,740.00
Concrete Channel	145	SY	$ 45.00	$ 6,525.00
Seed/Mulch	20,400	SF	$ 0.20	$ 4,080.00
Excavation	450	CY	$ 3.00	$ 1,350.00
New Pavement	180	SY	$ 45.00	$ 8,100.00
			TOTAL	$ 427,061.25