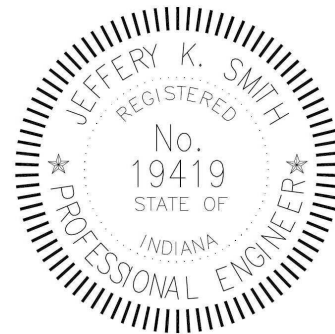


Final Drainage Report for

150 S. MAIN STREET

CONDOMINIUMS

Dated: February 8, 2022



Calculations Prepared By:

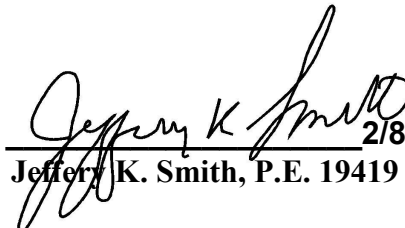
PROJECTS plus

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LAND PLANNING • ENGINEERING • SURVEYING • PROJECT MANAGEMENT

Certified By:


Jeffery K. Smith, P.E. 19419 2/8/22

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TECHNICAL INFORMATION DATA

Pre-Developed Drainage Conditions Summary:

This project, “150 S. Main Street Condominiums”, is located at 150 S. Main Street, Franklin, IN 46131 in Johnson County, Indiana. The site is located within the ‘B’ soil classifications per the Soil Survey Maps for Johnson County. The site currently has a single family dwelling on the lot.

A summary for the Pre-Development Watersheds is as follows:

Pre-Basin ‘1B’: This watershed consists of a residential dwelling with associated improvements. The drainage runoff from this watershed drains west to an adjacent parking lot and into the Offsite Pre-Basin ‘1A’ watershed.

A = 0.16 acres	CN = 70.3
Q ₂ = 0.02 cfs, Q ₁₀ = 0.08 cfs, Q ₁₀₀ = 0.22 cfs	

Pre-Basin ‘1A’: This watershed contains the runoff from Pre-Basin ‘1B’ and the existing asphalt parking lot and commercial roof tops. The entire stormwater runoff sheet drains to an existing water quality rain garden with a 6” subsurface drain that outlets via a 12” RCP storm sewer southwest to the intersection of Wayne Street and Jackson Street. This storm sewer outlets to Young’s Creek.

A = 1.32 acres	CN = 90.2
Q ₂ = 1.41 cfs, Q ₁₀ = 3.47 cfs, Q ₁₀₀ = 6.36 cfs	

Pre-Basin ‘2’: This watershed contains a residential dwelling with associated improvements. The drainage runoff from this watershed drains east to Main Street and then sheets flows south to an existing storm sewer system along Main Street and then outlets to Young’s Creek.

A = 0.08 acres	CN = 74.9
Q ₂ = 0.02 cfs, Q ₁₀ = 0.07 cfs, Q ₁₀₀ = 0.18 cfs	

Post-Developed Drainage Conditions Summary:

This proposed project will remove all of the existing improvements and construct a 7,800 square foot condominium building and associated infrastructure improvements on the lot.

A summary for the Post-Development Watersheds is as follows:

Post-Basin '1B': The runoff from the proposed improvements will be routed to a proposed underground detention storage system. The outlet flow from the underground storage system is restricted via a proposed control box and then flows thru a proposed 6" storm sewer pipe west to the existing 6" subsurface drain located in the adjacent water quality rain garden.

A = 0.24 acres	CN = 91.8
Q ₂ = 0.41 cfs, Q ₁₀ = 0.85 cfs, Q ₁₀₀ = 1.50 cfs	

Underground Detention Release	
Q ₂ = 0.07 cfs, Q ₁₀ = 0.11 cfs, Q ₁₀₀ = 0.15 cfs	
Outlet Elev. 721.90	100 yr. Elev. 724.31

Post-Basin '1A': This watershed contains the runoff from the existing asphalt parking lot and commercial roof tops. The drainage runoff sheet drains to an existing water quality rain garden.

A = 1.16 acres	CN = 91.3
Q ₂ = 1.45 cfs, Q ₁₀ = 3.35 cfs, Q ₁₀₀ = 6.07 cfs	

Combined Release: The combined runoff from Post-Basin '1B' and Post-Basin '1A' drains to the existing 12" RCP storm sewer that outlets southwest to the intersection of Wayne Street and Jackson Street. This storm sewer system outlets to Young's Creek.

Total Release	
Q ₂ = 1.49 cfs, Q ₁₀ = 3.41 cfs, Q ₁₀₀ = 6.15 cfs	

Downstream Release Summary:

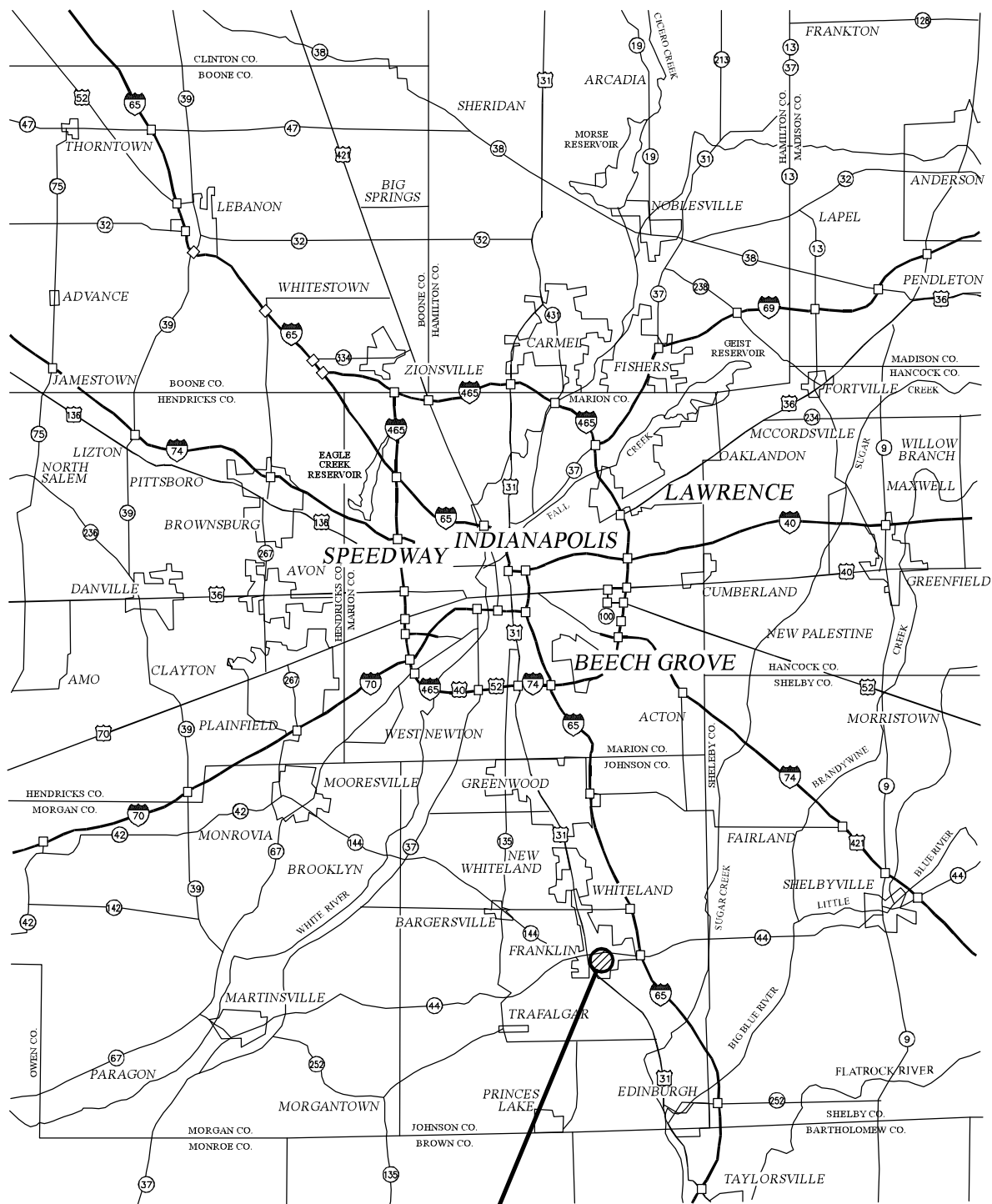
The discharge from the proposed underground detention storage area flows through a proposed 6" storm sewer that connects into an existing 6" storm sewer a water quality rain garden located in the adjacent parking lot. This existing 6" underdrain outlets to an existing 12" RCP storm sewer with a flow capacity of 7.09 cfs. The existing upstream watershed, under a 100-yr. storm event, has a flow rate of 6.36 cfs, which is 78.9% of the total pipe capacity. The runoff from this project will decrease the 100-yr. storm event flow rate to 6.15 cfs, which is 76.5% of the total pipe capacity.

Engineering Methodology:

The runoff and detention facilities were designed using the HYDRAFLOW Hydrograph Routing Module. Runoff hydrographs were developed using the "SCS Curve Number Method" and utilizing Huff Storm Distribution. Runoffs are combined for each watershed and routed through a user defined detention basin and outlet structure configuration. Water surface elevations and outlet rates are determined by the storage indication method which uses a stage/storage/discharge relationship and inflow hydrograph to set the inflow minus the outflow equal to the change in storage.

Stormwater Pollution Prevention:

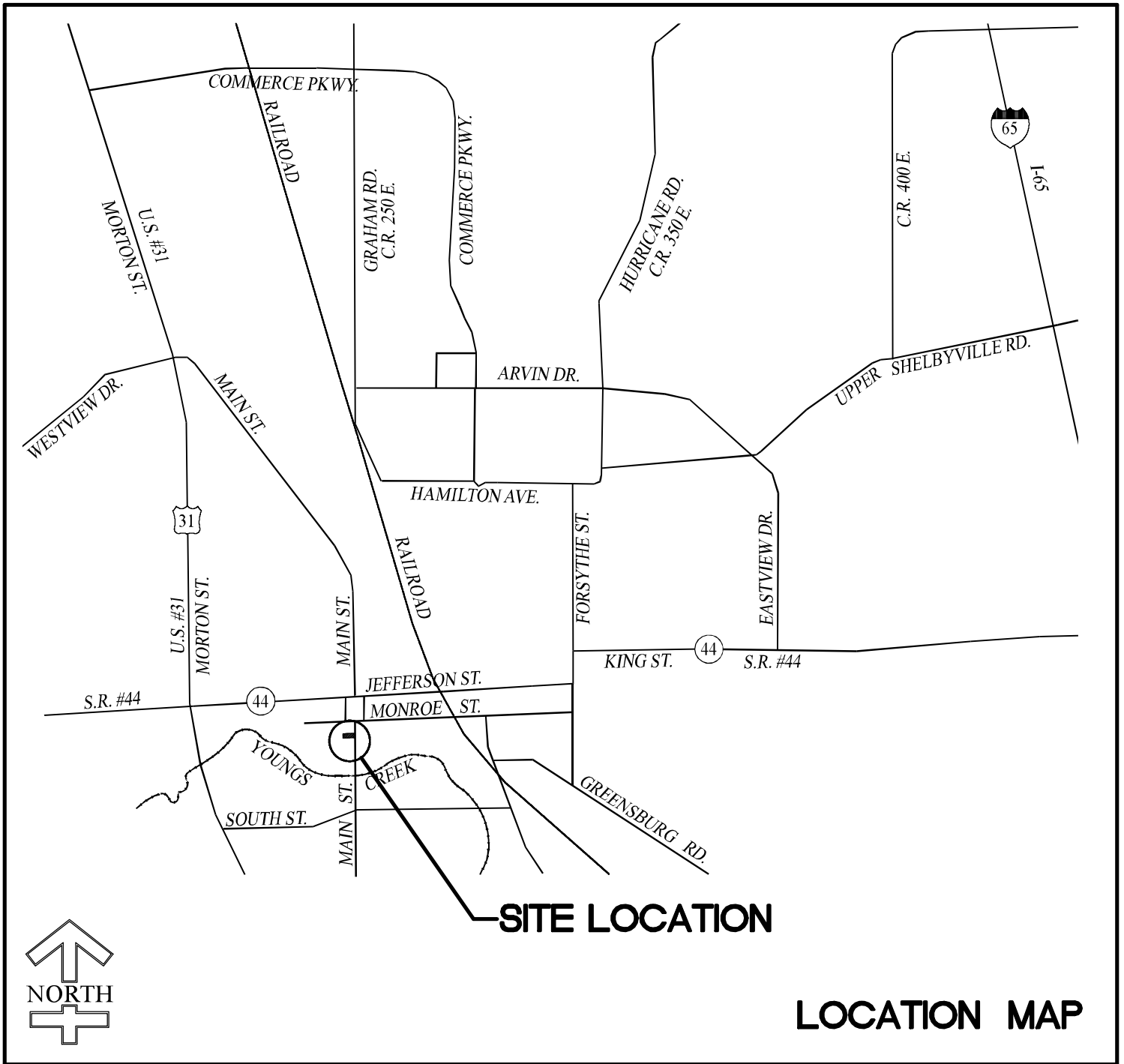
The land disturbing activities will be less than 1 acre, so a Rule 5 submittal is not required. A Stormwater Pollution Prevention Plan (SWPPP) with an activities schedule will be submitted as part of the construction plans. Standard maintenance schedules and details will be included. A perimeter filter fence will be installed where needed as well as at all ditch inlets.



SITE LOCATION

AREA MAP





National Flood Hazard Layer FIRMette



86°3'39"W 39°28'58"N

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS

- Without Base Flood Elevation (BFE)
Zone A, V, A99
- With BFE or Depth
Zone AE, AO, AH, VE, AR
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD

- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile
Zone X
- Future Conditions 1% Annual Chance Flood Hazard
Zone X
- Area with Reduced Flood Risk due to Levee. See Notes.
Zone X
- Area with Flood Risk due to Levee
Zone D

OTHER AREAS

- Area of Minimal Flood Hazard
Zone X
- Effective LOMRMs
- Area of Undetermined Flood Hazard
Zone D

GENERAL STRUCTURES

- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES

- Cross Sections with 1% Annual Chance Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS

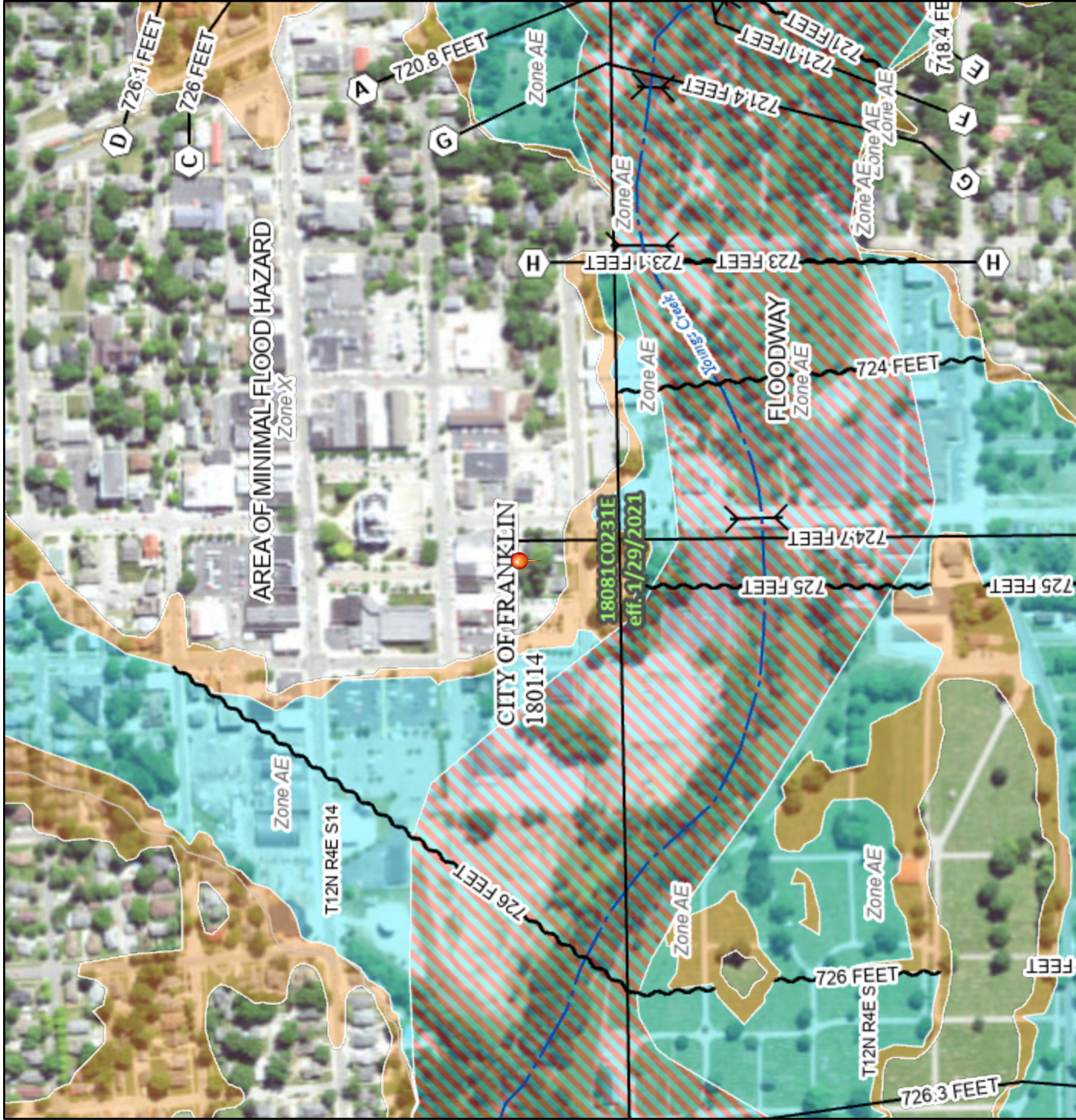
- Digital Data Available
- No Digital Data Available
- Unmapped

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards.

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 2/8/2022 at 8:34 AM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.



Search

Map Unit Legend

Johnson County, Indiana (IN081)				
Johnson County, Indiana (IN081)				
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI	
Sh	Shoals silt loam	3.0	17.0%	
YfIA	Fox loam-Urban land complex, 0 to 2 percent slopes	10.9	61.4%	
YfIB2	Fox loam-Urban land complex, 2 to 6 percent slopes, eroded	3.8	21.6%	
Totals for Area of Interest		17.7	100.0%	

Soil Map

Legend

Scale (not to scale)



Hours	Minutes	Return Period - Rainfall Intensity (in/hr)					
		2	5	10	25	50	100
0.08	5	4.75	6.14	6.99	8.08	8.83	9.69
0.17	10	3.63	4.75	5.48	6.40	7.07	7.77
0.25	15	2.97	3.92	4.55	5.34	5.94	6.53
0.5	30	1.98	2.64	3.09	3.65	4.10	4.50
1	60	1.25	1.67	1.96	2.31	2.62	2.88
2	120	0.76	1.02	1.20	1.40	1.59	1.75
3	180	0.56	0.75	0.88	1.03	1.17	1.29
6	360	0.33	0.44	0.52	0.60	0.68	0.75
12	720	0.20	0.26	0.30	0.35	0.39	0.43
24	1440	0.11	0.15	0.17	0.20	0.22	0.25

Hours	Minutes	Return Period - Rainfall Depth (in)					
		2	5	10	25	50	100
0.08	5	0.40	0.51	0.58	0.67	0.74	0.81
0.17	10	0.61	0.79	0.91	1.07	1.18	1.30
0.25	15	0.74	0.98	1.14	1.34	1.49	1.63
0.5	30	0.99	1.32	1.55	1.83	2.05	2.25
1	60	1.25	1.67	1.96	2.31	2.62	2.88
2	120	1.52	2.04	2.40	2.80	3.18	3.50
3	180	1.68	2.25	2.64	3.09	3.51	3.87
6	360	1.98	2.64	3.12	3.60	4.08	4.50
12	720	2.40	3.12	3.60	4.20	4.68	5.16
24	1440	2.64	3.60	4.08	4.80	5.28	6.00

TABLE 202-02: IDF and IDD Tables for Indianapolis, IN

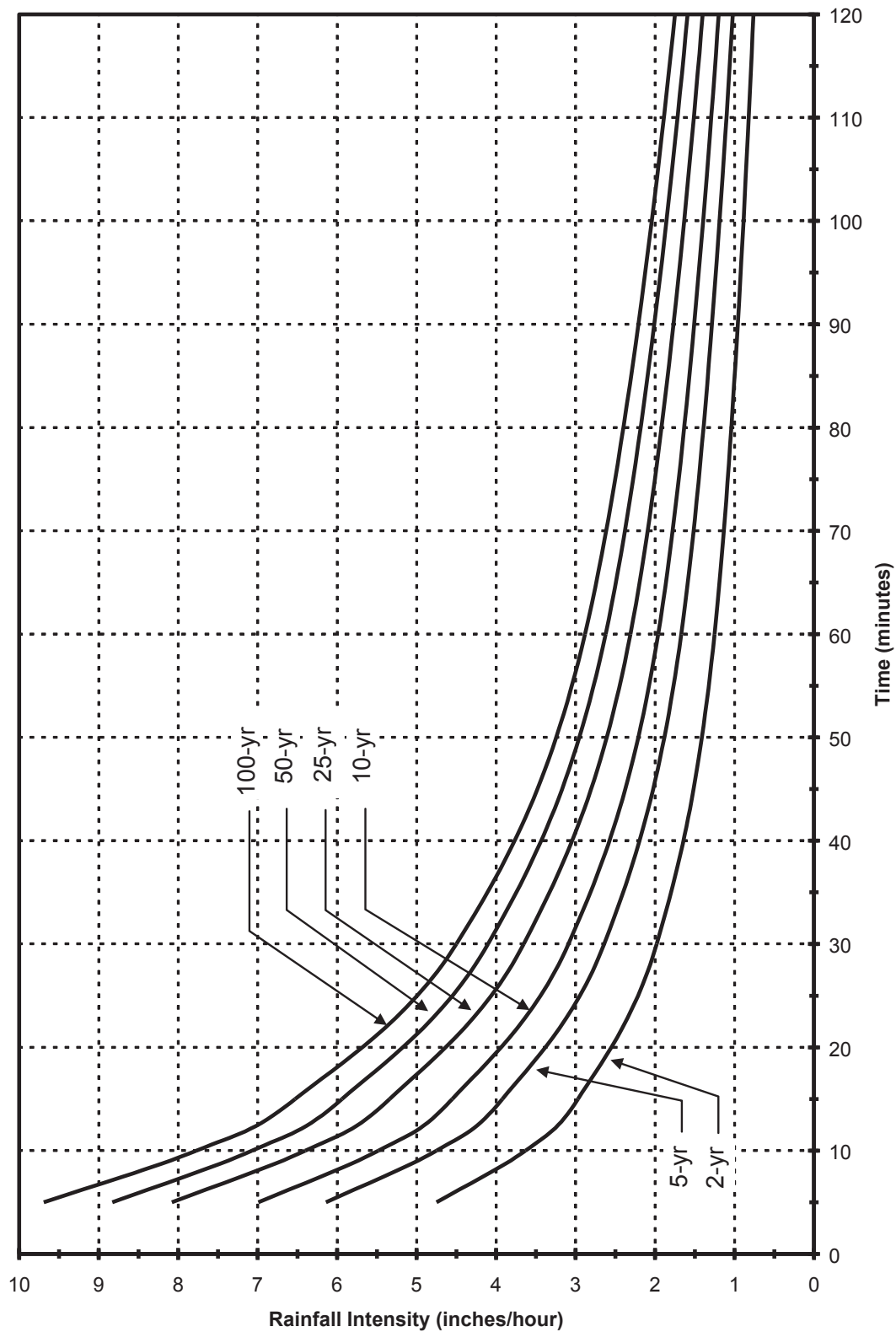


FIGURE 202-01: Indianapolis IDF Curve

<i>Cumulative storm rainfall (percent) for given storm type</i>				
<i>Cumulative storm time (percent)</i>	<i>First- quartile</i>	<i>Second- quartile</i>	<i>Third- quartile</i>	<i>Fourth- quartile</i>
5	16	3	3	2
10	33	8	6	5
15	43	12	9	8
20	52	16	12	10
25	60	22	15	13
30	66	29	19	16
35	71	39	23	19
40	75	51	27	22
45	79	62	32	25
50	82	70	38	28
55	84	76	45	32
60	86	81	57	35
65	88	85	70	39
70	90	88	79	45
75	92	91	85	51
80	94	93	89	59
85	96	95	92	72
90	97	97	95	84
95	98	98	97	92

FIGURE 202-02: Huff Rainfall Distribution
(SOURCE: Bulletin 71, "Rainfall Frequency Atlas of the Midwest", 1992)

% Storm Time	% Precipitation
0	0.0
5	2.7
10	6.5
15	11.0
20	18.1
25	26.0
30	35.9
35	44.7
40	52.9
45	61.0
50	67.9
55	72.5
60	76.5
65	80.2
70	83.8
75	87.2
80	90.7
85	93.3
90	95.9
95	97.9
100	100.0

Estimated Values in Italics

TABLE 202-03: Huff Curve Ordinates

(SOURCE: Purdue, et al, "Statistical Characteristics of Short Time Increment Rainfall")

Worksheet 3: Time of Concentration (T_C) or travel time (T_t)

Project	By	Date
Location	Checked	Date

Check one: ☐ Present ☐ Developed

Check one: ☐ T_C ☐ T_t through subarea

Notes: Space for as many as two segments per flow type can be used for each worksheet.
Include a map, schematic, or description of flow segments.

Sheet flow (Applicable to T_C only)

	Segment ID				
1. Surface description (table 3-1)					
2. Manning's roughness coefficient, n (table 3-1)					
3. Flow length, L (total L \geq 300 ft) ft					
4. Two-year 24-hour rainfall, P_2 in					
5. Land slope, s ft/ft					
6. $T_t = \frac{0.007 (nL)^{0.8}}{P_2^{0.5} s^{0.4}}$ Compute T_t hr			+		=

Shallow concentrated flow

	Segment ID				
7. Surface description (paved or unpaved)					
8. Flow length, L ft					
9. Watercourse slope, s ft/ft					
10. Average velocity, V (figure 3-1) ft/s					
11. $T_t = \frac{L}{3600 V}$ Compute T_t hr			+		=

Channel flow

	Segment ID				
12. Cross sectional flow area, a ft ²					
13. Wetted perimeter, p_w ft					
14. Hydraulic radius, $r = \frac{a}{p_w}$ Compute r ft					
15. Channel slope, s ft/ft					
16. Manning's roughness coefficient, n					
17. $V = \frac{1.49 r^{2/3} s^{1/2}}{n}$ Compute V ft/s					
18. Flow length, L ft					
19. $T_t = \frac{L}{3600 V}$ Compute T_t hr			+		=
20. Watershed or subarea T_C or T_t (add T_t in steps 6, 11, and 19) Hr					

FIGURE 203-01: Time of Concentration or Travel Time Worksheet
(SOURCE: 210-VI-TR-55, Second Ed., June 1986)

Surface Description	n
Smooth surfaces (concrete, asphalt, gravel, or bare soil)	0.011
Fallow (no residue)	0.05
Cultivated Soils:	
Residue cover $\leq 20\%$	0.06
Residue cover $> 20\%$	0.17
Grass:	
Short grass prairie	0.15
Dense grasses	0.24
Bermuda grass	0.41
Range (natural)	0.13
Woods:	
Light underbrush	0.40
Dense underbrush	0.80

TABLE 203-01: Roughness coefficients (Manning's n) for sheet flow

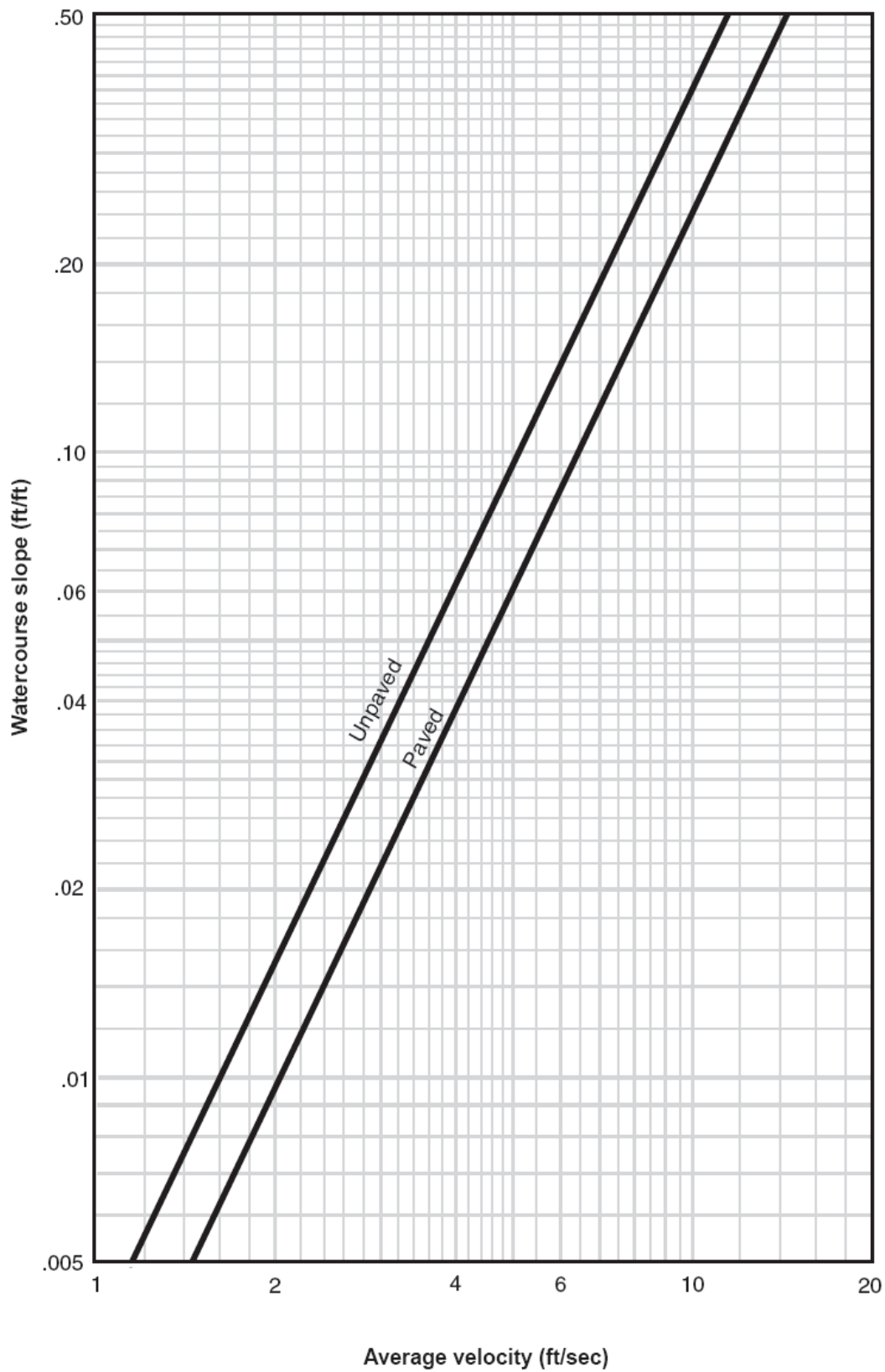


FIGURE 203-02: Average Velocities for Estimating Travel Time for Shallow Concentrated Flow
(SOURCE: 210-VI-TR-55, Second Ed., June 1986)

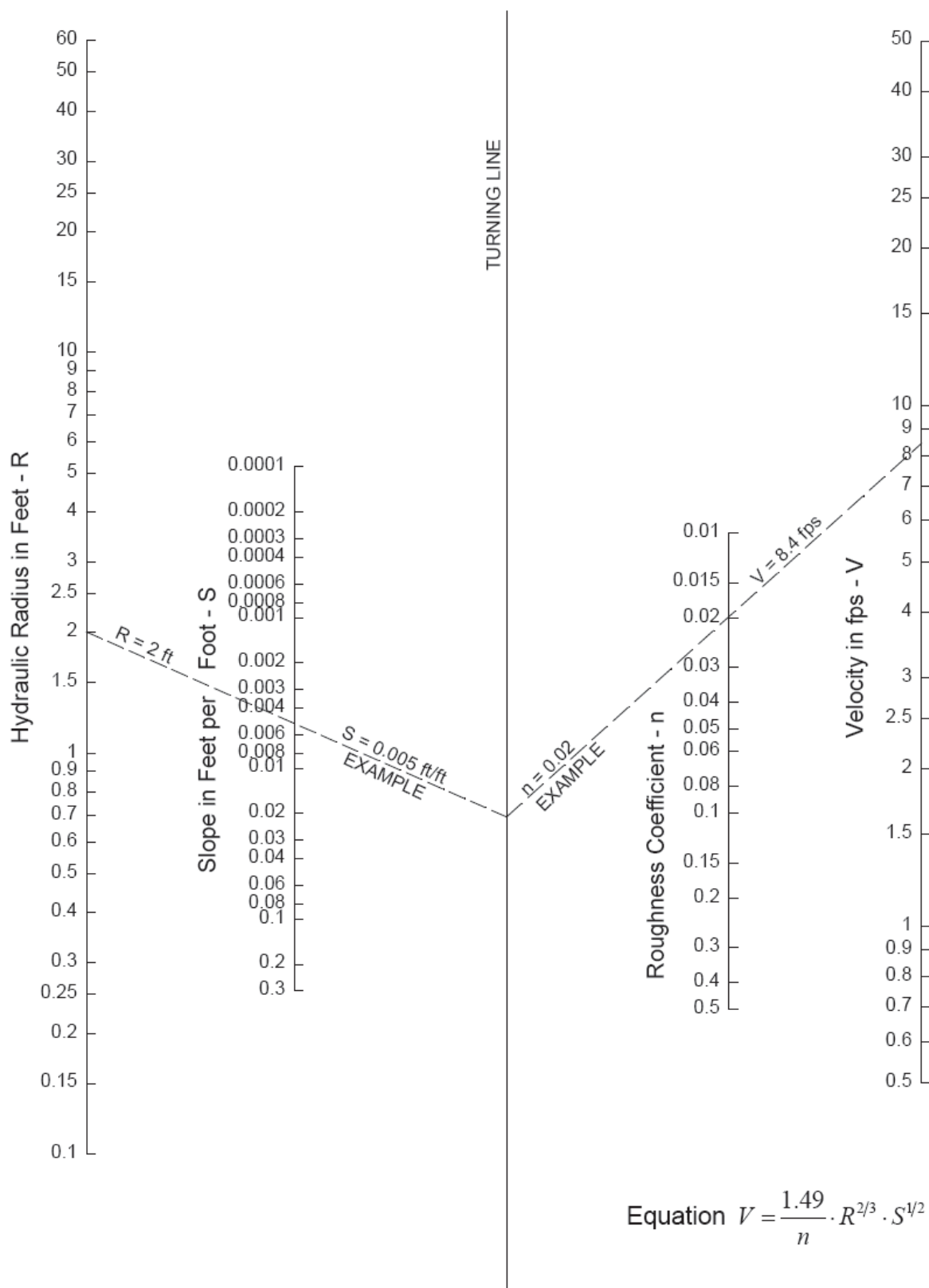


FIGURE 203-03: Nomograph for Solution of Manning Equation
(SOURCE: North Carolina Erosion & Sediment Control Planning & Design Manual, 09/01/88)

<u>TYPE OF SURFACE</u>	<u>RUNOFF COEFFICIENT ©</u>
<u>Non-Urban Areas</u>	
Bare earth	0.55
Steep grassed areas (slope 2:1)	0.60
Turf meadows	0.25
Forested areas	0.20
Cultivated fields	0.30
<u>Urban Areas</u>	
All watertight roof surfaces	0.90
Pavement	0.85
Gravel	0.85
Impervious soils (heavy)	0.55
Impervious soils (with turf)	0.45
Slightly pervious soil	0.25
Slightly pervious soil (with turf)	0.20
Moderately pervious soil	0.15
Moderately pervious soil (with turf)	0.10
Business, Commercial & Industrial	0.85
Apartments & Townhouses	0.70
Schools & Churches	0.55
Single Family Lots < 10,000 SF	0.45
Lots < 12,000 SF	0.45
Lots < 17,000 SF	0.40
Lots > ½ acre	0.35
Park, Cemetery or Unimproved Area	0.30

TABLE 204-01: Runoff Coefficients© for Use in the Rational Method

[Absence of an entry indicates the feature is not a concern. The symbol < means less than; > means greater than]

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Potential frost action
		Frequency	Duration	Months	Depth	Kind	Months	
Brookston: Br	B/D	Frequent	Brief	Dec-May	^{Ft} 0-1.0	Apparent	Dec-May	High.
Crosby: CrA	C	None			1.0-3.0	Apparent	Jan-Apr	High.
¹ CsB2: Crosby part	C	None			1.0-3.0	Apparent	Jan-Apr	High.
Miami part	B	None			>6.0			Moderate.
Eel: Ee	C	Frequent	Brief	Oct-Jun	3.0-6.0	Apparent	Jan-Apr	High.
Fox: FoA, FoB2, ¹ FxC2	B	None			>6.0			Moderate.
Genesee: Ge	B	Frequent	Brief	Oct-Jun	>6.0			Moderate.
Hennepin: HeF	B	None			>6.0			Moderate.
Martinsville: MgA, MgB2	B	None			>6.0			Moderate.
Miami: MmA, MmB2, MmC2, ¹ MxD2, MxE2	B	None			>6.0			Moderate.
Ockley: OcA, OcB2	B	None			>6.0			Moderate.
Rensselaer: Re	B/D	None			0-1.0	Apparent	Dec-May	High.
Shoals: Sh	C	Frequent	Brief	Oct-Jun	1.0-3.0	Apparent	Jan-Apr	High.
Sleeth: Sk	C	None			1.0-3.0	Apparent	Jan-Apr	High.
Sloan: Sn	B/D	Frequent	Long	Oct-Jun	0-0.5	Apparent	Nov-Jun	High.
Urban land: ¹ Ub:								
Brookston part	B/D	Frequent	Brief	Dec-May	0-1.0	Apparent	Dec-May	High.
¹ Ucl: Crosby part	C	None			1.0-3.0	Apparent	Jan-Apr	High.
¹ UfA: Fox part	B	None			>6.0			Moderate.
¹ UfC: Fox part	B	None			>6.0			Moderate.
¹ Ug: Genesee part	B	Frequent	Brief	Oct-Jun	>6.0			Moderate.
¹ UmB: Miami part	B	None			>6.0			Moderate.
¹ UmC: Miami part	B	None			>6.0			Moderate.
¹ Uw: Westland part	B/D	Frequent	Brief	Dec-May	0-1.0	Apparent	Dec-May	High.
Westland: We	B/D	Frequent	Brief	Dec-May	0-1.0	Apparent	Dec-May	High.
Whitaker: Wh	C	None			1.0-3.0	Apparent	Jan-Apr	High.

¹ This mapping unit is made up of two or more dominant kinds of soil. See mapping unit description for the composition and behavior of the whole mapping unit.

TABLE 205-01: Soil and Water Features for Marion County, Indiana
(SOURCE: NRCS, Soil Survey of Marion county, Indiana, 1991)

Cover Description	Curve Numbers for Hydrologic Soil Groups				
Cover Type and Hydrologic Condition	Average Percent Impervious Area ²	A	B	C	D
Fully developed urban areas (vegetation established)					
Open space (lawns, parks, golf courses, cemeteries, etc.) ²		68	79	86	89
Poor condition (grass cover < 50%)		49	69	79	84
Fair condition (grass cover 50% to 75%)		39	61	74	80
Good condition (grass cover > 75%)					
Impervious Areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and Roads:					
Paved; curbs and storm drains (excluding right-of-way)		98	98	98	98
Paved; open ditches (including right-of-way)		83	89	92	93
Gravel (including right-of-way)		76	85	89	91
Dirt (including right-of-way)		72	82	87	89
Urban Districts:					
Commercial and Business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential Districts by Average Lot Size:					
0.125 acre or less (townhouses)	65	77	85	90	92
0.25 acre	38	61	75	83	87
0.33 acre	30	57	72	81	86
0.50 acre	25	54	70	80	85
1.00 acre	20	51	68	79	84
2.00 acre	12	46	65	77	82
Developing Urban Areas					
Newly graded areas (pervious area only, no vegetation)		77	86	91	94
Idle lands (CN's are determined using cover types similar to those in <i>Table 205-04</i>).					

¹ Average runoff condition, and $I_a = 0.2S$

² The average percent impervious area shown was used to develop the composite CNs. Other assumptions are as follows: Impervious areas are directly connected to the drainage system, impervious areas have a CN of 98, and pervious areas are considered equivalent to open space in good hydrologic condition. If the impervious area is not connected, the NRCS method has an adjustment to reduce the effect.

³ CNs shown are equivalent to those of pasture. Composite CNs may be computed for other combinations of open space cover type.

TABLE 205-02: Runoff Curve Numbers for Urban Areas
(SOURCE: 210-VI-TR-55, Second Ed., June 1986)

Cover Description	Curve Numbers for Hydrologic Soil Groups			
Cover Type and Hydrologic Condition	A	B	C	D
Cultivated Land (Row Crops)	72	81	88	91
With conservation treatment	62	71	78	81
Without conservation treatment				
Pasture or Range Land	68	79	86	89
Poor condition	39	61	74	80
Good condition				
Meadow	30	58	71	78
Good condition				
Wood or Forest Land				
Thin stand, poor cover, no mulch	45	66	77	83
Good cover	25	55	70	77

TABLE 205-03: Runoff Curve Numbers for Undeveloped Areas
(SOURCE: 210-VI-TR-55, Second Ed., June 1986)

Cover Description	Curve Numbers for Hydrologic Soil Groups			
Cover Type and Hydrologic Condition	A	B	C	D
Pasture, grassland or range with continuous forage for grazing.				
Poor	68	79	86	89
Fair	49	69	79	84
Good	39	61	74	80
Meadow with continuous grass, protected from grazing and generally mowed for hay.	30	58	71	78
Brush/brush-weed-grass mixture with brush being the major element.				
Poor	48	67	77	83
Fair	35	56	70	77
Good	30	48	65	73
Woods and grass combination (orchard or tree farm).				
Poor	57	73	82	86
Fair	43	65	76	82
Good	32	58	72	79
Woods				
Poor	45	66	77	83
Fair	36	60	73	79
Good	30	55	70	77
Farmsteads	59	74	82	86

TABLE 205-04: Runoff Curve Numbers for Agricultural Lands
(SOURCE: 210-VI-TR-55, Second Ed., June 1986)

Pre-Developed Drainage Conditions

Runoff curve number (CN) and Time of Concentration (TC) Calculations

Project: 150 S. Main Street Condos

By: JPH

Date: 11/17/21

Circle one: ☒ Present

☐ Developed

Onsite Basin 1B

Runoff curve number (CN)

Soil Name and Hydrologic Group	Cover Description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN 1/	Area (in acres)	Product of CN x area
Br 'B'	Open Space - Established Lawns - Good Condition	61	0.11	6.7
				0.0
				0.0
				0.0
				0.0
				0.0
				0.0
				0.0
	Impervious Areas	98	0.05	4.9
		Totals=	0.16	11.61

CN (weighted) = $\frac{\text{Total Product}}{\text{Total Area}}$

CN (weighted) = $\frac{11.6}{0.2}$

CN (weighted) = **72.6**

Runoff curve number (CN) and Time of Concentration (TC) Calculations

Project: 150 S. Main Street Condos

By: JPH

Date: 11/17/21

Circle one: ☒ Present

☐ Developed

Onsite Basin 1A

Runoff curve number (CN)

Soil Name and Hydrologic Group	Cover Description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN 1/	Area (in acres)	Product of CN x area
Br 'B'	Open Space - Established Lawns - Good Condition	61	0.28	17.1
				0.0
				0.0
				0.0
				0.0
				0.0
				0.0
				0.0
	Impervious Areas	98	1.04	101.9
		Totals=	1.32	119.00

CN (weighted) = $\frac{\text{Total Product}}{\text{Total Area}}$

CN (weighted) = $\frac{119.0}{1.3}$

CN (weighted) = **90.2**

Runoff curve number (CN) and Time of Concentration (TC) Calculations

Project: 150 S. Main Street Condos

By: JPH

Date: 11/17/21

Circle one: ☒ Present

☐ Developed

Onsite Basin 2

Runoff curve number (CN)

Soil Name and Hydrologic Group	Cover Description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN 1/	Area (in acres)	Product of CN x area
Br 'B'	Open Space - Established Lawns - Good Condition	61	0.04	2.4
				0.0
				0.0
				0.0
				0.0
				0.0
				0.0
				0.0
	Impervious Areas	98	0.04	3.9
		Totals=	0.08	6.36

$$\text{CN (weighted)} = \frac{\text{Total Product}}{\text{Total Area}}$$

$$\text{CN (weighted)} = \frac{6.4}{0.1}$$

$$\text{CN (weighted)} = \mathbf{79.5}$$

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	1.41	2	10	1,443	---	----	----	Pre Onsite 1A - 0.5 hr.
2	SCS Runoff	1.25	2	16	2,249	---	----	----	Pre Onsite 1A - 1 hr.
3	SCS Runoff	1.25	2	16	2,249	---	----	----	Pre Onsite 1A - 1 hr.
4	SCS Runoff	0.01	2	26	7	---	----	----	Pre Onsite 1B - 0.5 hr.
5	SCS Runoff	0.01	2	30	31	---	----	----	Pre Onsite 1B - 1 hr.
6	SCS Runoff	0.02	2	54	70	---	----	----	Pre Onsite 1B - 2 hr.
7	SCS Runoff	0.02	2	16	20	---	----	----	Pre Onsite 2 - 0.5 hr.
8	SCS Runoff	0.02	2	22	44	---	----	----	Pre Onsite 2 - 1 hr.
9	SCS Runoff	0.02	2	32	77	---	----	----	Pre Onsite 2 - 2 hr.
21016pre1.gpw					Return Period: 2 Year			Monday, Feb 7 2022, 3:15 PM	

Hydrograph Report

Hydraflow Hydrographs by Intelisolve

Monday, Feb 7 2022, 3:17 PM

Hyd. No. 1

Pre Onsite 1A - 0.5 hr.

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.41 cfs
Storm frequency	=	2 yrs	Time interval	=	2 min
Drainage area	=	1.32 ac	Curve number	=	90.2
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	5.0 min
Total precip.	=	0.99 in	Distribution	=	Huff-1st
Storm duration	=	1 hrs	Shape factor	=	484

Hydrograph Volume = 1,443 cuft

(Printed values >= 50% of Qp.)

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

0.13	1.15
0.17	1.41 <<
0.20	1.37
0.23	1.22
0.27	1.03
0.30	0.83

...End

Hydrograph Report

Hydraflow Hydrographs by Intelisolve

Monday, Feb 7 2022, 3:17 PM

Hyd. No. 4

Pre Onsite 1B - 0.5 hr.

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.01 cfs
Storm frequency	=	2 yrs	Time interval	=	2 min
Drainage area	=	0.16 ac	Curve number	=	72.6
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	5.0 min
Total precip.	=	0.99 in	Distribution	=	Huff-1st
Storm duration	=	1 hrs	Shape factor	=	484

Hydrograph Volume = 7 cuft

(Printed values >= 50% of Qp.)

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

0.33	0.00
0.37	0.01
0.40	0.01
0.43	0.01 <<
0.47	0.01
0.50	0.01
0.53	0.01

...End

Hydrograph Report

Hydraflow Hydrographs by Intelisolve

Monday, Feb 7 2022, 3:18 PM

Hyd. No. 7

Pre Onsite 2 - 0.5 hr.

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.02 cfs
Storm frequency	=	2 yrs	Time interval	=	2 min
Drainage area	=	0.08 ac	Curve number	=	79.5
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	5.0 min
Total precip.	=	0.99 in	Distribution	=	Huff-1st
Storm duration	=	1 hrs	Shape factor	=	484

Hydrograph Volume = 20 cuft

(Printed values >= 50% of Qp.)

Hydrograph Discharge Table

Time -- Outflow
(hrs cfs)

0.20	0.01
0.23	0.02
0.27	0.02 <<
0.30	0.02
0.33	0.01
0.37	0.01
0.40	0.01
0.43	0.01
0.47	0.01
0.50	0.01
0.53	0.01

...End

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	3.47	2	10	3,298	----	-----	-----	Pre Onsite 1A - 0.5 hr.
2	SCS Runoff	2.80	2	12	4,822	----	-----	-----	Pre Onsite 1A - 1 hr.
3	SCS Runoff	2.80	2	12	4,822	----	-----	-----	Pre Onsite 1A - 1 hr.
4	SCS Runoff	0.07	2	16	75	----	-----	-----	Pre Onsite 1B - 0.5 hr.
5	SCS Runoff	0.08	2	20	159	----	-----	-----	Pre Onsite 1B - 1 hr.
6	SCS Runoff	0.07	2	32	272	----	-----	-----	Pre Onsite 1B - 2 hr.
7	SCS Runoff	0.07	2	12	80	----	-----	-----	Pre Onsite 2 - 0.5 hr.
8	SCS Runoff	0.07	2	18	140	----	-----	-----	Pre Onsite 2 - 1 hr.
9	SCS Runoff	0.06	2	30	217	----	-----	-----	Pre Onsite 2 - 2 hr.
21016pre1.gpw					Return Period: 10 Year			Monday, Feb 7 2022, 3:15 PM	

Hydrograph Report

Hydraflow Hydrographs by Intelisolve

Monday, Feb 7 2022, 3:17 PM

Hyd. No. 1

Pre Onsite 1A - 0.5 hr.

Hydrograph type	= SCS Runoff	Peak discharge	= 3.47 cfs
Storm frequency	= 10 yrs	Time interval	= 2 min
Drainage area	= 1.32 ac	Curve number	= 90.2
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.0 min
Total precip.	= 1.55 in	Distribution	= Huff-1st
Storm duration	= 1 hrs	Shape factor	= 484

Hydrograph Volume = 3,298 cuft

(Printed values >= 50% of Qp.)

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

0.10	2.29
0.13	3.22
0.17	3.47 <<
0.20	3.05
0.23	2.58
0.27	2.12

...End

Hydrograph Report

Hydraflow Hydrographs by Intelisolve

Monday, Feb 7 2022, 3:17 PM

Hyd. No. 4

Pre Onsite 1B - 0.5 hr.

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.07 cfs
Storm frequency	=	10 yrs	Time interval	=	2 min
Drainage area	=	0.16 ac	Curve number	=	72.6
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	5.0 min
Total precip.	=	1.55 in	Distribution	=	Huff-1st
Storm duration	=	1 hrs	Shape factor	=	484

Hydrograph Volume = 75 cuft

(Printed values >= 50% of Qp.)

Hydrograph Discharge Table

Time -- Outflow
(hrs cfs)

0.20	0.05
0.23	0.06
0.27	0.07 <<
0.30	0.06
0.33	0.05
0.37	0.05
0.40	0.05
0.43	0.05
0.47	0.05
0.50	0.04
0.53	0.03

...End

Hydrograph Report

Hydraflow Hydrographs by Intelisolve

Monday, Feb 7 2022, 3:18 PM

Hyd. No. 7

Pre Onsite 2 - 0.5 hr.

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.07 cfs
Storm frequency	=	10 yrs	Time interval	=	2 min
Drainage area	=	0.08 ac	Curve number	=	79.5
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	5.0 min
Total precip.	=	1.55 in	Distribution	=	Huff-1st
Storm duration	=	1 hrs	Shape factor	=	484

Hydrograph Volume = 80 cuft

(Printed values >= 50% of Qp.)

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

0.13	0.04
0.17	0.06
0.20	0.07 <<
0.23	0.07
0.27	0.06
0.30	0.05
0.33	0.04
0.37	0.04
0.40	0.04
0.43	0.04

...End

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	6.36	2	10	5,951	----	-----	-----	Pre Onsite 1A - 0.5 hr.
2	SCS Runoff	5.31	2	10	8,495	----	-----	-----	Pre Onsite 1A - 1 hr.
3	SCS Runoff	5.31	2	10	8,495	----	-----	-----	Pre Onsite 1A - 1 hr.
4	SCS Runoff	0.21	2	12	228	----	-----	-----	Pre Onsite 1B - 0.5 hr.
5	SCS Runoff	0.22	2	18	414	----	-----	-----	Pre Onsite 1B - 1 hr.
6	SCS Runoff	0.18	2	30	629	----	-----	-----	Pre Onsite 1B - 2 hr.
7	SCS Runoff	0.18	2	10	190	----	-----	-----	Pre Onsite 2 - 0.5 hr.
8	SCS Runoff	0.17	2	16	307	----	-----	-----	Pre Onsite 2 - 1 hr.
9	SCS Runoff	0.13	2	30	436	----	-----	-----	Pre Onsite 2 - 2 hr.
21016pre1.gpw					Return Period: 100 Year			Monday, Feb 7 2022, 3:15 PM	

Hydrograph Report

Hydraflow Hydrographs by Intelisolve

Monday, Feb 7 2022, 3:17 PM

Hyd. No. 1

Pre Onsite 1A - 0.5 hr.

Hydrograph type	=	SCS Runoff	Peak discharge	=	6.36 cfs
Storm frequency	=	100 yrs	Time interval	=	2 min
Drainage area	=	1.32 ac	Curve number	=	90.2
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	5.0 min
Total precip.	=	2.25 in	Distribution	=	Huff-1st
Storm duration	=	1 hrs	Shape factor	=	484

Hydrograph Volume = 5,951 cuft

(Printed values >= 50% of Qp.)

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

0.10	5.00
0.13	6.36
0.17	6.36 <<
0.20	5.32
0.23	4.37
0.27	3.54

...End

Hydrograph Report

Hydraflow Hydrographs by Intelisolve

Monday, Feb 7 2022, 3:17 PM

Hyd. No. 4

Pre Onsite 1B - 0.5 hr.

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.21 cfs
Storm frequency	=	100 yrs	Time interval	=	2 min
Drainage area	=	0.16 ac	Curve number	=	72.6
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	5.0 min
Total precip.	=	2.25 in	Distribution	=	Huff-1st
Storm duration	=	1 hrs	Shape factor	=	484

Hydrograph Volume = 228 cuft

(Printed values >= 50% of Qp.)

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

0.13	0.11
0.17	0.18
0.20	0.21 <<
0.23	0.21
0.27	0.18
0.30	0.15
0.33	0.13
0.37	0.12
0.40	0.12
0.43	0.12

...End

Hydrograph Report

Hydraflow Hydrographs by Intelisolve

Monday, Feb 7 2022, 3:18 PM

Hyd. No. 7

Pre Onsite 2 - 0.5 hr.

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.18 cfs
Storm frequency	=	100 yrs	Time interval	=	2 min
Drainage area	=	0.08 ac	Curve number	=	79.5
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	5.0 min
Total precip.	=	2.25 in	Distribution	=	Huff-1st
Storm duration	=	1 hrs	Shape factor	=	484

Hydrograph Volume = 190 cuft

(Printed values >= 50% of Qp.)

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

0.13	0.15
0.17	0.18 <<
0.20	0.18
0.23	0.16
0.27	0.14
0.30	0.11

...End

tmp#2.txt

Manning Pipe Calculator

Given Input Data:

Shape	Circular
Solving for	Flowrate
Diameter	12.0000 in
Depth	11.3000 in
Slope	0.0292 ft/ft
Manning's n	0.0120

Computed Results:

Flowrate	7.0941 cfs
Area	0.7854 ft2
Wetted Area	0.7669 ft2
Wetted Perimeter	31.8447 in
Perimeter	37.6991 in
Velocity	9.2499 fps
Hydraulic Radius	3.4681 in
Percent Full	94.1667 %
Full flow Flowrate	6.5955 cfs
Full flow velocity	8.3976 fps

Post-Developed Drainage Conditions

Runoff curve number (CN) and Time of Concentration (TC) Calculations

Project: 150 S. Main Street Condos

By: JPH

Date: 11/17/21

Circle one: Present ☒ Developed

Onsite Basin 1B

Runoff curve number (CN)

Soil Name and Hydrologic Group	Cover Description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN 1/	Area (in acres)	Product of CN x area
Br 'B'	Open Space - Established Lawns - Good Condition	61	0.04	2.4
				0.0
				0.0
				0.0
				0.0
				0.0
				0.0
				0.0
	Impervious Areas	98	0.20	19.6
		Totals=	0.24	22.04

CN (weighted) = $\frac{\text{Total Product}}{\text{Total Area}}$

CN (weighted) = $\frac{22.0}{0.2}$

CN (weighted) = **91.8**

Runoff curve number (CN) and Time of Concentration (TC) Calculations

Project: 150 S. Main Street Condos

By: JPH

Date: 11/17/21

Circle one: ☒ Present

☐ Developed

Onsite Basin 1A

Runoff curve number (CN)

Soil Name and Hydrologic Group	Cover Description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN 1/	Area (in acres)	Product of CN x area
Br 'B'	Open Space - Established Lawns - Good Condition	61	0.21	12.8
				0.0
				0.0
				0.0
				0.0
				0.0
				0.0
				0.0
	Impervious Areas	98	0.95	93.1
		Totals=	1.16	105.91

$$\text{CN (weighted)} = \frac{\text{Total Product}}{\text{Total Area}}$$

$$\text{CN (weighted)} = \frac{105.9}{1.2}$$

$$\text{CN (weighted)} = \mathbf{91.3}$$

Pond Report

Hydraflow Hydrographs by Intelisolve

Monday, Feb 7 2022, 2:48 PM

Pond No. 1 - Underground 1

Pond Data

Bottom LxW = 122.0 x 4.3 ft Side slope = 0.0:1 Bottom elev. = 721.90 ft Depth = 3.50 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	721.90	519	0	0
0.18	722.08	519	91	91
0.35	722.25	519	91	181
0.53	722.43	519	91	272
0.70	722.60	519	91	363
0.88	722.78	519	91	454
1.05	722.95	519	91	544
1.23	723.13	519	91	635
1.40	723.30	519	91	726
1.58	723.48	519	91	817
1.75	723.65	519	91	907
1.93	723.83	519	91	998
2.10	724.00	519	91	1,089
2.28	724.18	519	91	1,180
2.45	724.35	519	91	1,270
2.63	724.53	519	91	1,361
2.80	724.70	519	91	1,452
2.97	724.88	519	91	1,543
3.15	725.05	519	91	1,633
3.32	725.23	519	91	1,724
3.50	725.40	519	91	1,815

Culvert / Orifice Structures

	[A]	[B]	[C]	[D]
Rise (in)	= 6.00	2.00	0.00	0.00
Span (in)	= 6.00	2.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 721.90	721.90	0.00	0.00
Length (ft)	= 90.00	0.00	0.00	0.00
Slope (%)	= 1.00	0.00	0.00	0.00
N-Value	= .013	.013	.000	.000
Orif. Coeff.	= 0.60	0.60	0.00	0.00
Multi-Stage	= n/a	Yes	No	No

Weir Structures

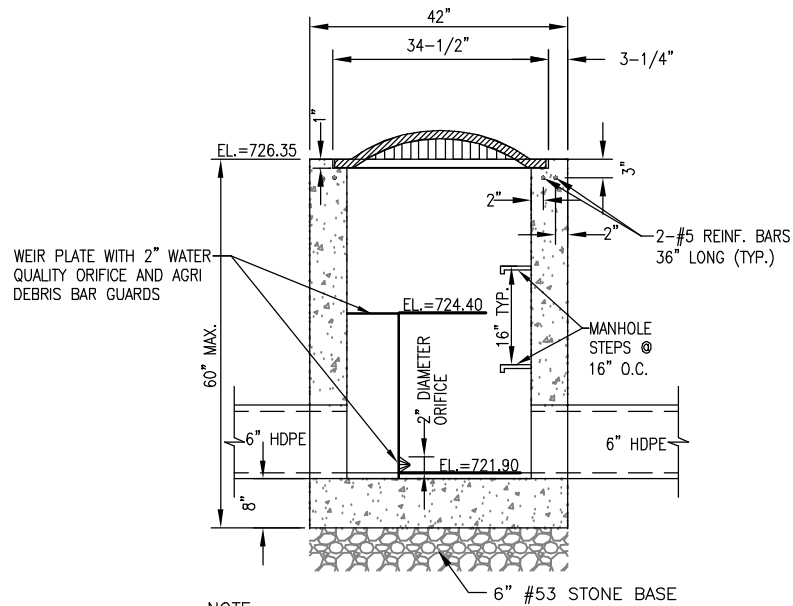
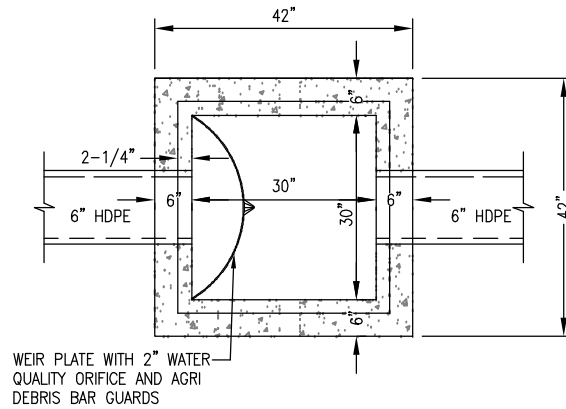
	[A]	[B]	[C]	[D]
Crest Len (ft)	= 0.00	0.00	0.00	0.00
Crest El. (ft)	= 0.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	0.00	0.00	0.00
Weir Type	= ---	---	---	---
Multi-Stage	= No	No	No	No

Exfiltration = 0.000 in/hr (Contour) Tailwater Elev. = 0.00 ft

Note: Culvert/Orifice outflows have been analyzed under inlet and outlet control.

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Total cfs
0.00	0	721.90	0.00	0.00	---	---	---	---	---	---	---	0.00
0.18	91	722.08	0.03	0.03	---	---	---	---	---	---	---	0.03
0.35	181	722.25	0.05	0.05	---	---	---	---	---	---	---	0.05
0.53	272	722.43	0.07	0.06	---	---	---	---	---	---	---	0.06
0.70	363	722.60	0.08	0.08	---	---	---	---	---	---	---	0.08
0.88	454	722.78	0.09	0.09	---	---	---	---	---	---	---	0.09
1.05	544	722.95	0.10	0.10	---	---	---	---	---	---	---	0.10
1.23	635	723.13	0.11	0.11	---	---	---	---	---	---	---	0.11
1.40	726	723.30	0.11	0.11	---	---	---	---	---	---	---	0.11
1.58	817	723.48	0.12	0.12	---	---	---	---	---	---	---	0.12
1.75	907	723.65	0.13	0.13	---	---	---	---	---	---	---	0.13
1.93	998	723.83	0.14	0.14	---	---	---	---	---	---	---	0.14
2.10	1,089	724.00	0.14	0.14	---	---	---	---	---	---	---	0.14
2.28	1,180	724.18	0.15	0.15	---	---	---	---	---	---	---	0.15
2.45	1,270	724.35	0.16	0.16	---	---	---	---	---	---	---	0.16
2.63	1,361	724.53	0.16	0.16	---	---	---	---	---	---	---	0.16
2.80	1,452	724.70	0.17	0.17	---	---	---	---	---	---	---	0.17
2.97	1,543	724.88	0.18	0.17	---	---	---	---	---	---	---	0.17
3.15	1,633	725.05	0.18	0.18	---	---	---	---	---	---	---	0.18
3.32	1,724	725.23	0.18	0.18	---	---	---	---	---	---	---	0.18
3.50	1,815	725.40	0.19	0.19	---	---	---	---	---	---	---	0.19

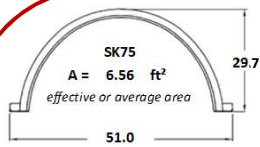


NOTE:

1. IN ACCORDANCE WITH INDIANA STATE
HIGHWAY SPECIFICATIONS.
2. MINIMUM CONCRETE COMPRESSIVE
STRENGTH 4000 P.S.I.
3. PRECAST ADJUSTING SECTIONS AVAILABLE.

Chamber System Layout & System Data

STORMKEEPER™

Storage Excavation Length, ℓ

Chambers per Row	17
Chamber Length	84.9 in
End Cap Length	10.08 in
Row Length	121.96 ft
End Cap to Trench Wall	12 in
Manifold Sidefill Width, a	0.73 ft
Manifold Width, b	4.00 ft
Storage Length, ℓ	127.68 ft

Volume Provided in Chambers, V_c

No. of Chambers	17
Storage per Chamber	46.40 ft³
No. of End Caps	2
Storage per End Cap	2.73 ft³
Chamber Storage, V_c	794 ft³

Volume Provided in Manifold, V_m

Manifold Storage, V_m	7.07 ft³
(based on mainline and stub ID's)	
Volume Taken by Manifold, V_{mb}	
Manifold Blockout, V_{mb}	10.085 ft³
(based on mainline and stub OD's)	

Total Stone Required, V_s

$$V_s = V_{exc} - (V_c + V_{mb}) = 1,969 \text{ ft}^3$$

Total Storage in Stone Voids, V_v

$$V_v = 0.4 V_s = 788 \text{ ft}^3$$

Total System Storage, V_T

$$V_T = V_c + V_m + V_v = 1,589 \text{ ft}^3$$

$$V_T = V_c + V_m + V_v = 1,585 \text{ ft}^3$$

$$\text{Volume Req'd, } V_R = 1,585 \text{ ft}^3$$

$$\text{Safety Factor, } V_T/V_R = 1.002$$

Storage Excavation Width, w

No. of Rows	1
Row Spacing (in)	6.0 in
Storage Width, w	6.25 ft

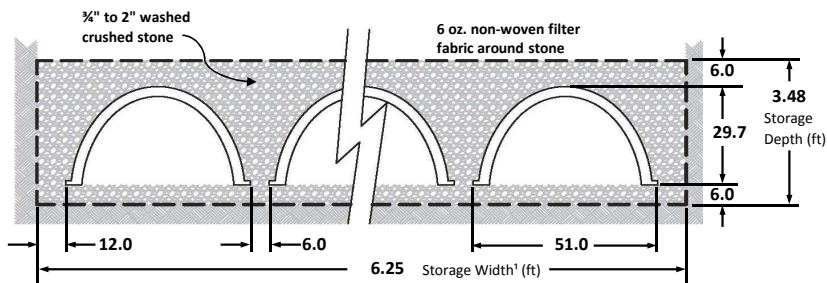
Storage Excavation Depth, d

Storage Depth, d	3.48 ft
--------------------	---------

Total Excavation Volume, V_{exc}

$$V_{exc} = w \times \ell \times d = 2,773 \text{ ft}^3$$

The schematic illustrated below maintains minimum stone embedment dimensions (chamber bedding, cover, and spacings).



All dimensions in inches unless noted otherwise.

*The system width will vary slightly depending on the manifold configuration used. Resulting changes to the storage volume will be negligible.

Project: _____

Location: _____

Engineer: _____

System Designation: _____

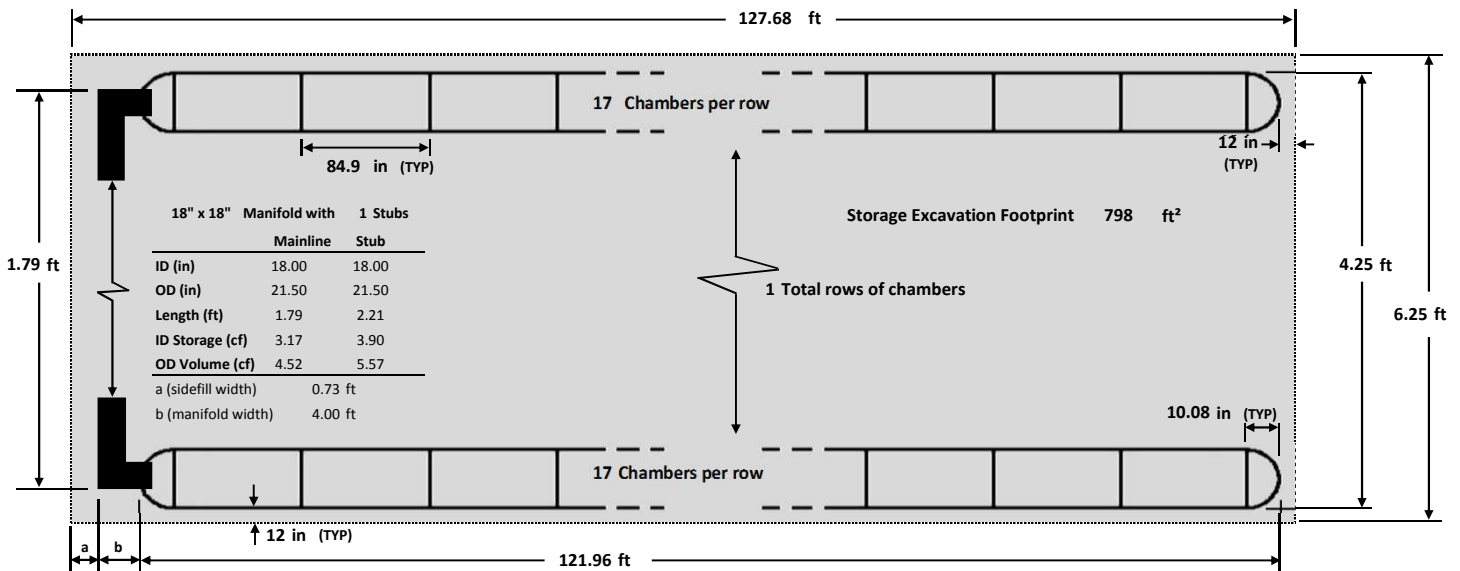
Volume Required, V_R (ft³) = **1,585**

Quantities

- 17 SK75 Chambers
- 2 SK75 Chamber End Caps
- 73 Cubic Yards of Stone
- 281 Square Yards of Fabric

Consult a Lane sales representative for manifold fitting quantities

Notes





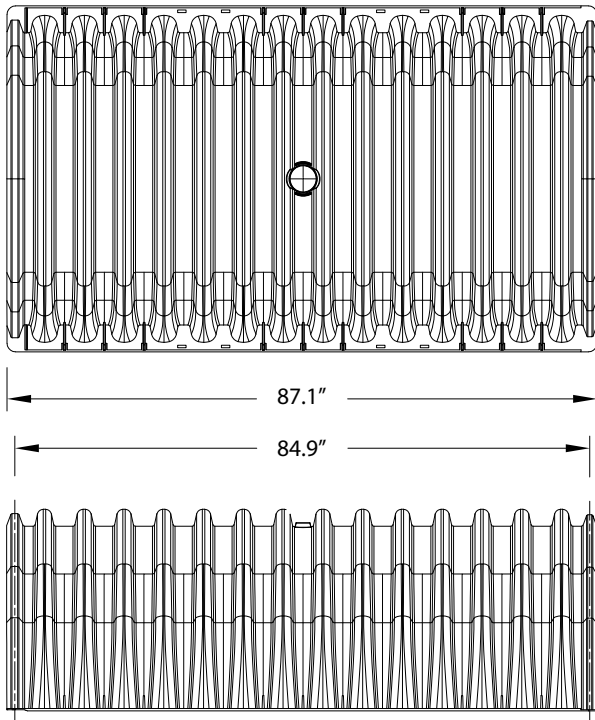
StormKeeper SK75

The StormKeeper family of products are the highest quality and structurally sound stormwater chambers available on the market and meet the full requirements of ASTM F2418. The StormKeeper family of chambers are designed utilizing the most sophisticated and comprehensive techniques to meet the stringent AASHTO LRFD and ASTM requirements. Intended for use under traffic and nontraffic areas, StormKeeper provides a truly cost-effective and structurally superior system to provide underground stormwater storage saving valuable land and protecting the environment.

StormKeeper SK75

Nominal Dimensions

Size (L x W x H)	87.1" x 51.0" x 29.7"
Chamber Storage	46.4 cf
Min. Installed Storage	74.9 cf
Weight	70 lbs



StormKeeper SK75 End Caps

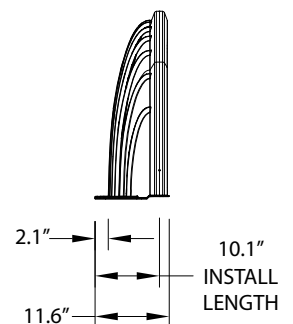
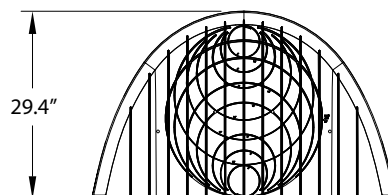
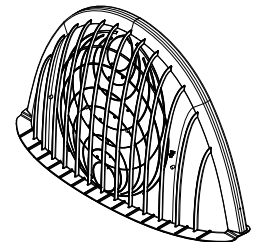
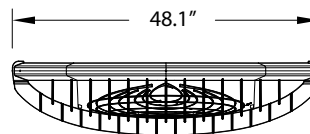
Nominal Dimensions

Size (L x W x H)	11.61" x 48.13" x 29.40"
End Cap Storage	2.73 cf
Min. Installed Storage	13.9 cf
Weight	6 lbs

Shipping

Nominal Dimensions

32 chambers per pallet
45 end caps per pallet
12 pallets per truck



StormKeeper SK75

Volume of Excation Required Per Chamber/End Cap

	Stone Bedding Depth		
	6"	12"	18"
StormKeeper SK75	5.6 cy	6.2 cy	6.8 cy
StormKeeper SK75 End Cap	1.5 cy	1.6 cy	1.8 cy

Assumes 6" of separation between chamber rows, 12" of perimeter stone in front of end caps and 18" of cover. Should depth of cover exceed 18", the volume of excavation will increase accordingly.

Storage Volume Per Chamber/End Cap

	Chamber Volume Only	Chamber and Stone Volume Bedding Depth		
		6"	12"	18"
StormKeeper SK75	46.4 cf	75 cf	81.7 cf	88.4 cf
StormKeeper SK75 End Cap	2.73 cf	13.9 cf	15.6 cf	17.4 cf

Assumes 6" stone above chambers, 6" of stone between chambers and 40% stone porosity. End cap volume assumes 12" of stone perimeter.

Amount of Stone Per Chamber/End Cap

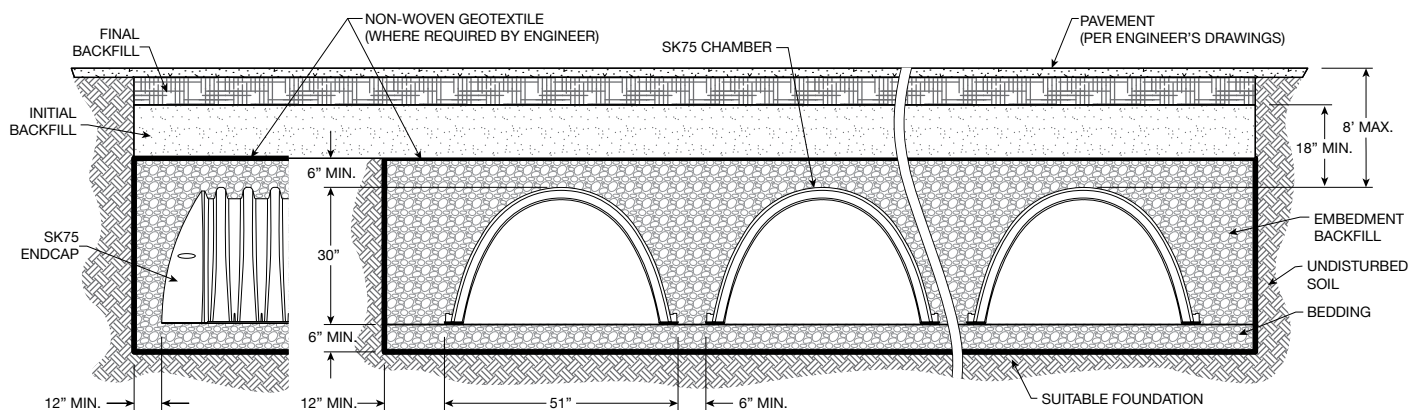
	Stone Bedding Depth		
	6"	12"	18"
StormKeeper SK75	2.6 cy	3.3 cy	3.9 cy
StormKeeper SK75 End Cap	1.0 cy	1.2 cy	1.4 cy

Assumes 6" of stone above, 6" row spacing, and 12" of perimeter stone in front of end caps.

Stage vs. Storage for StormKeeper SK75

Depth (in)	Chamber Volume (cf)	Installed Volume (cf)	Depth (in)	Chamber Volume (cf)	Installed Volume (cf)
0	0.00	0.00	22	32.03	43.86
1	0.00	1.12	23	33.69	45.98
2	0.00	2.24	24	35.30	48.07
3	0.00	3.36	25	36.85	50.12
4	0.00	4.48	26	38.33	52.12
5	0.00	5.60	27	39.74	54.09
6	0.00	6.72	28	41.07	56.01
7	2.23	9.18	29	42.31	57.87
8	4.43	11.62	30	43.45	59.68
9	6.60	14.04	31	44.46	61.40
10	8.75	16.45	32	45.32	63.04
11	10.87	18.84	33	45.93	64.52
12	12.97	21.22	34	46.23	65.83
13	15.03	23.58	35	46.36	67.02
14	17.06	25.92	36	46.36	68.14
15	19.07	28.25	37	46.36	69.26
16	21.04	30.55	38	46.36	70.38
17	22.97	32.83	39	46.36	71.50
18	24.87	35.09	40	46.36	72.62
19	26.72	37.32	41	46.36	73.74
20	28.54	39.53	42	46.36	74.86

Assumes a void of 40% in the stone. Based on 6" of stone above and below the chambers. Add another 1.12 cubic feet of storage for each inch of additional stone in the foundation.



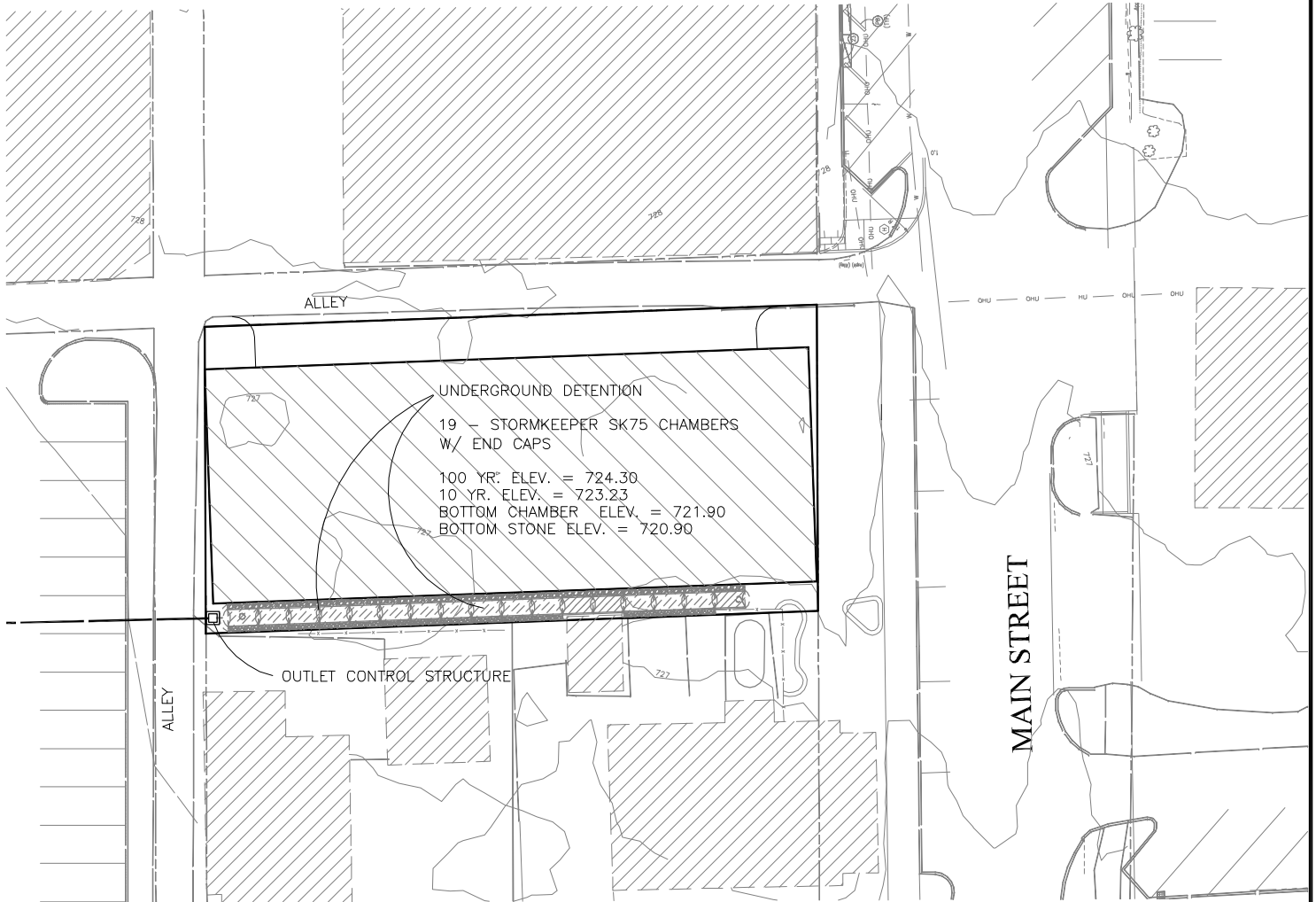
MANUFACTURER'S WARRANTY

Lane ensures, certifies and documents that SK75 StormKeeper Stormwater Chambers shipped to the job site meet the above claims and standards, and warrants the product is free of any material or workmanship defects.



Lane Enterprises, Inc.
3905 Hartzdale Drive, Suite 514
Camp Hill, PA 17011
P: 717.761.8175 • F: 717.761.5055
lane-enterprises.com/StormKeeper

150 S. MAIN STREET CONDOS



UNDERGROUND DETENTION			
STORM EVENT	2-YEAR	10-YEAR	100-YEAR
PEAK Q IN (CFS)	0.41	0.85	1.50
RELEASE (CFS)	0.07	0.11	0.15
STAGE (FT)	722.49	773.23	724.30
VOLUME (CFT)	308	689	1244
DESCRIPTION			
MANUFACTURER/TYPE	LANE STORMKEEPER SK75 CHAMBERS		
OVERALL PLAN DIMENSIONS	128'L X 6'W X 4.45'H		
MATERIAL	POLYPROPYLENE		
DIA. OR DEPTH OF CHAMBERS	29.7" H		
TOTAL VOLUME	1585 -CFT		
INVERT ELEVATION:	720.90-STONE / 721.90-CHAMBERS		
MINIMUM COVER	18-INCHES		
APPLICATION	UNDER EARTHEN SWALE		
GROUND INFILTRATION	NONE - WATER TIGHT SYSTEM		



SCALE 1" = 40'

PROJECTS *plus*

GREENWOOD SURVEYING COMPANY

SITE ENGINEERING-LAND SURVEYING-CONSTRUCTION LAYOUT
1257 Airport Parkway Suite A - Greenwood, Indiana 46143
(317)-882-5003

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	0.41	2	10	391	----	-----	-----	Post Onsite 1B - 0.5 hr.
2	SCS Runoff	0.27	2	14	477	----	-----	-----	Post Onsite 1B - 1 hr.
3	SCS Runoff	0.20	2	14	657	----	-----	-----	Post Onsite 1B - 2 hr.
4	SCS Runoff	0.18	2	20	769	----	-----	-----	Post Onsite 1B - 3 hr.
5	SCS Runoff	0.13	2	36	984	----	-----	-----	Post Onsite 1B - 6 hr.
6	SCS Runoff	0.09	2	288	1,294	----	-----	-----	Post Onsite 1B - 12 hr.
7	SCS Runoff	0.06	2	936	1,475	----	-----	-----	Post Onsite 1B - 24 hr.
8	Reservoir	0.07	2	32	378	1	722.47	296	Thru Pond 1 - 0.5 hr.
9	Reservoir	0.07	2	54	464	2	722.46	292	Thru Pond 1 - 1 hr.
10	Reservoir	0.07	2	64	645	3	722.49	308	Thru Pond 1 - 2 hr.
11	Reservoir	0.07	2	86	756	4	722.48	303	Thru Pond 1 - 3 hr.
12	Reservoir	0.06	2	114	971	5	722.41	263	Thru Pond 1 - 6 hr.
13	Reservoir	0.06	2	330	1,281	6	722.40	259	Thru Pond 1 - 12 hr.
14	Reservoir	0.05	2	940	1,462	7	722.25	181	Thru Pond 1 - 24 hr.
15	SCS Runoff	1.45	2	10	1,440	----	-----	-----	Post Onsite 1A - 0.5 hr.
16	SCS Runoff	1.23	2	16	2,198	----	-----	-----	Post Onsite 1A - 1 hr.
17	SCS Runoff	0.88	2	26	3,053	----	-----	-----	Post Onsite 1A - 2 hr.
18	SCS Runoff	0.80	2	20	3,585	----	-----	-----	Post Onsite 1A - 3 hr.
19	SCS Runoff	0.61	2	36	4,608	----	-----	-----	Post Onsite 1A - 6 hr.
20	SCS Runoff	0.40	2	288	6,094	----	-----	-----	Post Onsite 1A - 12 hr.
21	SCS Runoff	0.27	2	936	6,961	----	-----	-----	Post Onsite 1A - 24 hr.
22	Combine	1.49	2	10	1,818	8, 15,	-----	-----	Total to 12 rcp- 0.5 hr.
23	Combine	1.27	2	16	2,662	9, 16,	-----	-----	Total to 12 rcp- 1 hr.
24	Combine	0.93	2	26	3,698	10, 17,	-----	-----	Total to 12 rcp- 2 hr.
25	Combine	0.82	2	20	4,341	11, 18,	-----	-----	Total to 12 rcp- 3 hr.
26	Combine	0.64	2	36	5,579	12, 19,	-----	-----	Total to 12 rcp- 6 hr.
27	Combine	0.46	2	324	7,375	13, 20,	-----	-----	Total to 12 rcp- 12 hr.
28	Combine	0.32	2	936	8,424	14, 21,	-----	-----	Total to 12 rcp- 24 hr.
21016post2.gpw					Return Period: 2 Year			Monday, Feb 7 2022, 3:19 PM	

Hydrograph Report

Hydraflow Hydrographs by Intelisolve

Monday, Feb 7 2022, 3:20 PM

Hyd. No. 1

Post Onsite 1B - 0.5 hr.

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.41 cfs
Storm frequency	=	2 yrs	Time interval	=	2 min
Drainage area	=	0.24 ac	Curve number	=	93.7
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	5.0 min
Total precip.	=	0.99 in	Distribution	=	Huff-1st
Storm duration	=	1 hrs	Shape factor	=	484

Hydrograph Volume = 391 cuft

(Printed values >= 50% of Qp.)

Hydrograph Discharge Table

Time -- Outflow

(hrs	cfs)
0.10	0.28
0.13	0.39
0.17	0.41 <<
0.20	0.36
0.23	0.30
0.27	0.25

...End

Hydrograph Report

Hydraflow Hydrographs by Intelisolve

Monday, Feb 7 2022, 3:21 PM

Hyd. No. 10

Thru Pond 1 - 2 hr.

Hydrograph type = Reservoir
Storm frequency = 2 yrs
Inflow hyd. No. = 3
Max. Elevation = 722.49 ft

Peak discharge = 0.07 cfs
Time interval = 2 min
Reservoir name = Underground 1
Max. Storage = 308 cuft

Storage Indication method used.

Outflow hydrograph volume = 645 cuft

(Printed values >= 90% of Qp.)

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
0.70	0.13	722.41	0.07	0.06	----	----	----	----	----	----	----	0.06
0.73	0.12	722.42	0.07	0.06	----	----	----	----	----	----	----	0.06
0.77	0.11	722.44	0.07	0.07	----	----	----	----	----	----	----	0.07
0.80	0.11	722.45	0.07	0.07	----	----	----	----	----	----	----	0.07
0.83	0.11	722.46	0.07	0.07	----	----	----	----	----	----	----	0.07
0.87	0.11	722.46	0.07	0.07	----	----	----	----	----	----	----	0.07
0.90	0.11	722.47	0.07	0.07	----	----	----	----	----	----	----	0.07
0.93	0.10	722.48	0.07	0.07	----	----	----	----	----	----	----	0.07
0.97	0.09	722.49	0.07	0.07	----	----	----	----	----	----	----	0.07
1.00	0.08	722.49	0.07	0.07	----	----	----	----	----	----	----	0.07
1.03	0.08	722.49	0.07	0.07	----	----	----	----	----	----	----	0.07
1.07	0.07	722.49	0.07	0.07	----	----	----	----	----	----	----	0.07 <<
1.10	0.06	722.49	0.07	0.07	----	----	----	----	----	----	----	0.07
1.13	0.05	722.49	0.07	0.07	----	----	----	----	----	----	----	0.07
1.17	0.06	722.49	0.07	0.07	----	----	----	----	----	----	----	0.07
1.20	0.06	722.48	0.07	0.07	----	----	----	----	----	----	----	0.07
1.23	0.06	722.48	0.07	0.07	----	----	----	----	----	----	----	0.07
1.27	0.06	722.48	0.07	0.07	----	----	----	----	----	----	----	0.07
1.30	0.06	722.47	0.07	0.07	----	----	----	----	----	----	----	0.07
1.33	0.06	722.47	0.07	0.07	----	----	----	----	----	----	----	0.07
1.37	0.06	722.47	0.07	0.07	----	----	----	----	----	----	----	0.07
1.40	0.06	722.47	0.07	0.07	----	----	----	----	----	----	----	0.07
1.43	0.06	722.46	0.07	0.07	----	----	----	----	----	----	----	0.07
1.47	0.06	722.46	0.07	0.07	----	----	----	----	----	----	----	0.07
1.50	0.06	722.46	0.07	0.07	----	----	----	----	----	----	----	0.07
1.53	0.06	722.46	0.07	0.07	----	----	----	----	----	----	----	0.07
1.57	0.06	722.45	0.07	0.07	----	----	----	----	----	----	----	0.07
1.60	0.06	722.45	0.07	0.07	----	----	----	----	----	----	----	0.07
1.63	0.06	722.45	0.07	0.07	----	----	----	----	----	----	----	0.07
1.67	0.06	722.45	0.07	0.07	----	----	----	----	----	----	----	0.07
1.70	0.06	722.45	0.07	0.07	----	----	----	----	----	----	----	0.07
1.73	0.05	722.44	0.07	0.07	----	----	----	----	----	----	----	0.07
1.77	0.04	722.44	0.07	0.07	----	----	----	----	----	----	----	0.07
1.80	0.03	722.43	0.07	0.06	----	----	----	----	----	----	----	0.06
1.83	0.03	722.42	0.07	0.06	----	----	----	----	----	----	----	0.06
1.87	0.03	722.42	0.07	0.06	----	----	----	----	----	----	----	0.06
1.90	0.03	722.41	0.07	0.06	----	----	----	----	----	----	----	0.06

...End

Hydrograph Report

Hydraflow Hydrographs by Intelisolve

Monday, Feb 7 2022, 3:22 PM

Hyd. No. 15

Post Onsite 1A - 0.5 hr.

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.45 cfs
Storm frequency	=	2 yrs	Time interval	=	2 min
Drainage area	=	1.16 ac	Curve number	=	91.3
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	5.0 min
Total precip.	=	0.99 in	Distribution	=	Huff-1st
Storm duration	=	1 hrs	Shape factor	=	484

Hydrograph Volume = 1,440 cuft

(Printed values >= 50% of Qp.)

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

0.10	0.77
0.13	1.24
0.17	1.45 <<
0.20	1.36
0.23	1.19
0.27	1.00
0.30	0.80

...End

Hydrograph Report

Hydraflow Hydrographs by Intelisolve

Monday, Feb 7 2022, 3:23 PM

Hyd. No. 22

Total to 12 rcp- 0.5 hr.

Hydrograph type = Combine
Storm frequency = 2 yrs
Inflow hyds. = 8, 15

Peak discharge = 1.49 cfs
Time interval = 2 min

Hydrograph Volume = 1,818 cuft

(Printed values >= 90% of Qp.)

Hydrograph Discharge Table

Time (hrs)	Hyd. 8 + (cfs)	Hyd. 15 + (cfs)	Outflow (cfs)
0.17	0.04	1.45 <<	1.49 <<
0.20	0.04	1.36	1.41

...End

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	0.85	2	8	784	----	-----	-----	Post Onsite 1B - 0.5 hr.
2	SCS Runoff	0.58	2	12	969	----	-----	-----	Post Onsite 1B - 1 hr.
3	SCS Runoff	0.48	2	14	1,294	----	-----	-----	Post Onsite 1B - 2 hr.
4	SCS Runoff	0.40	2	18	1,475	----	-----	-----	Post Onsite 1B - 3 hr.
5	SCS Runoff	0.28	2	36	1,843	----	-----	-----	Post Onsite 1B - 6 hr.
6	SCS Runoff	0.14	2	288	2,216	----	-----	-----	Post Onsite 1B - 12 hr.
7	SCS Runoff	0.09	2	936	2,593	----	-----	-----	Post Onsite 1B - 24 hr.
8	Reservoir	0.11	2	34	771	1	723.11	625	Thru Pond 1 - 0.5 hr.
9	Reservoir	0.11	2	56	956	2	723.16	653	Thru Pond 1 - 1 hr.
10	Reservoir	0.11	2	64	1,281	3	723.23	689	Thru Pond 1 - 2 hr.
11	Reservoir	0.11	2	88	1,462	4	723.21	679	Thru Pond 1 - 3 hr.
12	Reservoir	0.10	2	128	1,830	5	723.06	601	Thru Pond 1 - 6 hr.
13	Reservoir	0.10	2	362	2,203	6	722.90	521	Thru Pond 1 - 12 hr.
14	Reservoir	0.08	2	940	2,580	7	722.60	361	Thru Pond 1 - 24 hr.
15	SCS Runoff	3.35	2	10	3,155	----	-----	-----	Post Onsite 1A - 0.5 hr.
16	SCS Runoff	2.70	2	12	4,540	----	-----	-----	Post Onsite 1A - 1 hr.
17	SCS Runoff	2.22	2	14	6,077	----	-----	-----	Post Onsite 1A - 2 hr.
18	SCS Runoff	1.85	2	18	6,961	----	-----	-----	Post Onsite 1A - 3 hr.
19	SCS Runoff	1.32	2	36	8,723	----	-----	-----	Post Onsite 1A - 6 hr.
20	SCS Runoff	0.68	2	288	10,519	----	-----	-----	Post Onsite 1A - 12 hr.
21	SCS Runoff	0.45	2	936	12,333	----	-----	-----	Post Onsite 1A - 24 hr.
22	Combine	3.41	2	10	3,926	8, 15,	-----	-----	Total to 12 rcp- 0.5 hr.
23	Combine	2.76	2	12	5,496	9, 16,	-----	-----	Total to 12 rcp- 1 hr.
24	Combine	2.26	2	14	7,358	10, 17,	-----	-----	Total to 12 rcp- 2 hr.
25	Combine	1.89	2	20	8,423	11, 18,	-----	-----	Total to 12 rcp- 3 hr.
26	Combine	1.37	2	36	10,553	12, 19,	-----	-----	Total to 12 rcp- 6 hr.
27	Combine	0.76	2	288	12,722	13, 20,	-----	-----	Total to 12 rcp- 12 hr.
28	Combine	0.53	2	936	14,912	14, 21,	-----	-----	Total to 12 rcp- 24 hr.
21016post2.gpw					Return Period: 10 Year			Monday, Feb 7 2022, 3:19 PM	

Hydrograph Report

Hydraflow Hydrographs by Intelisolve

Monday, Feb 7 2022, 3:20 PM

Hyd. No. 1

Post Onsite 1B - 0.5 hr.

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.85 cfs
Storm frequency	=	10 yrs	Time interval	=	2 min
Drainage area	=	0.24 ac	Curve number	=	93.7
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	5.0 min
Total precip.	=	1.55 in	Distribution	=	Huff-1st
Storm duration	=	1 hrs	Shape factor	=	484

Hydrograph Volume = 784 cuft

(Printed values >= 50% of Qp.)

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

0.10	0.69
0.13	0.85 <<
0.17	0.84
0.20	0.69
0.23	0.57
0.27	0.46

...End

Hydrograph Report

Hydraflow Hydrographs by Intelisolve

Monday, Feb 7 2022, 3:21 PM

Hyd. No. 10

Thru Pond 1 - 2 hr.

Hydrograph type = Reservoir
Storm frequency = 10 yrs
Inflow hyd. No. = 3
Max. Elevation = 723.23 ft

Peak discharge = 0.11 cfs
Time interval = 2 min
Reservoir name = Underground 1
Max. Storage = 689 cuft

Storage Indication method used.

Outflow hydrograph volume = 1,281 cuft

(Printed values >= 90% of Qp.)

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
0.67	0.25	723.01	0.10	0.10	----	----	----	----	----	----	----	0.10
0.70	0.24	723.04	0.10	0.10	----	----	----	----	----	----	----	0.10
0.73	0.22	723.07	0.11	0.10	----	----	----	----	----	----	----	0.10
0.77	0.21	723.10	0.11	0.11	----	----	----	----	----	----	----	0.11
0.80	0.20	723.12	0.11	0.11	----	----	----	----	----	----	----	0.11
0.83	0.19	723.14	0.11	0.11	----	----	----	----	----	----	----	0.11
0.87	0.19	723.16	0.11	0.11	----	----	----	----	----	----	----	0.11
0.90	0.19	723.18	0.11	0.11	----	----	----	----	----	----	----	0.11
0.93	0.18	723.19	0.11	0.11	----	----	----	----	----	----	----	0.11
0.97	0.16	723.21	0.11	0.11	----	----	----	----	----	----	----	0.11
1.00	0.15	723.22	0.11	0.11	----	----	----	----	----	----	----	0.11
1.03	0.14	723.23	0.11	0.11	----	----	----	----	----	----	----	0.11
1.07	0.12	723.23 <<	0.11	0.11	----	----	----	----	----	----	----	0.11 <<
1.10	0.10	723.23	0.11	0.11	----	----	----	----	----	----	----	0.11
1.13	0.10	723.23	0.11	0.11	----	----	----	----	----	----	----	0.11
1.17	0.10	723.22	0.11	0.11	----	----	----	----	----	----	----	0.11
1.20	0.10	723.22	0.11	0.11	----	----	----	----	----	----	----	0.11
1.23	0.10	723.22	0.11	0.11	----	----	----	----	----	----	----	0.11
1.27	0.10	723.21	0.11	0.11	----	----	----	----	----	----	----	0.11
1.30	0.10	723.21	0.11	0.11	----	----	----	----	----	----	----	0.11
1.33	0.10	723.21	0.11	0.11	----	----	----	----	----	----	----	0.11
1.37	0.10	723.21	0.11	0.11	----	----	----	----	----	----	----	0.11
1.40	0.10	723.20	0.11	0.11	----	----	----	----	----	----	----	0.11
1.43	0.10	723.20	0.11	0.11	----	----	----	----	----	----	----	0.11
1.47	0.10	723.20	0.11	0.11	----	----	----	----	----	----	----	0.11
1.50	0.10	723.19	0.11	0.11	----	----	----	----	----	----	----	0.11
1.53	0.10	723.19	0.11	0.11	----	----	----	----	----	----	----	0.11
1.57	0.10	723.19	0.11	0.11	----	----	----	----	----	----	----	0.11
1.60	0.10	723.19	0.11	0.11	----	----	----	----	----	----	----	0.11
1.63	0.10	723.18	0.11	0.11	----	----	----	----	----	----	----	0.11
1.67	0.10	723.18	0.11	0.11	----	----	----	----	----	----	----	0.11
1.70	0.10	723.18	0.11	0.11	----	----	----	----	----	----	----	0.11
1.73	0.09	723.18	0.11	0.11	----	----	----	----	----	----	----	0.11
1.77	0.07	723.17	0.11	0.11	----	----	----	----	----	----	----	0.11
1.80	0.06	723.16	0.11	0.11	----	----	----	----	----	----	----	0.11
1.83	0.05	723.15	0.11	0.11	----	----	----	----	----	----	----	0.11
1.87	0.05	723.13	0.11	0.11	----	----	----	----	----	----	----	0.11
1.90	0.05	723.12	0.11	0.11	----	----	----	----	----	----	----	0.11

Continues on next page...

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
1.93	0.06	723.11	0.11	0.11	----	----	----	----	----	----	----	0.11
1.97	0.08	723.10	0.11	0.11	----	----	----	----	----	----	----	0.11
2.00	0.09	723.09	0.11	0.11	----	----	----	----	----	----	----	0.11
2.03	0.08	723.09	0.11	0.10	----	----	----	----	----	----	----	0.10
2.07	0.04	723.08	0.11	0.10	----	----	----	----	----	----	----	0.10
2.10	0.01	723.06	0.10	0.10	----	----	----	----	----	----	----	0.10
2.13	0.00	723.04	0.10	0.10	----	----	----	----	----	----	----	0.10
2.17	0.00	723.02	0.10	0.10	----	----	----	----	----	----	----	0.10

...End

Hydrograph Report

Hydraflow Hydrographs by Intelisolve

Monday, Feb 7 2022, 3:22 PM

Hyd. No. 15

Post Onsite 1A - 0.5 hr.

Hydrograph type	=	SCS Runoff	Peak discharge	=	3.35 cfs
Storm frequency	=	10 yrs	Time interval	=	2 min
Drainage area	=	1.16 ac	Curve number	=	91.3
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	5.0 min
Total precip.	=	1.55 in	Distribution	=	Huff-1st
Storm duration	=	1 hrs	Shape factor	=	484

Hydrograph Volume = 3,155 cuft

(Printed values >= 50% of Qp.)

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

0.10	2.36
0.13	3.20
0.17	3.35 <<
0.20	2.89
0.23	2.41
0.27	1.97

...End

Hydrograph Report

Hydraflow Hydrographs by Intelisolve

Monday, Feb 7 2022, 3:23 PM

Hyd. No. 22

Total to 12 rcp- 0.5 hr.

Hydrograph type = Combine
Storm frequency = 10 yrs
Inflow hyds. = 8, 15

Peak discharge = 3.41 cfs
Time interval = 2 min

Hydrograph Volume = 3,926 cuft

(Printed values >= 90% of Qp.)

Hydrograph Discharge Table

Time (hrs)	Hyd. 8 + (cfs)	Hyd. 15 + (cfs)	Outflow (cfs)
0.13	0.05	3.20	3.25
0.17	0.06	3.35 <<	3.41 <<

...End

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	1.50	2	8	1,311	----	-----	-----	Post Onsite 1B - 0.5 hr.
2	SCS Runoff	1.08	2	10	1,658	----	-----	-----	Post Onsite 1B - 1 hr.
3	SCS Runoff	0.87	2	14	2,138	----	-----	-----	Post Onsite 1B - 2 hr.
4	SCS Runoff	0.72	2	18	2,427	----	-----	-----	Post Onsite 1B - 3 hr.
5	SCS Runoff	0.47	2	36	2,925	----	-----	-----	Post Onsite 1B - 6 hr.
6	SCS Runoff	0.22	2	288	3,450	----	-----	-----	Post Onsite 1B - 12 hr.
7	SCS Runoff	0.14	2	936	4,122	----	-----	-----	Post Onsite 1B - 24 hr.
8	Reservoir	0.14	2	34	1,298	1	724.00	1,089	Thru Pond 1 - 0.5 hr.
9	Reservoir	0.15	2	62	1,645	2	724.22	1,201	Thru Pond 1 - 1 hr.
10	Reservoir	0.15	2	66	2,125	3	724.30	1,244	Thru Pond 1 - 2 hr.
11	Reservoir	0.15	2	92	2,415	4	724.31	1,251	Thru Pond 1 - 3 hr.
12	Reservoir	0.14	2	130	2,912	5	724.03	1,103	Thru Pond 1 - 6 hr.
13	Reservoir	0.13	2	364	3,437	6	723.71	937	Thru Pond 1 - 12 hr.
14	Reservoir	0.11	2	942	4,109	7	723.16	655	Thru Pond 1 - 24 hr.
15	SCS Runoff	6.07	2	8	5,558	----	-----	-----	Post Onsite 1A - 0.5 hr.
16	SCS Runoff	5.06	2	10	7,839	----	-----	-----	Post Onsite 1A - 1 hr.
17	SCS Runoff	4.09	2	14	10,144	----	-----	-----	Post Onsite 1A - 2 hr.
18	SCS Runoff	3.39	2	18	11,537	----	-----	-----	Post Onsite 1A - 3 hr.
19	SCS Runoff	2.21	2	36	13,927	----	-----	-----	Post Onsite 1A - 6 hr.
20	SCS Runoff	1.04	2	288	16,461	----	-----	-----	Post Onsite 1A - 12 hr.
21	SCS Runoff	0.69	2	936	19,702	----	-----	-----	Post Onsite 1A - 24 hr.
22	Combine	6.15	2	8	6,856	8, 15,	-----	-----	Total to 12 rcp- 0.5 hr.
23	Combine	5.12	2	10	9,485	9, 16,	-----	-----	Total to 12 rcp- 1 hr.
24	Combine	4.16	2	14	12,269	10, 17,	-----	-----	Total to 12 rcp- 2 hr.
25	Combine	3.46	2	18	13,952	11, 18,	-----	-----	Total to 12 rcp- 3 hr.
26	Combine	2.30	2	36	16,839	12, 19,	-----	-----	Total to 12 rcp- 6 hr.
27	Combine	1.15	2	288	19,898	13, 20,	-----	-----	Total to 12 rcp- 12 hr.
28	Combine	0.79	2	936	23,811	14, 21,	-----	-----	Total to 12 rcp- 24 hr.
21016post2.gpw					Return Period: 100 Year			Monday, Feb 7 2022, 3:19 PM	

Hydrograph Report

Hydraflow Hydrographs by Intelisolve

Monday, Feb 7 2022, 3:20 PM

Hyd. No. 1

Post Onsite 1B - 0.5 hr.

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.50 cfs
Storm frequency	=	100 yrs	Time interval	=	2 min
Drainage area	=	0.24 ac	Curve number	=	93.7
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	5.0 min
Total precip.	=	2.25 in	Distribution	=	Huff-1st
Storm duration	=	1 hrs	Shape factor	=	484

Hydrograph Volume = 1,311 cuft

(Printed values >= 50% of Qp.)

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

0.10	1.29
0.13	1.50 <<
0.17	1.39
0.20	1.11
0.23	0.90

...End

Hydrograph Report

Hydraflow Hydrographs by Intelisolve

Monday, Feb 7 2022, 3:21 PM

Hyd. No. 11

Thru Pond 1 - 3 hr.

Hydrograph type = Reservoir
Storm frequency = 100 yrs
Inflow hyd. No. = 4
Max. Elevation = 724.31 ft

Peak discharge = 0.15 cfs
Time interval = 2 min
Reservoir name = Underground 1
Max. Storage = 1,251 cuft

Storage Indication method used.

Outflow hydrograph volume = 2,415 cuft

(Printed values >= 90% of Qp.)

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
0.87	0.33	723.91	0.14	0.14	----	----	----	----	----	----	----	0.14
0.90	0.32	723.96	0.14	0.14	----	----	----	----	----	----	----	0.14
0.93	0.31	724.00	0.14	0.14	----	----	----	----	----	----	----	0.14
0.97	0.29	724.03	0.15	0.14	----	----	----	----	----	----	----	0.14
1.00	0.28	724.07	0.15	0.15	----	----	----	----	----	----	----	0.15
1.03	0.27	724.10	0.15	0.15	----	----	----	----	----	----	----	0.15
1.07	0.27	724.12	0.15	0.15	----	----	----	----	----	----	----	0.15
1.10	0.25	724.15	0.15	0.15	----	----	----	----	----	----	----	0.15
1.13	0.23	724.17	0.15	0.15	----	----	----	----	----	----	----	0.15
1.17	0.22	724.19	0.15	0.15	----	----	----	----	----	----	----	0.15
1.20	0.22	724.21	0.15	0.15	----	----	----	----	----	----	----	0.15
1.23	0.22	724.22	0.15	0.15	----	----	----	----	----	----	----	0.15
1.27	0.22	724.24	0.15	0.15	----	----	----	----	----	----	----	0.15
1.30	0.22	724.25	0.15	0.15	----	----	----	----	----	----	----	0.15
1.33	0.22	724.27	0.15	0.15	----	----	----	----	----	----	----	0.15
1.37	0.22	724.28	0.16	0.15	----	----	----	----	----	----	----	0.15
1.40	0.20	724.30	0.16	0.15	----	----	----	----	----	----	----	0.15
1.43	0.18	724.30	0.16	0.15	----	----	----	----	----	----	----	0.15
1.47	0.17	724.31	0.16	0.15	----	----	----	----	----	----	----	0.15
1.50	0.17	724.31	0.16	0.15	----	----	----	----	----	----	----	0.15
1.53	0.16	724.31	0.16	0.15	----	----	----	----	----	----	----	0.15 <<
1.57	0.13	724.31	0.16	0.15	----	----	----	----	----	----	----	0.15
1.60	0.12	724.30	0.16	0.15	----	----	----	----	----	----	----	0.15
1.63	0.11	724.29	0.16	0.15	----	----	----	----	----	----	----	0.15
1.67	0.11	724.28	0.16	0.15	----	----	----	----	----	----	----	0.15
1.70	0.11	724.27	0.16	0.15	----	----	----	----	----	----	----	0.15
1.73	0.11	724.26	0.15	0.15	----	----	----	----	----	----	----	0.15
1.77	0.11	724.25	0.15	0.15	----	----	----	----	----	----	----	0.15
1.80	0.11	724.25	0.15	0.15	----	----	----	----	----	----	----	0.15
1.83	0.11	724.24	0.15	0.15	----	----	----	----	----	----	----	0.15
1.87	0.11	724.23	0.15	0.15	----	----	----	----	----	----	----	0.15
1.90	0.11	724.22	0.15	0.15	----	----	----	----	----	----	----	0.15
1.93	0.11	724.21	0.15	0.15	----	----	----	----	----	----	----	0.15
1.97	0.11	724.20	0.15	0.15	----	----	----	----	----	----	----	0.15
2.00	0.11	724.19	0.15	0.15	----	----	----	----	----	----	----	0.15
2.03	0.11	724.18	0.15	0.15	----	----	----	----	----	----	----	0.15
2.07	0.11	724.17	0.15	0.15	----	----	----	----	----	----	----	0.15
2.10	0.11	724.16	0.15	0.15	----	----	----	----	----	----	----	0.15

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Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
2.13	0.11	724.15	0.15	0.15	----	----	----	----	----	----	----	0.15
2.17	0.11	724.15	0.15	0.15	----	----	----	----	----	----	----	0.15
2.20	0.11	724.14	0.15	0.15	----	----	----	----	----	----	----	0.15
2.23	0.11	724.13	0.15	0.15	----	----	----	----	----	----	----	0.15
2.27	0.11	724.12	0.15	0.15	----	----	----	----	----	----	----	0.15
2.30	0.11	724.11	0.15	0.15	----	----	----	----	----	----	----	0.15
2.33	0.11	724.10	0.15	0.15	----	----	----	----	----	----	----	0.15
2.37	0.11	724.10	0.15	0.15	----	----	----	----	----	----	----	0.15
2.40	0.11	724.09	0.15	0.15	----	----	----	----	----	----	----	0.15
2.43	0.11	724.08	0.15	0.15	----	----	----	----	----	----	----	0.15
2.47	0.11	724.07	0.15	0.15	----	----	----	----	----	----	----	0.15
2.50	0.11	724.06	0.15	0.15	----	----	----	----	----	----	----	0.15
2.53	0.11	724.06	0.15	0.15	----	----	----	----	----	----	----	0.15
2.57	0.11	724.05	0.15	0.15	----	----	----	----	----	----	----	0.15
2.60	0.09	724.04	0.15	0.14	----	----	----	----	----	----	----	0.14
2.63	0.07	724.02	0.15	0.14	----	----	----	----	----	----	----	0.14
2.67	0.06	724.00	0.14	0.14	----	----	----	----	----	----	----	0.14
2.70	0.06	723.98	0.14	0.14	----	----	----	----	----	----	----	0.14
2.73	0.06	723.96	0.14	0.14	----	----	----	----	----	----	----	0.14
2.77	0.06	723.94	0.14	0.14	----	----	----	----	----	----	----	0.14
2.80	0.06	723.92	0.14	0.14	----	----	----	----	----	----	----	0.14
2.83	0.06	723.90	0.14	0.14	----	----	----	----	----	----	----	0.14

...End

Hydrograph Report

Hydraflow Hydrographs by Intelisolve

Monday, Feb 7 2022, 3:22 PM

Hyd. No. 15

Post Onsite 1A - 0.5 hr.

Hydrograph type	= SCS Runoff	Peak discharge	= 6.07 cfs
Storm frequency	= 100 yrs	Time interval	= 2 min
Drainage area	= 1.16 ac	Curve number	= 91.3
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.0 min
Total precip.	= 2.25 in	Distribution	= Huff-1st
Storm duration	= 1 hrs	Shape factor	= 484

Hydrograph Volume = 5,558 cuft

(Printed values >= 50% of Qp.)

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

0.10	4.92
0.13	6.07 <<
0.17	5.94
0.20	4.90
0.23	4.00
0.27	3.23

...End

Hydrograph Report

Hydraflow Hydrographs by Intelisolve

Monday, Feb 7 2022, 3:23 PM

Hyd. No. 22

Total to 12 rcp- 0.5 hr.

Hydrograph type = Combine
Storm frequency = 100 yrs
Inflow hyds. = 8, 15

Peak discharge = 6.15 cfs
Time interval = 2 min

Hydrograph Volume = 6,856 cuft

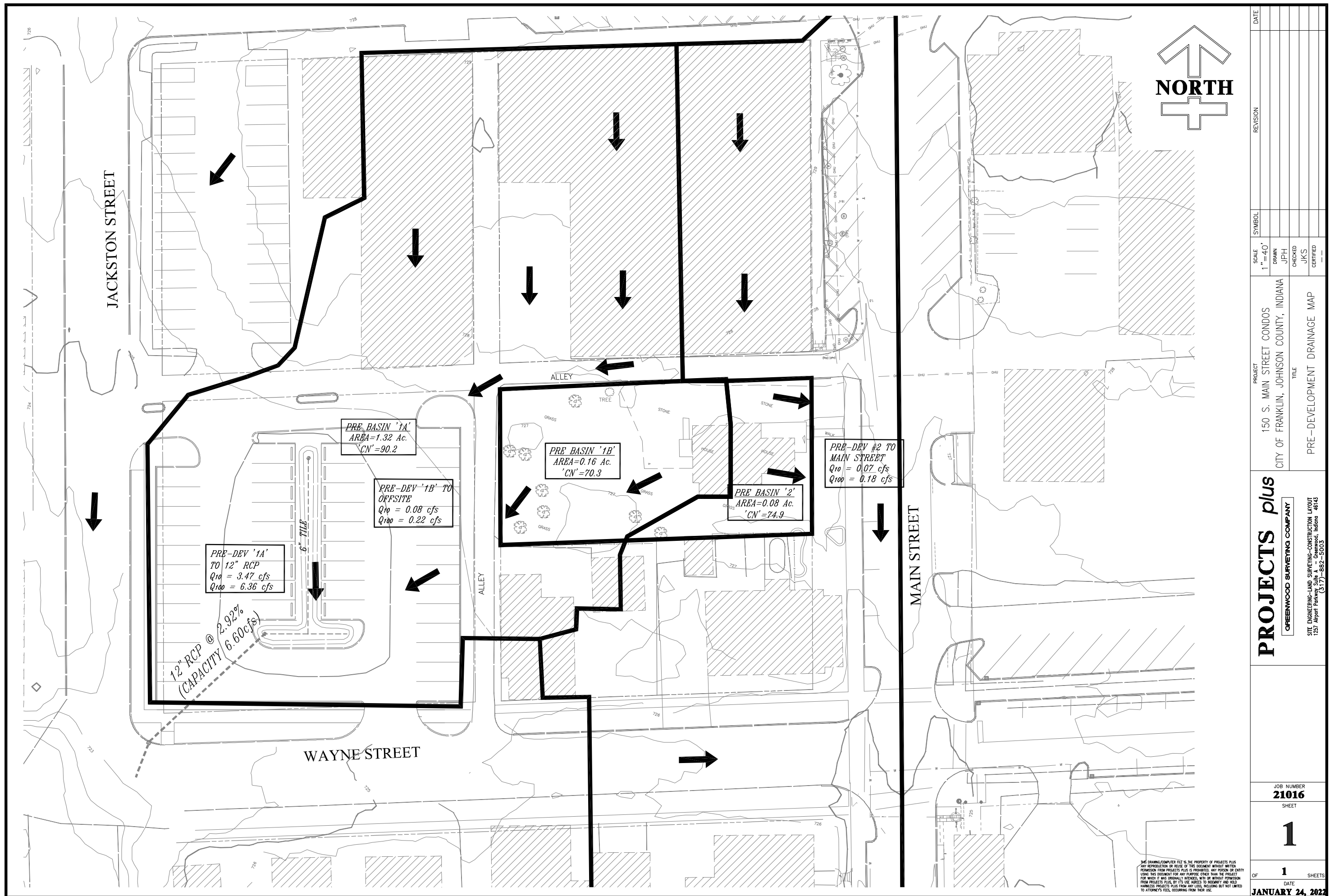
(Printed values >= 90% of Qp.)

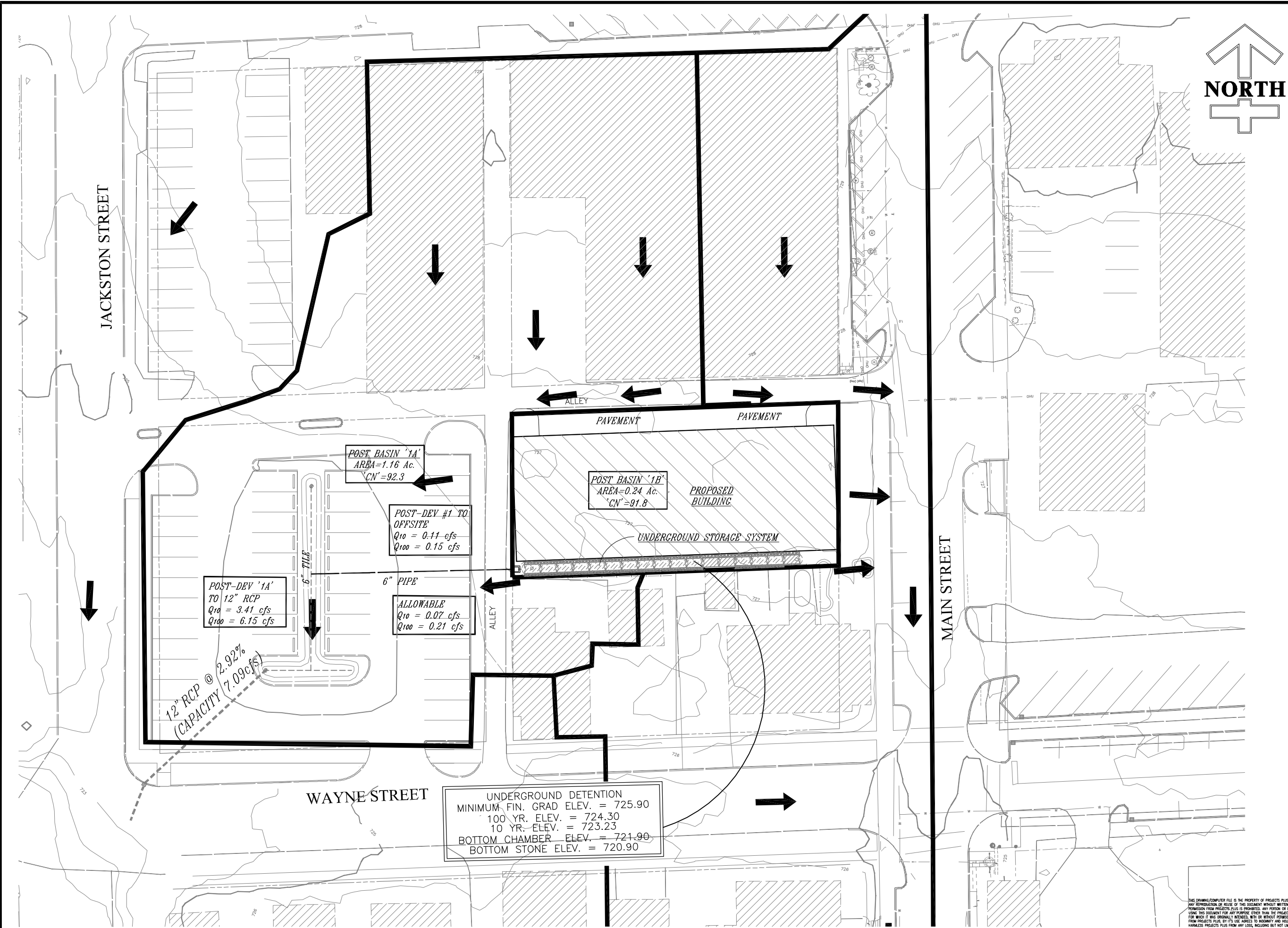
Hydrograph Discharge Table

Time (hrs)	Hyd. 8 + (cfs)	Hyd. 15 + (cfs)	Outflow (cfs)
0.13	0.07	6.07 <<	6.15 <<
0.17	0.09	5.94	6.04

...End

Watershed Delineation Maps





DATE	REVISION	SYMBOL	SCALE	PROJECT	TITLE
			1"=40'	150 S. MAIN STREET CONDOS	POST-DEVELOPMENT DRAINAGE MAP
			DRAWN	CITY OF FRANKLIN, JOHNSON COUNTY, INDIANA	
			JPH		
			CHECKED		
			JKS		
			CERTIFIED		

PROJECTS <i>plus</i>					
GREENWOOD SURVEYING COMPANY					
SITE ENGINEERING-LAND SURVEYING-CONSTRUCTION LAYOUT					
125 Airport Parkway, Suite 4014 Franklin, Indiana 46143 (317) 882-5003					
JOB NUMBER 21016					
SHEET 1					
OF 1 SHEETS					
DATE JANUARY 24, 2021					