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# Drainage Computations Summary

For

## I-65 South Logistics Center

State Road 44 & Forest Road  
Franklin, IN 46131



Prepared For:  
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# **DRAINAGE COMPUTATIONS SUMMARY**

**For**

## **I-65 South Logistics Center**

State Road 44 & Forest Road

Franklin, IN 46131

### **PROJECT DESCRIPTION**

The proposed project is located at the intersection of State Road 44 and Forest Road in Franklin, Johnson County, Indiana. The  $\pm 68.75$  acre site currently consists of undeveloped farmland with no existing stormwater infrastructure onsite. The developed site will consist of a  $\pm 979,200$  sf industrial warehouse facility, asphalt and concrete paving, installation of storm sewer piping and other associated utilities. In addition, a stormwater detention basin will be constructed to detain additional runoff from the proposed site improvements. Refer to Appendix A for an aerial map of the site's location.

The Natural Resources Conservation Service (NRCS) Web Soil Survey of Johnson County, Indiana, indicates an approximately 50.1% distribution of Brookston silty clay loam, a 19.6% distribution of Crosby silt loam, and a 30.3% distribution of Miami silt loam. Refer to Appendix A for the Soils Map.

The site is located within a special flood hazard zone, 'Flood Zone A', as indicated on the Flood Insurance Rate Maps (FIRM) 18081C0232D and 18081C0275D for Johnson County, Indiana, dated August 2, 2007. Compensatory storage for fill placed within the floodplain has been provided per City of Franklin requirements. Refer to Appendix A for the FIRM.

The adjacent land uses for this site have been included below:

North: Agriculture

South: Agriculture

East: Agriculture

West: Agriculture

### **EXISTING CONDITIONS**

The existing property currently consists of undeveloped farmland. In the existing condition, stormwater runoff from the site is allowed to sheet flow un-detained across the site from west to east before eventually discharging to Amity Ditch east of the project site. No existing stormwater infrastructure exists on the project site.

The allowable release rates for the project site has been determined in accordance with the *City of Franklin Subdivision Control Ordinance* which requires runoff to be detained to 2-yr pre-existing rates in 10-year return storm events and to 10-yr pre-existing rates in 100-year storm events. The existing release rates have been summarized in the table below. Refer to Appendix B for Existing Drainage Conditions.

Storm Event	Existing Release Rates
2-Year	6.37 cfs
10-Year	13.51 cfs
100-Year	41.85 cfs

Table 1. Site Existing Release Rates

## PROPOSED CONDITIONS

The proposed development includes the construction of a ±979,200 sf industrial warehouse facility, asphalt and concrete paving, installation of storm sewer piping and other associated utilities. The stormwater from the development will be collected in proposed storm infrastructure and conveyed to a new detention basin located on the east side of the property. The stormwater will eventually discharge to Amity Ditch.

Proposed conditions release rates have been modeled in ICPR and have been summarized in the table below. Due to the project's ultimate discharge into Amity Ditch, tailwater from upstream areas contributing to Amity Ditch were incorporated into the ICPR model to analyze the effects of the upstream stormwater on the detention basin as well as release rates into the ditch. As a result of this analysis, it was found that the peak discharge from the detention basin and the peak discharge through Amity Ditch from upstream areas did not occur at the same time and that tailwater effects on the proposed detention caused minimal impact to the intended function of the basin. Refer to Appendix C for a Proposed Conditions Basin Map and runoff calculations.

Storm Event	Existing Release Rates	Allowable Release Rates	Proposed Release Rate
10-Year	13.51 cfs	6.37 cfs	6.36 cfs
100-Year	41.85 cfs	13.51 cfs	7.55 cfs

Table 2. Release Rate Summary

In addition to the modeling of tailwater in Amity Ditch, a second ICPR model was created to analyze the detention basin negating all storage volume below the floodplain base flood elevation. The purpose of this model is to ensure the detention basin has enough storage volume to accept the 10 and 100 year rainfall events without overtopping in the event of a fully flooded Amity Ditch. Refer to Appendix C for all proposed detention calculations.

## COMPENSATORY STORAGE

Due to the project site's location within 'Flood Zone A', compensatory storage will be required for all fill placed within the floodplain. Amity Ditch has a base flood elevation of 717.80 for this segment of the ditch.

In the existing site conditions, it was determined that the site provided approximately 52,236 cy of floodplain storage within the property boundary limits. The proposed project will provide the compensatory storage within the detention basin to ensure no floodplain storage is lost as a result of the development. The table below summarizes pre and post floodplain volumes across the site.

	Volume
Existing	52,236 cy
Proposed	56,643 cy

Table 3. Floodplain Storage Volume





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In addition to the detention modeling analysis described above, a third ICPR model was created to analyze the impact of stormwater runoff generated from the project site only. It was found that runoff from the site caused the basin to stage to an elevation of 713.36 in the 100-yr storm which was then used to generate the compensatory storage volume provided in Table 3. Refer to Appendix C for all compensatory storage calculations.

## **STORM SEWER DESIGN**

The proposed storm sewer has been designed based on a 10-year storm event in accordance with the *City of Franklin Stormwater Management Ordinance*. All proposed storm has been sized to accept runoff from the fully developed project site. A storm basin map can be found in Appendix D of the report.

## **STORMWATER QUALITY**

The proposed wet detention basin has been designed to act as water quality for the development in accordance with the *City of Franklin Stormwater Management Ordinance*. The required WQv for the basin based on full buildout of the site is 3.74 ac-ft. The water quality volume provided below normal pool is 57.58 ac-ft. Refer to Appendix E for water quality volume calculations.

## **SUMMARY AND CONCLUSIONS**

The proposed storm sewer and site improvements have been designed in accordance with the *City of Franklin Subdivision Control Ordinance*. In addition, post developed peak discharge rates for the proposed development will be restricted to rates less than the pre-developed conditions. The detention basin will act as water quality to remove sediment and other solids from the stormwater prior to discharge from the site. We believe the proposed improvements will not adversely affect this site, adjacent developments, the City of Franklin, or Johnson County.

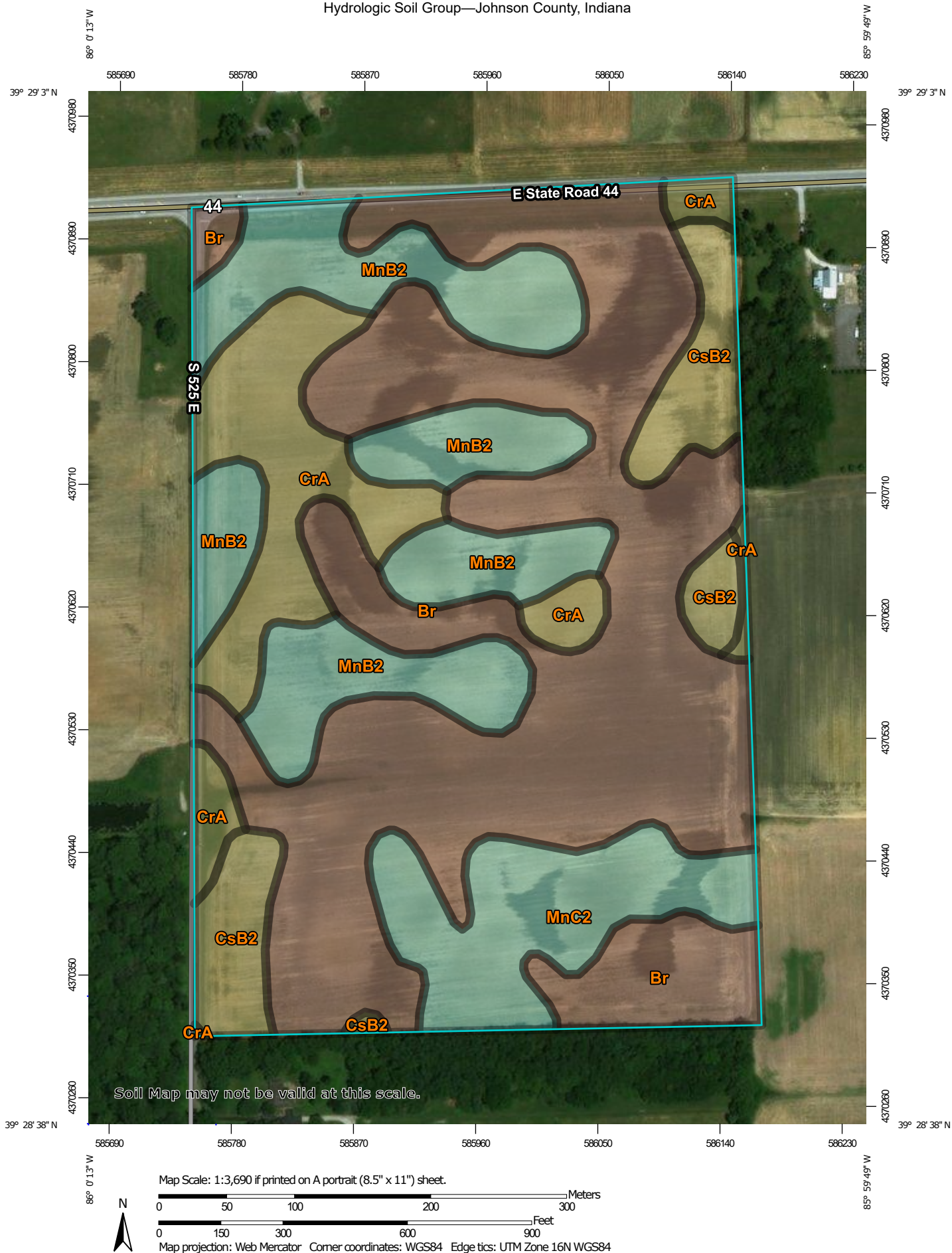
# **APPENDIX A**

## **MAPS**




## PROJECT LOCATION MAP

# Hydrologic Soil Group—Johnson County, Indiana



## MAP LEGEND

### Area of Interest (AOI)









 Area of Interest (AOI)

### Soils

#### Soil Rating Polygons





 A  
 A/D  
 B  
 B/D  
 C  
 C/D  
 D  
 Not rated or not available

#### Soil Rating Lines


 A  
 A/D  
 B  
 B/D  
 C  
 C/D  
 D  
 Not rated or not available

#### Soil Rating Points






 A  
 A/D  
 B  
 B/D

 C  
 C/D  
 D  
 Not rated or not available


### Water Features

 Streams and Canals

### Transportation

 Rails  
 Interstate Highways  
 US Routes  
 Major Roads  
 Local Roads

### Background

 Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service  
 Web Soil Survey URL:  
 Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Johnson County, Indiana  
 Survey Area Data: Version 27, Sep 16, 2019

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Sep 24, 2014—Mar 20, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

## Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
Br	Brookston silty clay loam, 0 to 2 percent slopes	B/D	31.2	50.1%
CrA	Crosby silt loam, fine-loamy subsoil, 0 to 2 percent slopes	C/D	7.4	11.9%
CsB2	Crosby-Miami silt loams, 2 to 4 percent slopes, eroded	C/D	4.8	7.7%
MnB2	Miami silt loam, 2 to 6 percent slopes, eroded	C	12.9	20.7%
MnC2	Miami silt loam, 6 to 12 percent slopes, eroded	C	6.0	9.6%
<b>Totals for Area of Interest</b>			<b>62.3</b>	<b>100.0%</b>



## Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

## Rating Options

*Aggregation Method:* Dominant Condition

*Component Percent Cutoff:* None Specified

*Tie-break Rule:* Higher

# National Flood Hazard Layer FIRMette



## 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		NO SCREEN Area of Minimal Flood Hazard Zone X
		Effective LOMRs
		Area of Undetermined Flood Hazard Zone D
GENERAL STRUCTURES		Channel, Culvert, or Storm Sewer
		Levee, Dike, or Floodwall
OTHER FEATURES		20.2 Cross Sections with 1% Annual Chance Water Surface Elevation
		17.5
		Coastal Transect
		Base Flood Elevation Line (BFE)
		Limit of Study
		Jurisdiction Boundary
		Coastal Transect Baseline
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 **1/8/2020 at 7:13:32 PM** 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.

39°29'4.65"N



USGS The National Map: Orthoimagery. Data refreshed April, 2019.

0 250 500 1,000 1,500 2,000 Feet 1:6,000

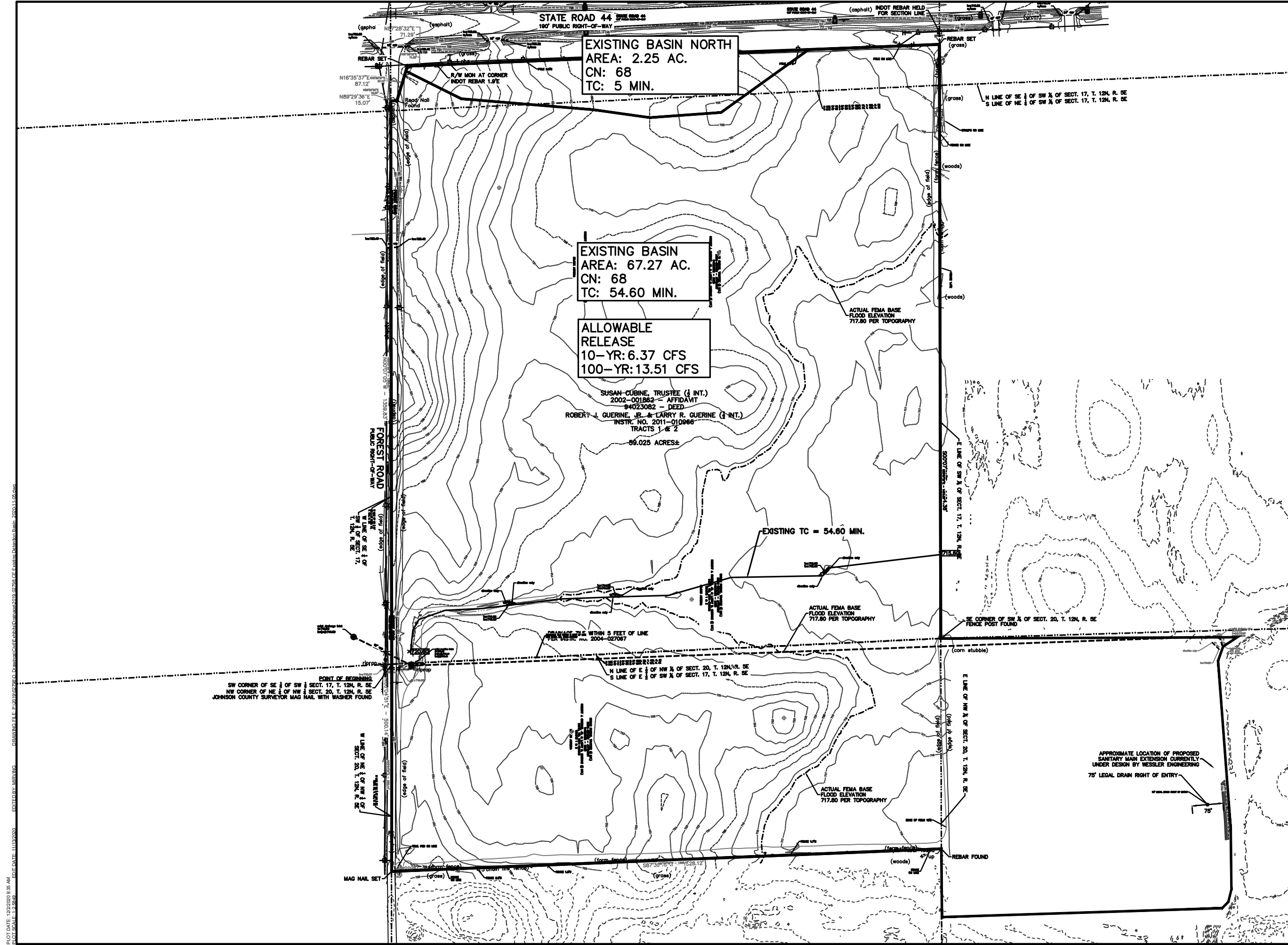
39°28'36.88"N

85°59'40.56"W



# **APPENDIX B**

## **EXISTING CONDITIONS**



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**I-65 SOUTH  
LOGISTICS CENTER  
LOT 1**  
  
81/89 Forest Road  
Franklin, Indiana

**REGISTERED PROFESSIONAL ENGINEER**  
**PE 00000000**  
**STATE OF INDIANA**  
**CERTIFIED BY**  
*[Signature]*

ISSUANCE INDEX		
DATE:	12/03/2020	
PROJECT PHASE:	CONSTRUCTION DOCUMENTS	

REVISION SCHEDULE		
NO.	DESCRIPTION	DATE

Project Number 2019.02798

**EXISTING  
CONDITIONS BASINS  
MAP**  
  
**EX-1**

PLOT DATE: 12/22/2020 9:35 AM  
PLOT SCALE: 1"=50'  
DRAWING FILE: P:\2019\2020\I-65 SOUTH LOGISTICS CENTER\2019.02798 EXISTING CONDITIONS BASINS MAP\2019.02798 EXISTING CONDITIONS BASINS MAP.dwg  
EDIT DATE: 11/03/2020  
EDIT BY: MERVINS



**NOAA Atlas 14, Volume 2, Version 3**  
**Location name: Franklin, Indiana, USA\***  
**Latitude: 39.4813°, Longitude: -86.0012°**  
**Elevation: 724.85 ft\*\***  
 \* source: ESRI Maps  
 \*\* source: USGS



### POINT PRECIPITATION FREQUENCY ESTIMATES

G.M. Bonnin, D. Martin, B. Lin, T. Parzybok, M. Yekta, and D. Riley

NOAA, National Weather Service, Silver Spring, Maryland

[PF tabular](#) | [PF graphical](#) | [Maps & aeriels](#)

### PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches) <sup>1</sup>										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.373 (0.333-0.421)	0.444 (0.396-0.501)	0.532 (0.473-0.599)	0.600 (0.533-0.676)	0.691 (0.609-0.779)	0.761 (0.666-0.859)	0.830 (0.719-0.939)	0.902 (0.774-1.02)	0.998 (0.842-1.14)	1.07 (0.889-1.23)
10-min	0.579 (0.518-0.654)	0.693 (0.619-0.782)	0.826 (0.735-0.931)	0.927 (0.822-1.04)	1.06 (0.931-1.19)	1.15 (1.01-1.30)	1.25 (1.08-1.41)	1.35 (1.16-1.53)	1.47 (1.24-1.68)	1.56 (1.30-1.80)
15-min	0.710 (0.634-0.802)	0.848 (0.756-0.956)	1.01 (0.903-1.14)	1.14 (1.01-1.28)	1.31 (1.15-1.47)	1.43 (1.25-1.61)	1.55 (1.34-1.76)	1.68 (1.44-1.90)	1.83 (1.55-2.10)	1.95 (1.62-2.24)
30-min	0.939 (0.839-1.06)	1.13 (1.01-1.28)	1.39 (1.24-1.57)	1.58 (1.41-1.78)	1.84 (1.62-2.08)	2.04 (1.79-2.31)	2.24 (1.94-2.54)	2.44 (2.10-2.78)	2.71 (2.29-3.11)	2.92 (2.43-3.36)
60-min	1.15 (1.02-1.30)	1.39 (1.24-1.57)	1.74 (1.55-1.97)	2.02 (1.79-2.27)	2.39 (2.11-2.70)	2.69 (2.35-3.04)	3.00 (2.60-3.39)	3.32 (2.85-3.77)	3.75 (3.17-4.29)	4.10 (3.41-4.72)
2-hr	1.34 (1.20-1.52)	1.62 (1.45-1.84)	2.04 (1.82-2.31)	2.37 (2.10-2.68)	2.84 (2.50-3.21)	3.23 (2.81-3.64)	3.64 (3.13-4.10)	4.06 (3.45-4.59)	4.66 (3.89-5.31)	5.15 (4.22-5.91)
3-hr	1.42 (1.27-1.61)	1.72 (1.53-1.95)	2.16 (1.93-2.45)	2.53 (2.24-2.85)	3.04 (2.67-3.43)	3.47 (3.01-3.91)	3.92 (3.36-4.43)	4.40 (3.72-4.99)	5.09 (4.20-5.82)	5.65 (4.57-6.50)
6-hr	1.70 (1.51-1.94)	2.05 (1.83-2.34)	2.59 (2.30-2.95)	3.03 (2.68-3.44)	3.66 (3.20-4.14)	4.19 (3.63-4.74)	4.75 (4.06-5.38)	5.36 (4.50-6.09)	6.24 (5.12-7.12)	6.96 (5.59-7.99)
12-hr	2.03 (1.82-2.30)	2.44 (2.19-2.76)	3.04 (2.72-3.43)	3.52 (3.14-3.97)	4.20 (3.71-4.72)	4.76 (4.17-5.34)	5.35 (4.63-6.00)	5.97 (5.09-6.72)	6.84 (5.72-7.76)	7.54 (6.20-8.61)
24-hr	2.43 (2.24-2.64)	2.91 (2.69-3.17)	3.57 (3.29-3.88)	4.08 (3.75-4.43)	4.77 (4.37-5.19)	5.33 (4.86-5.79)	5.88 (5.34-6.40)	6.45 (5.83-7.03)	7.22 (6.47-7.89)	7.83 (6.96-8.69)
2-day	2.84 (2.63-3.08)	3.41 (3.15-3.69)	4.15 (3.83-4.50)	4.73 (4.36-5.12)	5.51 (5.05-5.97)	6.12 (5.59-6.64)	6.73 (6.13-7.31)	7.36 (6.66-8.01)	8.20 (7.37-8.95)	8.85 (7.90-9.69)
3-day	3.05 (2.84-3.28)	3.65 (3.39-3.92)	4.42 (4.11-4.75)	5.02 (4.66-5.39)	5.83 (5.39-6.26)	6.46 (5.96-6.94)	7.10 (6.52-7.63)	7.74 (7.08-8.33)	8.60 (7.82-9.28)	9.27 (8.38-10.0)
4-day	3.26 (3.05-3.48)	3.89 (3.64-4.15)	4.68 (4.39-5.00)	5.31 (4.96-5.66)	6.14 (5.73-6.55)	6.80 (6.33-7.24)	7.46 (6.92-7.95)	8.12 (7.51-8.66)	9.01 (8.28-9.61)	9.69 (8.86-10.4)
7-day	3.86 (3.61-4.14)	4.59 (4.29-4.91)	5.51 (5.14-5.89)	6.24 (5.82-6.67)	7.22 (6.72-7.72)	8.00 (7.43-8.54)	8.79 (8.14-9.39)	9.59 (8.85-10.3)	10.7 (9.80-11.4)	11.5 (10.5-12.3)
10-day	4.41 (4.13-4.71)	5.24 (4.91-5.59)	6.26 (5.87-6.69)	7.07 (6.63-7.55)	8.17 (7.64-8.71)	9.04 (8.42-9.63)	9.91 (9.21-10.6)	10.8 (10.00-11.5)	12.0 (11.0-12.8)	12.9 (11.8-13.8)
20-day	6.04 (5.70-6.43)	7.15 (6.73-7.60)	8.43 (7.94-8.96)	9.43 (8.86-10.0)	10.7 (10.1-11.4)	11.8 (11.0-12.5)	12.8 (11.9-13.6)	13.8 (12.8-14.6)	15.1 (14.0-16.0)	16.1 (14.8-17.1)
30-day	7.44 (7.03-7.88)	8.76 (8.27-9.28)	10.2 (9.62-10.8)	11.3 (10.6-12.0)	12.7 (12.0-13.5)	13.8 (13.0-14.7)	14.9 (14.0-15.8)	16.0 (14.9-16.9)	17.4 (16.1-18.4)	18.4 (17.0-19.5)
45-day	9.44 (8.90-9.98)	11.1 (10.5-11.7)	12.8 (12.0-13.5)	14.1 (13.2-14.9)	15.7 (14.8-16.6)	17.0 (16.0-18.0)	18.2 (17.0-19.2)	19.3 (18.1-20.5)	20.8 (19.4-22.0)	21.9 (20.3-23.2)
60-day	11.3 (10.6-11.9)	13.2 (12.5-14.0)	15.1 (14.3-16.0)	16.6 (15.7-17.6)	18.5 (17.4-19.6)	20.0 (18.8-21.1)	21.3 (20.0-22.6)	22.6 (21.2-24.0)	24.3 (22.7-25.7)	25.5 (23.7-27.0)

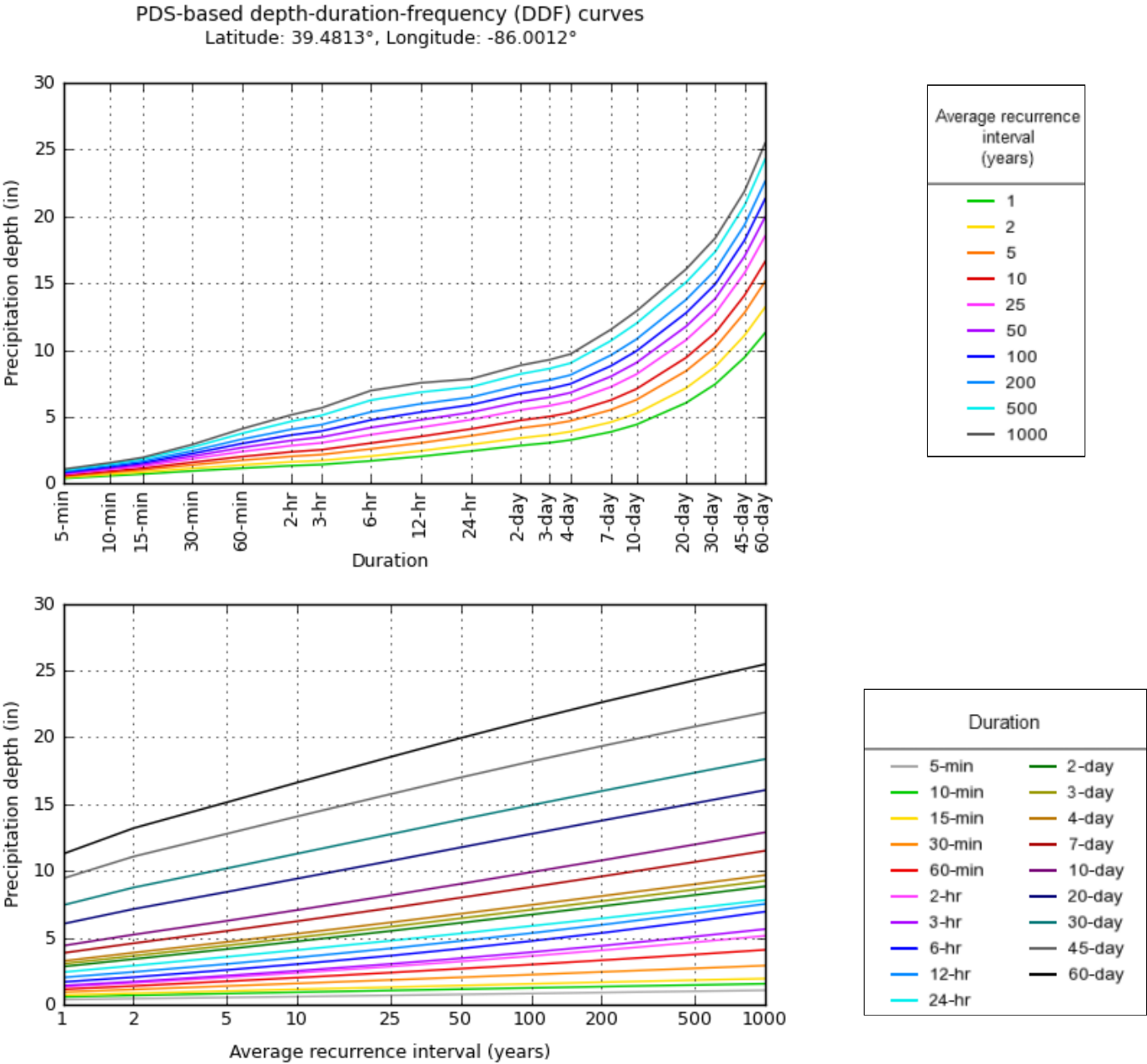
<sup>1</sup> Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

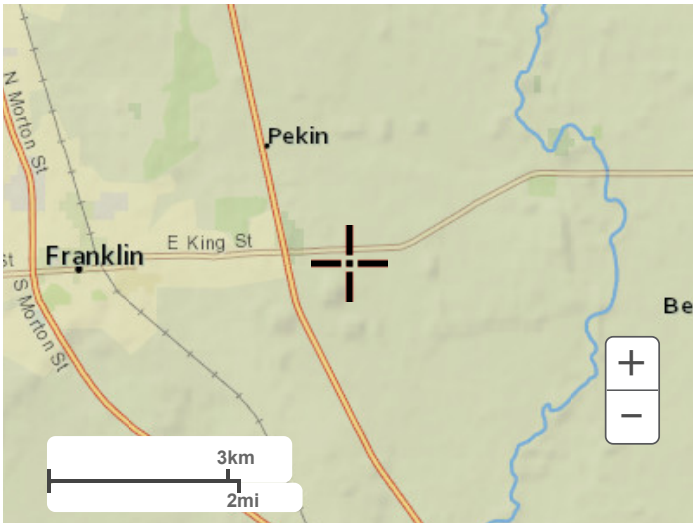
[Back to Top](#)

### PF graphical



## Maps & aerials

Small scale terrain



Large scale terrain



Large scale map



Large scale aerial



[Back to Top](#)

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[US Department of Commerce](#)  
[National Oceanic and Atmospheric Administration](#)  
[National Weather Service](#)  
[National Water Center](#)  
1325 East West Highway  
Silver Spring, MD 20910  
Questions?: [HDSC.Questions@noaa.gov](mailto:HDSC.Questions@noaa.gov)

[Disclaimer](#)

Runoff Curve Number Calculation

49.8%B, 50.2% C

**Job Information**  
**Description:** I-65 Logistics Center  
**Entity:** City of Franklin  
**Job #:** 2019.02798  
**Date:** 11/5/2020

Basin:	Existing Conditions
CN Calculation Method:	Actual Soil Group
Site Condition:	Existing

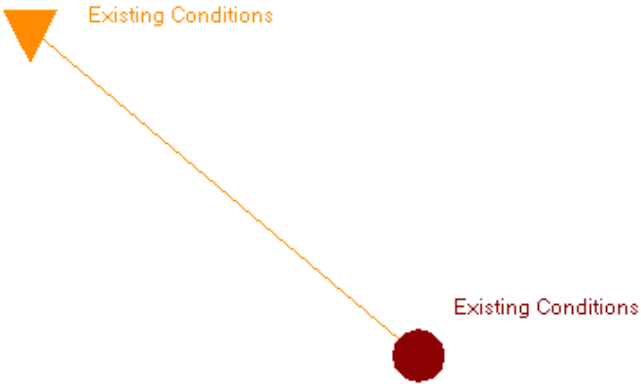
Soil Name and Hydrologic Group		Area Description	Cover Description	Cover Condition	CN	Area	Product of CN x area
						(Acres)	
Br	B	Fully Developed	Open Space	Good Condition (grass cover >75%)	61	33.50	2043.392628
	B	Fully Developed	Impervious	Paved/Rooftop	98	0.00	0
CrA	C	Fully Developed	Open Space	Good Condition (grass cover >75%)	74	33.77	2498.780346
	C	Fully Developed	Impervious	Paved/Rooftop	98	0.00	0
Totals =						67.27	4542.172974

CN (weighted) =  $\frac{\text{total product}}{\text{total area}}$  = 67.5      Use CN = 68





Background Image: Area



## Simple Basin: Existing Conditions

Scenario: Scenario1  
 Node: Existing Conditions  
 Hydrograph Method: NRCS Unit Hydrograph  
 Infiltration Method: Curve Number  
 Time of Concentration: 54.6000 min  
 Max Allowable Q: 0.00 cfs  
 Time Shift: 0.0000 hr  
 Unit Hydrograph: UH484  
 Peaking Factor: 484.0  
 Area: 67.2700 ac  
 Curve Number: 68.0  
 % Impervious: 0.00  
 % DCIA: 0.00  
 % Direct: 0.00  
 Rainfall Name: Indy HUFF 50 1Q

Comment:

## Node: Existing Conditions

Scenario: Scenario1  
 Type: Time/Stage  
 Base Flow: 0.00 cfs  
 Initial Stage: 0.00 ft  
 Warning Stage: 0.00 ft  
 Boundary Stage:

Year	Month	Day	Hour	Stage [ft]
0	0	0	0.0000	0.00
0	0	0	48.0000	0.00

Comment:

## Simulation: 100yr-01hr

Scenario: Scenario1  
 Run Date/Time: 11/5/2020 12:09:55 PM  
 Program Version: ICPR4 4.05.02

## General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	48.0000

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	60.0000	0.1000
Max Calculation Time:		48.0000

## Output Time Increments

## Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

## Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

## Restart File

Save Restart: False

## Resources &amp; Lookup Tables

## Resources

Rainfall Folder: Huff 24hr Dist

Unit Hydrograph  
Folder:

## Lookup Tables

Boundary Stage Set:  
Extern Hydrograph Set:  
Curve Number Set:Green-Ampt Set:  
Vertical Layers Set:  
Impervious Set:

## Tolerances &amp; Options

Time Marching: SAOR  
 Max Iterations: 6  
 Over-Relax Weight: 0.5 dec  
 Fact:  
 dZ Tolerance: 0.0010 ft  
 Max dZ: 1.0000 ft  
 Link Optimizer Tol: 0.0001 ft  
 Edge Length Option: Automatic

IA Recovery Time: 24.0000 hr  
 Smp/Man Basin Rain Opt: Global  
 Rainfall Name: Indy HUFF 50 1Q  
 Rainfall Amount: 3.00 in  
 Storm Duration: 1.0000 hr  
 Dflt Damping (1D): 0.0050 ft  
 Min Node Srf Area (1D): 100 ft2  
 Energy Switch (1D): Energy

Comment:

## Simulation: 100yr-02hr

Scenario: Scenario1  
 Run Date/Time: 11/5/2020 12:10:01 PM  
 Program Version: ICPR4 4.05.02

## General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	48.0000

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	60.0000	0.1000
Max Calculation Time:		48.0000

## Output Time Increments

## Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

## Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

## Restart File

Save Restart: False

## Resources &amp; Lookup Tables

## Resources

Rainfall Folder: Huff 24hr Dist

Unit Hydrograph  
Folder:

## Lookup Tables

Boundary Stage Set:  
 Extern Hydrograph Set:  
 Curve Number Set:

Green-Ampt Set:  
 Vertical Layers Set:  
 Impervious Set:

## Tolerances &amp; Options

Time Marching: SAOR  
 Max Iterations: 6  
 Over-Relax Weight: 0.5 dec  
 Fact:  
 dZ Tolerance: 0.0010 ft

IA Recovery Time: 24.0000 hr  
  
 Smp/Man Basin Rain: Global

Max dZ: 1.0000 ft  
 Link Optimizer Tol: 0.0001 ft  
 Edge Length Option: Automatic

Opt:

Rainfall Name: Indy HUFF 50 1Q  
 Rainfall Amount: 3.64 in  
 Storm Duration: 2.0000 hr  
 Dflt Damping (1D): 0.0050 ft  
 Min Node Srf Area (1D): 100 ft2  
 Energy Switch (1D): Energy

Comment:

Simulation: 100yr-03hr

Scenario: Scenario1  
 Run Date/Time: 11/5/2020 12:10:06 PM  
 Program Version: ICPR4 4.05.02

#### General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	48.0000
	Hydrology [sec]	Surface Hydraulics [sec]		
Min Calculation Time:	60.0000	0.1000		
Max Calculation Time:		48.0000		

#### Output Time Increments

##### Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

##### Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

##### Restart File

Save Restart: False

#### Resources & Lookup Tables

Resources	Lookup Tables
Rainfall Folder: Huff 24hr Dist	Boundary Stage Set:
Unit Hydrograph Folder:	Extern Hydrograph Set:
	Curve Number Set:
	Green-Ampt Set:
	Vertical Layers Set:
	Impervious Set:

Tolerances & Options			
Time Marching:	SAOR	IA Recovery Time:	24.0000 hr
Max Iterations:	6		
Over-Relax Weight	0.5 dec		
Fact:			
dZ Tolerance:	0.0010 ft	Smp/Man Basin Rain	Global
		Opt:	
Max dZ:	1.0000 ft	Rainfall Name:	Indy HUFF 50 1Q
Link Optimizer Tol:	0.0001 ft	Rainfall Amount:	3.92 in
Edge Length Option:	Automatic	Storm Duration:	3.0000 hr
		Dflt Damping (1D):	0.0050 ft
		Min Node Srf Area	100 ft2
		(1D):	
		Energy Switch (1D):	Energy

Comment:

#### Simulation: 100yr-06hr

Scenario: Scenario1  
Run Date/Time: 11/5/2020 12:10:12 PM  
Program Version: ICPR4 4.05.02

General				
Run Mode:	Normal			
	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	48.0000
	Hydrology [sec]	Surface Hydraulics [sec]		
Min Calculation Time:	60.0000	0.1000		
Max Calculation Time:		48.0000		

Output Time Increments
------------------------

## Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

## Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

## Restart File

Save Restart: False

## Resources &amp; Lookup Tables

## Resources

Rainfall Folder: Huff 24hr Dist

Unit Hydrograph  
Folder:

## Lookup Tables

Boundary Stage Set:  
Extern Hydrograph Set:  
Curve Number Set:Green-Ampt Set:  
Vertical Layers Set:  
Impervious Set:

## Tolerances &amp; Options

Time Marching: SAOR  
Max Iterations: 6  
Over-Relax Weight: 0.5 dec  
Fact:  
dZ Tolerance: 0.0010 ft  
  
Max dZ: 1.0000 ft  
Link Optimizer Tol: 0.0001 ft  
  
Edge Length Option: AutomaticIA Recovery Time: 24.0000 hr  
  
Smp/Man Basin Rain Global  
Opt:  
  
Rainfall Name: Indy HUFF 50 1Q  
Rainfall Amount: 4.75 in  
Storm Duration: 6.0000 hr  
  
Dflt Damping (1D): 0.0050 ft  
Min Node Srf Area 100 ft2  
(1D):  
Energy Switch (1D): Energy

Comment:

Simulation: 100yr-12hr

Scenario: Scenario1

Run Date/Time: 11/5/2020 12:10:17 PM  
 Program Version: ICPR4 4.05.02

## General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	48.0000

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	60.0000	0.1000
Max Calculation Time:		48.0000

## Output Time Increments

## Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

## Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

## Restart File

Save Restart: False

## Resources &amp; Lookup Tables

## Resources

Rainfall Folder: Huff 24hr Dist

Unit Hydrograph  
Folder:

## Lookup Tables

Boundary Stage Set:  
 Extern Hydrograph Set:  
 Curve Number Set:

Green-Ampt Set:  
 Vertical Layers Set:  
 Impervious Set:

## Tolerances &amp; Options

Time Marching: SAOR  
 Max Iterations: 6  
 Over-Relax Weight: 0.5 dec  
 Fact:  
 dZ Tolerance: 0.0010 ft  
 Max dZ: 1.0000 ft

IA Recovery Time: 24.0000 hr

Smp/Man Basin Rain: Global  
 Opt:



Link Optimizer Tol: 0.0001 ft  
 Edge Length Option: Automatic

Rainfall Name: Indy HUFF 50 2Q  
 Rainfall Amount: 5.35 in  
 Storm Duration: 12.0000 hr  
 Dflt Damping (1D): 0.0050 ft  
 Min Node Srf Area (1D): 100 ft2  
 Energy Switch (1D): Energy

Comment:

Simulation: 100yr-24hr

Scenario: Scenario1  
 Run Date/Time: 11/5/2020 12:10:24 PM  
 Program Version: ICPR4 4.05.02

#### General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	48.0000

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	60.0000	0.1000
Max Calculation Time:		48.0000

#### Output Time Increments

##### Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

##### Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

##### Restart File

Save Restart: False

#### Resources & Lookup Tables

##### Resources

Rainfall Folder: Huff 24hr Dist

##### Lookup Tables

Boundary Stage Set:

Unit Hydrograph  
Folder:

Extern Hydrograph Set:  
Curve Number Set:

Green-Ampt Set:  
Vertical Layers Set:  
Impervious Set:

#### Tolerances & Options

Time Marching: SAOR	IA Recovery Time: 24.0000 hr
Max Iterations: 6	
Over-Relax Weight 0.5 dec	
Fact:	
dZ Tolerance: 0.0010 ft	Smp/Man Basin Rain Global
	Opt:
Max dZ: 1.0000 ft	Rainfall Name: Indy HUFF 50 3Q
Link Optimizer Tol: 0.0001 ft	Rainfall Amount: 5.88 in
	Storm Duration: 24.0000 hr
Edge Length Option: Automatic	
	Dflt Damping (1D): 0.0050 ft
	Min Node Srf Area 100 ft2
	(1D):
	Energy Switch (1D): Energy

Comment:

#### Simulation: 10yr-01hr

Scenario: Scenario1  
Run Date/Time: 11/5/2020 12:10:29 PM  
Program Version: ICPR4 4.05.02

#### General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	48.0000

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	60.0000	0.1000
Max Calculation Time:		48.0000

#### Output Time Increments

#### Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

## Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

## Restart File

Save Restart: False

## Resources &amp; Lookup Tables

## Resources

Rainfall Folder: Huff 24hr Dist

Unit Hydrograph  
Folder:

## Lookup Tables

Boundary Stage Set:  
Extern Hydrograph Set:  
Curve Number Set:Green-Ampt Set:  
Vertical Layers Set:  
Impervious Set:

## Tolerances &amp; Options

Time Marching: SAOR	IA Recovery Time: 24.0000 hr
Max Iterations: 6	
Over-Relax Weight: 0.5 dec	
Fact:	
dZ Tolerance: 0.0010 ft	Smp/Man Basin Rain: Global
	Opt:
Max dZ: 1.0000 ft	Rainfall Name: Indy HUFF 50 1Q
Link Optimizer Tol: 0.0001 ft	Rainfall Amount: 2.02 in
	Storm Duration: 1.0000 hr
Edge Length Option: Automatic	
	Dflt Damping (1D): 0.0050 ft
	Min Node Srf Area: 100 ft2
	(1D):
	Energy Switch (1D): Energy

Comment:

## Simulation: 10yr-02hr

Scenario: Scenario1  
Run Date/Time: 11/5/2020 12:10:34 PM  
Program Version: ICPR4 4.05.02

General				
Run Mode: Normal				
	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	48.0000
	Hydrology [sec]	Surface Hydraulics [sec]		
Min Calculation Time:	60.0000	0.1000		
Max Calculation Time:		48.0000		
Output Time Increments				
Hydrology				
Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000
Surface Hydraulics				
Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000
Restart File				
Save Restart: False				
Resources & Lookup Tables				
Resources			Lookup Tables	
Rainfall Folder: Huff 24hr Dist			Boundary Stage Set:	
Unit Hydrograph Folder:			Extern Hydrograph Set:	
			Curve Number Set:	
			Green-Ampt Set:	
			Vertical Layers Set:	
			Impervious Set:	
Tolerances & Options				
Time Marching: SAOR			IA Recovery Time: 24.0000 hr	
Max Iterations: 6				
Over-Relax Weight Fact: 0.5 dec				
dZ Tolerance: 0.0010 ft			Smp/Man Basin Rain Opt: Global	
Max dZ: 1.0000 ft				
Link Optimizer Tol: 0.0001 ft			Rainfall Name: Indy HUFF 50 1Q	
			Rainfall Amount: 2.37 in	

Edge Length Option: Automatic

Storm Duration: 2.0000 hr

Dflt Damping (1D): 0.0050 ft

Min Node Srf Area 100 ft2

(1D):

Energy Switch (1D): Energy

Comment:
----------

Simulation: 10yr-03hr

Scenario: Scenario1

Run Date/Time: 11/5/2020 12:10:39 PM

Program Version: ICPR4 4.05.02

## General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	48.0000

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	60.0000	0.1000
Max Calculation Time:		48.0000

## Output Time Increments

## Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

## Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

## Restart File

Save Restart: False

## Resources &amp; Lookup Tables

## Resources

Rainfall Folder: Huff 24hr Dist

Unit Hydrograph

## Lookup Tables

Boundary Stage Set:

Extern Hydrograph Set:

Curve Number Set:

Folder:

Green-Ampt Set:  
Vertical Layers Set:  
Impervious Set:

## Tolerances &amp; Options

Time Marching: SAOR	IA Recovery Time: 24.0000 hr
Max Iterations: 6	
Over-Relax Weight 0.5 dec	
Fact:	
dZ Tolerance: 0.0010 ft	Smp/Man Basin Rain Global
	Opt:
Max dZ: 1.0000 ft	Rainfall Name: Indy HUFF 50 1Q
Link Optimizer Tol: 0.0001 ft	Rainfall Amount: 2.53 in
	Storm Duration: 3.0000 hr
Edge Length Option: Automatic	
	Dflt Damping (1D): 0.0050 ft
	Min Node Srf Area 100 ft2
	(1D):
	Energy Switch (1D): Energy

Comment:

## Simulation: 10yr-06hr

Scenario: Scenario1  
Run Date/Time: 11/5/2020 12:10:45 PM  
Program Version: ICPR4 4.05.02

## General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	48.0000

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	60.0000	0.1000
Max Calculation Time:		48.0000

## Output Time Increments

## Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
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Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

## Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

## Restart File

Save Restart: False

## Resources &amp; Lookup Tables

## Resources

Rainfall Folder: Huff 24hr Dist

Unit Hydrograph  
Folder:

## Lookup Tables

Boundary Stage Set:  
Extern Hydrograph Set:  
Curve Number Set:Green-Ampt Set:  
Vertical Layers Set:  
Impervious Set:

## Tolerances &amp; Options

Time Marching: SAOR	IA Recovery Time: 24.0000 hr
Max Iterations: 6	
Over-Relax Weight: 0.5 dec	
Fact:	
dZ Tolerance: 0.0010 ft	Smp/Man Basin Rain Global
	Opt:
Max dZ: 1.0000 ft	
Link Optimizer Tol: 0.0001 ft	Rainfall Name: Indy HUFF 50 1Q
	Rainfall Amount: 3.03 in
Edge Length Option: Automatic	Storm Duration: 6.0000 hr
	Dflt Damping (1D): 0.0050 ft
	Min Node Srf Area 100 ft2
	(1D):
	Energy Switch (1D): Energy

Comment:

## Simulation: 10yr-12hr

Scenario: Scenario1  
Run Date/Time: 11/5/2020 12:10:50 PM  
Program Version: ICPR4 4.05.02

General				
Run Mode: Normal				
	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	48.0000
	Hydrology [sec]	Surface Hydraulics [sec]		
Min Calculation Time:	60.0000	0.1000		
Max Calculation Time:		48.0000		
Output Time Increments				
Hydrology				
Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000
Surface Hydraulics				
Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000
Restart File				
Save Restart: False				
Resources & Lookup Tables				
Resources		Lookup Tables		
Rainfall Folder: Huff 24hr Dist		Boundary Stage Set:		
Unit Hydrograph Folder:		Extern Hydrograph Set:		
		Curve Number Set:		
		Green-Ampt Set:		
		Vertical Layers Set:		
		Impervious Set:		
Tolerances & Options				
Time Marching: SAOR		IA Recovery Time: 24.0000 hr		
Max Iterations: 6				
Over-Relax Weight Fact: 0.5 dec				
dZ Tolerance: 0.0010 ft		Smp/Man Basin Rain Opt: Global		
Max dZ: 1.0000 ft				
Link Optimizer Tol: 0.0001 ft		Rainfall Name: Indy HUFF 50 2Q		
		Rainfall Amount: 3.52 in		
Edge Length Option: Automatic		Storm Duration: 12.0000 hr		



Dflt Damping (1D): 0.0050 ft  
 Min Node Srf Area 100 ft2  
 (1D):  
 Energy Switch (1D): Energy

Comment:

Simulation: 10yr-24hr

Scenario: Scenario1  
 Run Date/Time: 11/5/2020 12:10:55 PM  
 Program Version: ICPR4 4.05.02

#### General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	48.0000

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	60.0000	0.1000
Max Calculation Time:		48.0000

#### Output Time Increments

##### Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

##### Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

##### Restart File

Save Restart: False

#### Resources & Lookup Tables

##### Resources

Rainfall Folder: Huff 24hr Dist  
  
 Unit Hydrograph  
 Folder:

##### Lookup Tables

Boundary Stage Set:  
 Extern Hydrograph Set:  
 Curve Number Set:

Green-Ampt Set:  
Vertical Layers Set:  
Impervious Set:

## Tolerances &amp; Options

Time Marching: SAOR	IA Recovery Time: 24.0000 hr
Max Iterations: 6	
Over-Relax Weight Fact: 0.5 dec	
dZ Tolerance: 0.0010 ft	Smp/Man Basin Rain Opt: Global
Max dZ: 1.0000 ft	
Link Optimizer Tol: 0.0001 ft	Rainfall Name: Indy HUFF 50 3Q
	Rainfall Amount: 4.08 in
Edge Length Option: Automatic	Storm Duration: 24.0000 hr
	Dflt Damping (1D): 0.0050 ft
	Min Node Srf Area (1D): 100 ft2
	Energy Switch (1D): Energy

Comment:

## Simulation: 2yr-01hr

Scenario: Scenario1  
Run Date/Time: 11/5/2020 12:11:01 PM  
Program Version: ICPR4 4.05.02

## General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	48.0000

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	60.0000	0.1000
Max Calculation Time:		48.0000

## Output Time Increments

## Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

## Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

## Restart File

Save Restart: False

## Resources &amp; Lookup Tables

## Resources

Rainfall Folder: Huff 24hr Dist

Unit Hydrograph  
Folder:

## Lookup Tables

Boundary Stage Set:

Extern Hydrograph Set:

Curve Number Set:

Green-Ampt Set:

Vertical Layers Set:

Impervious Set:

## Tolerances &amp; Options

Time Marching: SAOR

Max Iterations: 6

Over-Relax Weight 0.5 dec

Fact:

dZ Tolerance: 0.0010 ft

Max dZ: 1.0000 ft

Link Optimizer Tol: 0.0001 ft

Edge Length Option: Automatic

IA Recovery Time: 24.0000 hr

Smp/Man Basin Rain Global  
Opt:

Rainfall Name: Indy HUFF 50 1Q

Rainfall Amount: 1.39 in

Storm Duration: 1.0000 hr

Dflt Damping (1D): 0.0050 ft

Min Node Srf Area 100 ft2

(1D):

Energy Switch (1D): Energy

Comment:

Simulation: 2yr-02hr

Scenario: Scenario1

Run Date/Time: 11/5/2020 12:11:06 PM

Program Version: ICPR4 4.05.02

## General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	48.0000
	Hydrology [sec]	Surface Hydraulics [sec]		
Min Calculation Time:	60.0000	0.1000		
Max Calculation Time:		48.0000		

## Output Time Increments

## Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

## Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

## Restart File

Save Restart: False

## Resources &amp; Lookup Tables

## Resources

Rainfall Folder: Huff 24hr Dist

Unit Hydrograph  
Folder:

## Lookup Tables

Boundary Stage Set:  
Extern Hydrograph Set:  
Curve Number Set:Green-Ampt Set:  
Vertical Layers Set:  
Impervious Set:

## Tolerances &amp; Options

Time Marching: SAOR	IA Recovery Time: 24.0000 hr
Max Iterations: 6	
Over-Relax Weight 0.5 dec	
Fact:	
dZ Tolerance: 0.0010 ft	Smp/Man Basin Rain Global
	Opt:
Max dZ: 1.0000 ft	Rainfall Name: Indy HUFF 50 1Q
Link Optimizer Tol: 0.0001 ft	Rainfall Amount: 1.62 in
Edge Length Option: Automatic	Storm Duration: 2.0000 hr
	Dflt Damping (1D): 0.0050 ft

Min Node Srf Area 100 ft2  
 (1D):  
 Energy Switch (1D): Energy

Comment:

Simulation: 2yr-03hr

Scenario: Scenario1  
 Run Date/Time: 11/5/2020 12:11:12 PM  
 Program Version: ICPR4 4.05.02

#### General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	48.0000
	Hydrology [sec]	Surface Hydraulics [sec]		
Min Calculation Time:	60.0000	0.1000		
Max Calculation Time:		48.0000		

#### Output Time Increments

##### Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

##### Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

##### Restart File

Save Restart: False

#### Resources & Lookup Tables

##### Resources

Rainfall Folder: Huff 24hr Dist  
 Unit Hydrograph  
 Folder:

##### Lookup Tables

Boundary Stage Set:  
 Extern Hydrograph Set:  
 Curve Number Set:  
 Green-Ampt Set:  
 Vertical Layers Set:

Impervious Set:

## Tolerances &amp; Options

Time Marching: SAOR	IA Recovery Time: 24.0000 hr
Max Iterations: 6	
Over-Relax Weight 0.5 dec	
Fact:	
dZ Tolerance: 0.0010 ft	Smp/Man Basin Rain Global
	Opt:
Max dZ: 1.0000 ft	Rainfall Name: Indy HUFF 50 1Q
Link Optimizer Tol: 0.0001 ft	Rainfall Amount: 1.72 in
	Storm Duration: 3.0000 hr
Edge Length Option: Automatic	
	Dflt Damping (1D): 0.0050 ft
	Min Node Srf Area 100 ft2
	(1D):
	Energy Switch (1D): Energy

Comment:

## Simulation: 2yr-06hr

Scenario: Scenario1  
 Run Date/Time: 11/5/2020 12:11:17 PM  
 Program Version: ICPR4 4.05.02

## General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	48.0000

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	60.0000	0.1000
Max Calculation Time:		48.0000

## Output Time Increments

## Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

## Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Restart File

Save Restart: False

## Resources &amp; Lookup Tables

## Resources

Rainfall Folder: Huff 24hr Dist

Unit Hydrograph

Folder:

## Lookup Tables

Boundary Stage Set:

Extern Hydrograph Set:

Curve Number Set:

Green-Ampt Set:

Vertical Layers Set:

Impervious Set:

## Tolerances &amp; Options

Time Marching: SAOR

Max Iterations: 6

Over-Relax Weight 0.5 dec

Fact:

dZ Tolerance: 0.0010 ft

Max dZ: 1.0000 ft

Link Optimizer Tol: 0.0001 ft

Edge Length Option: Automatic

IA Recovery Time: 24.0000 hr

Smp/Man Basin Rain Global  
Opt:

Rainfall Name: Indy HUFF 50 1Q

Rainfall Amount: 2.05 in

Storm Duration: 6.0000 hr

Dflt Damping (1D): 0.0050 ft

Min Node Srf Area 100 ft2

(1D):

Energy Switch (1D): Energy

Comment:

Simulation: 2yr-12hr

Scenario: Scenario1

Run Date/Time: 11/5/2020 12:11:22 PM

Program Version: ICPR4 4.05.02

## General

Run Mode: Normal

Year

Month

Day

Hour [hr]

Start Time:	0	0	0	0.0000
End Time:	0	0	0	48.0000

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	60.0000	0.1000
Max Calculation Time:		48.0000

## Output Time Increments

## Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

## Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

## Restart File

Save Restart: False

## Resources &amp; Lookup Tables

## Resources

Rainfall Folder: Huff 24hr Dist

Unit Hydrograph  
Folder:

## Lookup Tables

Boundary Stage Set:  
Extern Hydrograph Set:  
Curve Number Set:Green-Ampt Set:  
Vertical Layers Set:  
Impervious Set:

## Tolerances &amp; Options

Time Marching: SAOR  
Max Iterations: 6  
Over-Relax Weight: 0.5 dec  
Fact:  
dZ Tolerance: 0.0010 ftMax dZ: 1.0000 ft  
Link Optimizer Tol: 0.0001 ft

Edge Length Option: Automatic

IA Recovery Time: 24.0000 hr

Smp/Man Basin Rain: Global  
Opt:Rainfall Name: Indy HUFF 50 2Q  
Rainfall Amount: 2.44 in  
Storm Duration: 12.0000 hrDflt Damping (1D): 0.0050 ft  
Min Node Srf Area: 100 ft2  
(1D):



Energy Switch (1D): Energy

Comment:
----------

Simulation: 2yr-24hr

Scenario: Scenario1  
 Run Date/Time: 11/5/2020 12:11:27 PM  
 Program Version: ICPR4 4.05.02

## General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	48.0000

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	60.0000	0.1000
Max Calculation Time:		48.0000

## Output Time Increments

## Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

## Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

## Restart File

Save Restart: False

## Resources &amp; Lookup Tables

## Resources

Rainfall Folder: Huff 24hr Dist

Unit Hydrograph Folder:

## Lookup Tables

Boundary Stage Set:

Extern Hydrograph Set:

Curve Number Set:

Green-Ampt Set:

Vertical Layers Set:

Impervious Set:

## Tolerances &amp; Options

Time Marching:	SAOR	IA Recovery Time:	24.0000 hr
Max Iterations:	6		
Over-Relax Weight	0.5 dec		
Fact:			
dZ Tolerance:	0.0010 ft	Smp/Man Basin Rain	Global
		Opt:	
Max dZ:	1.0000 ft	Rainfall Name:	Indy HUFF 50 3Q
Link Optimizer Tol:	0.0001 ft	Rainfall Amount:	2.91 in
		Storm Duration:	24.0000 hr
Edge Length Option:	Automatic		
		Dflt Damping (1D):	0.0050 ft
		Min Node Srf Area	100 ft2
		(1D):	
		Energy Switch (1D):	Energy

Comment:
----------

## Node Max Conditions [Scenario1]

Node Name	Sim Name	Warning Stage [ft]	Max Stage [ft]	Min/Max Delta Stage [ft]	Max Total Inflow [cfs]	Max Total Outflow [cfs]	Max Surface Area [ft2]
Existing Conditions	100yr-01hr	0.00	0.00	0.0000	38.85	0.00	0
Existing Conditions	100yr-02hr	0.00	0.00	0.0000	41.85	0.00	0
Existing Conditions	100yr-03hr	0.00	0.00	0.0000	38.23	0.00	0
Existing Conditions	100yr-06hr	0.00	0.00	0.0000	34.67	0.00	0
Existing Conditions	100yr-12hr	0.00	0.00	0.0000	32.31	0.00	0
Existing Conditions	100yr-24hr	0.00	0.00	0.0000	25.90	0.00	0
Existing Conditions	10yr-01hr	0.00	0.00	0.0000	12.92	0.00	0
Existing Conditions	10yr-02hr	0.00	0.00	0.0000	13.51	0.00	0
Existing Conditions	10yr-03hr	0.00	0.00	0.0000	12.68	0.00	0
Existing Conditions	10yr-06hr	0.00	0.00	0.0000	12.07	0.00	0
Existing Conditions	10yr-12hr	0.00	0.00	0.0000	13.35	0.00	0
Existing Conditions	10yr-24hr	0.00	0.00	0.0000	13.44	0.00	0
Existing Conditions	2yr-01hr	0.00	0.00	0.0000	2.78	0.00	0
Existing Conditions	2yr-02hr	0.00	0.00	0.0000	3.76	0.00	0
Existing Conditions	2yr-03hr	0.00	0.00	0.0000	3.30	0.00	0
Existing Conditions	2yr-06hr	0.00	0.00	0.0000	3.79	0.00	0
Existing Conditions	2yr-12hr	0.00	0.00	0.0000	4.97	0.00	0
Existing Conditions	2yr-24hr	0.00	0.00	0.0000	6.37	0.00	0

## **APPENDIX C**

### **PROPOSED CONDITIONS – WET POND DESIGN**



# Runoff Curve Number Calculation

49.8%B, 50.2% C

## Job Information

Description: I-65 Logistics Center  
 Entity: City of Franklin  
 Job #: 2019.02798  
 Date: 12/23/2020

Basin:	Proposed Site
CN Calculation Method:	Less Pervious Soil Group Than Actual
Site Condition:	Developed

Soil Name and Hydrologic Group		Area Description	Cover Description	Cover Condition	CN	Area	Product of CN x area
						(Acres)	
Br	B	Fully Developed	Open Space	Good Condition (grass cover >75%)	74	4.58	339.1636088
	B	Water	Water	Water	100	4.44	443.6018457
	B	Fully Developed	Impervious	Paved/Rooftop	98	22.74	2228.496404
CrA	C	Fully Developed	Open Space	Good Condition (grass cover >75%)	80	4.62	369.6084481
	C	Water	Water	Water	100	4.47	447.1649128
	C	Fully Developed	Impervious	Paved/Rooftop	98	22.92	2246.395974
Totals =						63.77	6074.431194

CN (weighted) =  $\frac{\text{total product}}{\text{total area}}$  = 95.3

Use CN = 95

**Time of Concentration ( $T_c$ ) or Travel Time ( $T_t$ )**

Project:	I-65 Logistics Center
Location:	City of Franklin
Basin:	701

By: \_\_\_\_\_  
Checked: \_\_\_\_\_

Date: \_\_\_\_\_  
Date: \_\_\_\_\_

Present  $\frac{-}{T_c}$  Developed  $\frac{X}{T_t}$  through subarea

## Sheet Flow

Surface description  
Manning's roughness coeff.,  $n$   
Flow Length,  $L$  ( $L < 300$  ft)  
Rainfall Calculation Method  
Two-year 24-hr rainfall,  $P_2$   
Land slope,  $s$

$$T_t = \frac{.007 (nL)^{0.8}}{(P_2)^{0.5} s^{0.4}}$$

Segment ID	
	Unpaved
	0.24
ft	100
	Entity Rainfall Data
in	2.90
ft/ft	0.01
hr	0.33

+

+

11

0.33

### Shallow Concentrated Flow

Surface description, (paved or unpaved)  
Flow length, L  
Watercourse slope, s  
Average velocity, V

$$T_t = \frac{L}{3600 \text{ V}}$$

Segment ID	
	Unpaved
ft	267
ft/ft	0.010
ft/s	1.61
hr	0.05

+

+

11

0.05

### Channel Flow

Channel Geometry  
Discharge (cfs)  
Diameter (ft)  
Bottom Width (ft)  
Side Slope (x:1) (ft)  
Slope of Channel (ft)  
Manning's Roughness Coefficient  
Depth (ft)  
Cross Sectional Area (ft<sup>2</sup>)  
Wetted Perimeter (ft)  
Hydraulic Radius (ft)  
Velocity (ft/s)  
Flow length, L  
$$T_t = \frac{L}{3600 \text{ V}}$$

$$T_t = \frac{L}{3600 V}$$

Segment ID	
	-
	-
	-
	-
	-
	-
	-
	-
	-
	-
	-
ft	-
hr	-

+

+

2

0.00

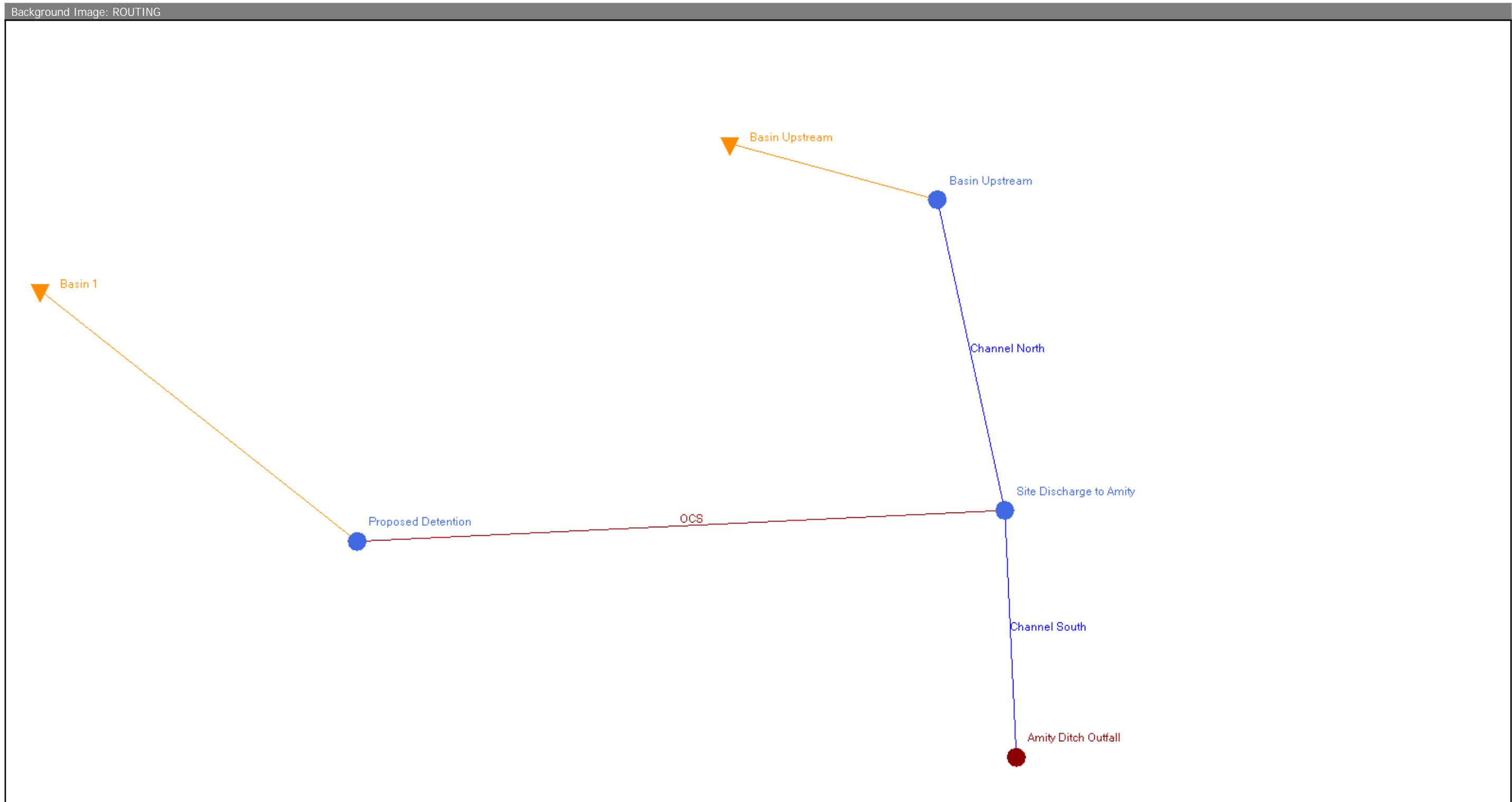
Watershed or subarea  $T_c$  or  $T_t$ 

hr  
min

0.38

22.52

\*A velocity of 5 ft/s was assumed for pipe travel time.





## Simple Basin: Basin 1

Scenario: Scenario1  
Node: Proposed Detention  
Hydrograph Method: NRCS Unit Hydrograph  
Infiltration Method: Curve Number  
Time of Concentration: 13.6000 min  
Max Allowable Q: 9999999999.00 cfs  
Time Shift: 0.0000 hr  
Unit Hydrograph: UH484  
Peaking Factor: 484.0  
Area: 63.7700 ac  
Curve Number: 95.0  
% Impervious: 0.00  
% DCIA: 0.00  
% Direct: 0.00  
Rainfall Name: Indy HUFF 50 1Q

Comment:

## Simple Basin: Basin Upstream

Scenario: Scenario1  
Node: Basin Upstream  
Hydrograph Method: NRCS Unit Hydrograph  
Infiltration Method: Curve Number  
Time of Concentration: 750.0000 min  
Max Allowable Q: 0.00 cfs  
Time Shift: 0.0000 hr  
Unit Hydrograph: UH484  
Peaking Factor: 484.0  
Area: 1369.3000 ac  
Curve Number: 84.0  
% Impervious: 0.00  
% DCIA: 0.00  
% Direct: 0.00  
Rainfall Name: ~SCSII-24

Comment:

## Node: Amity Ditch Outfall

Scenario: Scenario1  
Type: Time/Stage  
Base Flow: 0.00 cfs  
Initial Stage: 709.69 ft  
Warning Stage: 709.69 ft  
Boundary Stage:

Year	Month	Day	Hour	Stage [ft]
0	0	0	0.0000	709.69
0	0	0	48.0000	709.69

Comment:

#### Node: Basin Upstream

Scenario: Scenario1  
 Type: Stage/Area  
 Base Flow: 0.00 cfs  
 Initial Stage: 709.73 ft  
 Warning Stage: 709.73 ft

Stage [ft]	Area [ac]	Area [ft2]
709.73	0.0000	0
717.80	0.0000	0

Comment:

#### Node: Proposed Detention

Scenario: Scenario1  
 Type: Stage/Area  
 Base Flow: 0.00 cfs  
 Initial Stage: 710.42 ft  
 Warning Stage: 719.50 ft

Stage [ft]	Area [ac]	Area [ft2]
710.42	6.8900	300128
717.80	8.3500	363726
719.50	8.7000	378972
720.50	8.9070	387989

Comment:

#### Node: Site Discharge to Amity

Scenario: Scenario1  
 Type: Stage/Area  
 Base Flow: 0.00 cfs  
 Initial Stage: 709.71 ft  
 Warning Stage: 717.80 ft

Stage [ft]	Area [ac]	Area [ft2]
709.71	0.0000	0
718.80	0.0000	0

Comment:

Channel Link: Channel North		Upstream	Downstream
Scenario:	Scenario1	Invert: 711.71 ft	Invert: 709.71 ft
From Node:	Basin Upstream	Manning's N: 0.0000	Manning's N: 0.0000
To Node:	Site Discharge to Amity	Geometry: Irregular	Geometry: Irregular
		Cross Section: Amity Ditch Cross	Cross Section: Amity Ditch Cross
Link Count:	1		
Flow Direction:	Positive		
Damping:	0.0000 ft		
Length:	1000.00 ft		
Contraction Coef:	0.00		
Expansion Coef:	0.00		
Entr Loss Coef:	0.00		
Exit Loss Coef:	0.00		
Bend Loss Coef:	0.00		
Bend Location:	0.00 ft		
Energy Switch:	Energy		

Comment:

Channel Link: Channel South		Upstream	Downstream
Scenario:	Scenario1	Invert: 709.71 ft	Invert: 709.69 ft
From Node:	Site Discharge to Amity	Manning's N: 0.0000	Manning's N: 0.0000
To Node:	Amity Ditch Outfall	Geometry: Irregular	Geometry: Irregular
		Cross Section: Amity Ditch Cross	Cross Section: Amity Ditch Cross
Link Count:	1		
Flow Direction:	Both		
Damping:	0.0000 ft		
Length:	1000.00 ft		
Contraction Coef:	0.00		
Expansion Coef:	0.00		
Entr Loss Coef:	0.00		
Exit Loss Coef:	0.00		
Bend Loss Coef:	0.00		
Bend Location:	0.00 ft		
Energy Switch:	Energy		

Comment:

Drop Structure Link: OCS		Upstream Pipe	Downstream Pipe
Scenario:	Scenario1	Invert: 710.42 ft	Invert: 710.03 ft
From Node:	Proposed	Manning's N: 0.0130	Manning's N: 0.0130
	Detention	Geometry: Circular	Geometry: Circular
To Node:	Site Discharge to	Max Depth: 2.00 ft	Max Depth: 2.00 ft
	Amity	Bottom Clip	
Link Count:	1	Default: 0.00 ft	Default: 0.00 ft
Flow Direction:	Both	Op Table:	Op Table:
Solution:	Combine	Ref Node:	Ref Node:
Increments:	0	Manning's N: 0.0000	Manning's N: 0.0000
Pipe Count:	1	Top Clip	
Damping:	0.0000 ft	Default: 0.00 ft	Default: 0.00 ft
Length:	265.64 ft	Op Table:	Op Table:
FHWA Code:	0	Ref Node:	Ref Node:
Entr Loss Coef:	0.00	Manning's N: 0.0000	Manning's N: 0.0000
Exit Loss Coef:	1.00		
Bend Loss Coef:	0.00		
Bend Location:	0.00 ft		
Energy Switch:	Energy		
Pipe Comment:			

Weir Component		Bottom Clip
Weir:	1	Default: 0.00 ft
Weir Count:	1	Op Table:
Weir Flow Direction:	Both	Ref Node:
Damping:	0.0000 ft	Top Clip
Weir Type:	Sharp Crested Vertical	Default: 0.00 ft
Geometry Type:	Circular	Op Table:
Invert:	710.42 ft	Ref Node:
Control Elevation:	710.42 ft	Discharge Coefficients
Max Depth:	1.33 ft	Weir Default: 3.200
		Weir Table:
		Orifice Default: 0.600
		Orifice Table:
Weir Comment:		

Weir Component		Bottom Clip
Weir:	2	Default: 0.00 ft
Weir Count:	1	Op Table:
Weir Flow Direction:	Both	Ref Node:
Damping:	0.0000 ft	Top Clip
Weir Type:	Sharp Crested Vertical	Default: 0.00 ft
Geometry Type:	Rectangular	Op Table:
Invert:	714.75 ft	Ref Node:
Control Elevation:	714.75 ft	Discharge Coefficients
Max Depth:	2.50 ft	Weir Default: 3.200
Max Width:	3.00 ft	Weir Table:
Fillet:	0.00 ft	Orifice Default: 0.600

Orifice Table:

Weir Comment:

Drop Structure Comment:

Simulation: 100yr-01hr

Scenario: Scenario1

Run Date/Time: 12/27/2020 5:26:52 PM

Program Version: ICPR4 4.05.01

## General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	48.0000

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	60.0000	0.1000
Max Calculation Time:		48.0000

## Output Time Increments

## Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

## Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

## Restart File

Save Restart: False

## Resources &amp; Lookup Tables

## Resources

Rainfall Folder: Huff 24hr Dist

Unit Hydrograph  
Folder:

## Lookup Tables

Boundary Stage Set:  
Extern Hydrograph Set:  
Curve Number Set:Green-Ampt Set:  
Vertical Layers Set:

Impervious Set:

## Tolerances &amp; Options

Time Marching: SAOR	IA Recovery Time: 24.0000 hr
Max Iterations: 6	
Over-Relax Weight 0.5 dec	
Fact:	
dZ Tolerance: 0.0010 ft	Smp/Man Basin Rain Global
	Opt:
Max dZ: 1.0000 ft	Rainfall Name: Indy HUFF 50 1Q
Link Optimizer Tol: 0.0001 ft	Rainfall Amount: 3.00 in
	Storm Duration: 1.0000 hr
Edge Length Option: Automatic	
	Dflt Damping (1D): 0.0050 ft
	Min Node Srf Area 100 ft2
	(1D):
	Energy Switch (1D): Energy

Comment:

## Simulation: 100yr-02hr

Scenario: Scenario1  
 Run Date/Time: 12/27/2020 5:27:13 PM  
 Program Version: ICPR4 4.05.01

## General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	48.0000

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	60.0000	0.1000
Max Calculation Time:		48.0000

## Output Time Increments

## Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

## Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Restart File

Save Restart: False

## Resources &amp; Lookup Tables

## Resources

Rainfall Folder: Huff 24hr Dist

Unit Hydrograph  
Folder:

## Lookup Tables

Boundary Stage Set:  
Extern Hydrograph Set:  
Curve Number Set:Green-Ampt Set:  
Vertical Layers Set:  
Impervious Set:

## Tolerances &amp; Options

Time Marching: SAOR  
Max Iterations: 6  
Over-Relax Weight: 0.5 dec  
Fact:  
dZ Tolerance: 0.0010 ft  
  
Max dZ: 1.0000 ft  
Link Optimizer Tol: 0.0001 ft  
  
Edge Length Option: Automatic

IA Recovery Time: 24.0000 hr

Smp/Man Basin Rain: Global  
Opt:Rainfall Name: Indy HUFF 50 1Q  
Rainfall Amount: 3.64 in  
Storm Duration: 2.0000 hrDflt Damping (1D): 0.0050 ft  
Min Node Srf Area: 100 ft2  
(1D):  
Energy Switch (1D): Energy

Comment:

Simulation: 100yr-03hr

Scenario: Scenario1  
Run Date/Time: 12/27/2020 5:27:30 PM  
Program Version: ICPR4 4.05.01

## General

Run Mode: Normal

Year

Month

Day

Hour [hr]

Start Time:	0	0	0	0.0000
End Time:	0	0	0	48.0000

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	60.0000	0.1000
Max Calculation Time:		48.0000

## Output Time Increments

## Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

## Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

## Restart File

Save Restart: False

## Resources &amp; Lookup Tables

## Resources

Rainfall Folder: Huff 24hr Dist

Unit Hydrograph  
Folder:

## Lookup Tables

Boundary Stage Set:  
Extern Hydrograph Set:  
Curve Number Set:Green-Ampt Set:  
Vertical Layers Set:  
Impervious Set:

## Tolerances &amp; Options

Time Marching: SAOR  
Max Iterations: 6  
Over-Relax Weight: 0.5 dec  
Fact:  
dZ Tolerance: 0.0010 ftMax dZ: 1.0000 ft  
Link Optimizer Tol: 0.0001 ft

Edge Length Option: Automatic

IA Recovery Time: 24.0000 hr

Smp/Man Basin Rain: Global  
Opt:Rainfall Name: Indy HUFF 50 1Q  
Rainfall Amount: 3.92 in  
Storm Duration: 3.0000 hrDflt Damping (1D): 0.0050 ft  
Min Node Srf Area: 100 ft2  
(1D):



Energy Switch (1D): Energy

Comment:
----------

Simulation: 100yr-06hr

Scenario: Scenario1  
 Run Date/Time: 12/27/2020 5:27:47 PM  
 Program Version: ICPR4 4.05.01

## General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	48.0000

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	60.0000	0.1000
Max Calculation Time:		48.0000

## Output Time Increments

## Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

## Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

## Restart File

Save Restart: False

## Resources &amp; Lookup Tables

## Resources

Rainfall Folder: Huff 24hr Dist

Unit Hydrograph Folder:

## Lookup Tables

Boundary Stage Set:

Extern Hydrograph Set:

Curve Number Set:

Green-Ampt Set:

Vertical Layers Set:

Impervious Set:

## Tolerances &amp; Options

Time Marching: SAOR	IA Recovery Time: 24.0000 hr
Max Iterations: 6	
Over-Relax Weight 0.5 dec	
Fact:	
dZ Tolerance: 0.0010 ft	Smp/Man Basin Rain Global
	Opt:
Max dZ: 1.0000 ft	Rainfall Name: Indy HUFF 50 1Q
Link Optimizer Tol: 0.0001 ft	Rainfall Amount: 4.75 in
	Storm Duration: 3.0000 hr
Edge Length Option: Automatic	
	Dflt Damping (1D): 0.0050 ft
	Min Node Srf Area 100 ft2
	(1D):
	Energy Switch (1D): Energy

Comment:

## Simulation: 100yr-12hr

Scenario: Scenario1  
Run Date/Time: 12/27/2020 5:28:08 PM  
Program Version: ICPR4 4.05.01

## General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	48.0000

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	60.0000	0.1000
Max Calculation Time:		48.0000

## Output Time Increments

## Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

## Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
------	-------	-----	-----------	----------------------

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Restart File

Save Restart: False

## Resources &amp; Lookup Tables

## Resources

Rainfall Folder: Huff 24hr Dist

Unit Hydrograph  
Folder:

## Lookup Tables

Boundary Stage Set:

Extern Hydrograph Set:

Curve Number Set:

Green-Ampt Set:

Vertical Layers Set:

Impervious Set:

## Tolerances &amp; Options

Time Marching: SAOR

Max Iterations: 6

Over-Relax Weight 0.5 dec

Fact:

dZ Tolerance: 0.0010 ft

Max dZ: 1.0000 ft

Link Optimizer Tol: 0.0001 ft

Edge Length Option: Automatic

IA Recovery Time: 24.0000 hr

Smp/Man Basin Rain Global  
Opt:

Rainfall Name: Indy HUFF 50 2Q

Rainfall Amount: 5.35 in

Storm Duration: 12.0000 hr

Dflt Damping (1D): 0.0050 ft

Min Node Srf Area 100 ft2

(1D):

Energy Switch (1D): Energy

Comment:

Simulation: 100yr-24hr

Scenario: Scenario1

Run Date/Time: 12/27/2020 5:28:28 PM

Program Version: ICPR4 4.05.01

## General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000

End Time: 0 0 0 48.0000

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	60.0000	0.1000
Max Calculation Time:		48.0000

## Output Time Increments

## Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

## Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

## Restart File

Save Restart: False

## Resources &amp; Lookup Tables

## Resources

Rainfall Folder: Huff 24hr Dist

Unit Hydrograph Folder:

## Lookup Tables

Boundary Stage Set:

Extern Hydrograph Set:

Curve Number Set:

Green-Ampt Set:

Vertical Layers Set:

Impervious Set:

## Tolerances &amp; Options

Time Marching: SAOR

Max Iterations: 6

Over-Relax Weight Fact: 0.5 dec

dZ Tolerance: 0.0010 ft

Max dZ: 1.0000 ft

Link Optimizer Tol: 0.0001 ft

Edge Length Option: Automatic

IA Recovery Time: 24.0000 hr

Smp/Man Basin Rain Global Opt:

Rainfall Name: Indy HUFF 50 3Q

Rainfall Amount: 5.88 in

Storm Duration: 24.0000 hr

Dflt Damping (1D): 0.0050 ft

Min Node Srf Area (1D): 100 ft2

Energy Switch (1D): Energy

Comment:

Simulation: 10yr-01hr

Scenario: Scenario1  
Run Date/Time: 12/27/2020 5:28:47 PM  
Program Version: ICPR4 4.05.01

#### General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	48.0000

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	60.0000	0.1000
Max Calculation Time:		48.0000

#### Output Time Increments

##### Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

##### Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

##### Restart File

Save Restart: False

#### Resources & Lookup Tables

##### Resources

Rainfall Folder: Huff 24hr Dist

Unit Hydrograph  
Folder:

##### Lookup Tables

Boundary Stage Set:  
Extern Hydrograph Set:  
Curve Number Set:

Green-Ampt Set:  
Vertical Layers Set:  
Impervious Set:

#### Tolerances & Options

Time Marching: SAOR	IA Recovery Time: 24.0000 hr
Max Iterations: 6	
Over-Relax Weight 0.5 dec	
Fact:	
dZ Tolerance: 0.0010 ft	Smp/Man Basin Rain Global
	Opt:
Max dZ: 1.0000 ft	Rainfall Name: Indy HUFF 50 1Q
Link Optimizer Tol: 0.0001 ft	Rainfall Amount: 2.02 in
	Storm Duration: 1.0000 hr
Edge Length Option: Automatic	
	Dflt Damping (1D): 0.0050 ft
	Min Node Srf Area 100 ft2
	(1D):
	Energy Switch (1D): Energy

Comment:

Simulation: 10yr-02hr

Scenario: Scenario1  
Run Date/Time: 12/27/2020 5:29:07 PM  
Program Version: ICPR4 4.05.01

#### General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	48.0000

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	60.0000	0.1000
Max Calculation Time:		48.0000

#### Output Time Increments

##### Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

##### Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

## Restart File

Save Restart: False

## Resources &amp; Lookup Tables

## Resources

Rainfall Folder: Huff 24hr Dist

Unit Hydrograph  
Folder:

## Lookup Tables

Boundary Stage Set:  
Extern Hydrograph Set:  
Curve Number Set:Green-Ampt Set:  
Vertical Layers Set:  
Impervious Set:

## Tolerances &amp; Options

Time Marching: SAOR  
Max Iterations: 6  
Over-Relax Weight: 0.5 dec  
Fact:  
dZ Tolerance: 0.0010 ftMax dZ: 1.0000 ft  
Link Optimizer Tol: 0.0001 ft

Edge Length Option: Automatic

IA Recovery Time: 24.0000 hr

Smp/Man Basin Rain: Global  
Opt:Rainfall Name: Indy HUFF 50 1Q  
Rainfall Amount: 2.37 in  
Storm Duration: 2.0000 hrDflt Damping (1D): 0.0050 ft  
Min Node Srf Area: 100 ft2  
(1D):  
Energy Switch (1D): Energy

Comment:

## Simulation: 10yr-03hr

Scenario: Scenario1  
Run Date/Time: 12/27/2020 5:29:24 PM  
Program Version: ICPR4 4.05.01

## General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	48.0000

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	60.0000	0.1000
Max Calculation Time:		48.0000

## Output Time Increments

## Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

## Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

## Restart File

Save Restart: False

## Resources &amp; Lookup Tables

## Resources

Rainfall Folder: Huff 24hr Dist

Unit Hydrograph  
Folder:

## Lookup Tables

Boundary Stage Set:  
Extern Hydrograph Set:  
Curve Number Set:Green-Ampt Set:  
Vertical Layers Set:  
Impervious Set:

## Tolerances &amp; Options

Time Marching: SAOR  
 Max Iterations: 6  
 Over-Relax Weight: 0.5 dec  
 Fact:  
 dZ Tolerance: 0.0010 ft  
 Max dZ: 1.0000 ft  
 Link Optimizer Tol: 0.0001 ft  
 Edge Length Option: Automatic

IA Recovery Time: 24.0000 hr  
 Smp/Man Basin Rain Opt: Global  
 Rainfall Name: Indy HUFF 50 1Q  
 Rainfall Amount: 2.53 in  
 Storm Duration: 3.0000 hr  
 Dflt Damping (1D): 0.0050 ft  
 Min Node Srf Area (1D): 100 ft2  
 Energy Switch (1D): Energy

Comment:



## Simulation: 10yr-06hr

Scenario: Scenario1  
 Run Date/Time: 12/27/2020 5:29:44 PM  
 Program Version: ICPR4 4.05.01

## General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	48.0000

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	60.0000	0.1000
Max Calculation Time:		48.0000

## Output Time Increments

## Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

## Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

## Restart File

Save Restart: False

## Resources &amp; Lookup Tables

## Resources

Rainfall Folder: Huff 24hr Dist

Unit Hydrograph  
Folder:

## Lookup Tables

Boundary Stage Set:  
 Extern Hydrograph Set:  
 Curve Number Set:

Green-Ampt Set:  
 Vertical Layers Set:  
 Impervious Set:

## Tolerances &amp; Options

Time Marching: SAOR  
 Max Iterations: 6  
 Over-Relax Weight: 0.5 dec  
 Fact:  
 dZ Tolerance: 0.0010 ft

IA Recovery Time: 24.0000 hr  
  
 Smp/Man Basin Rain: Global

Max dZ: 1.0000 ft  
 Link Optimizer Tol: 0.0001 ft  
 Edge Length Option: Automatic

Opt:

Rainfall Name: Indy HUFF 50 1Q  
 Rainfall Amount: 3.03 in  
 Storm Duration: 6.0000 hr  
 Dflt Damping (1D): 0.0050 ft  
 Min Node Srf Area (1D): 100 ft2  
 Energy Switch (1D): Energy

Comment:

Simulation: 10yr-12hr

Scenario: Scenario1  
 Run Date/Time: 12/27/2020 5:30:02 PM  
 Program Version: ICPR4 4.05.01

#### General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	48.0000

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	60.0000	0.1000
Max Calculation Time:		48.0000

#### Output Time Increments

##### Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

##### Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

##### Restart File

Save Restart: False

#### Resources & Lookup Tables

Resources	Lookup Tables
Rainfall Folder: Huff 24hr Dist	Boundary Stage Set:
Unit Hydrograph Folder:	Extern Hydrograph Set:
	Curve Number Set:
	Green-Ampt Set:
	Vertical Layers Set:
	Impervious Set:

Tolerances & Options			
Time Marching:	SAOR	IA Recovery Time:	24.0000 hr
Max Iterations:	6		
Over-Relax Weight	0.5 dec		
Fact:			
dZ Tolerance:	0.0010 ft	Smp/Man Basin Rain	Global
		Opt:	
Max dZ:	1.0000 ft	Rainfall Name:	Indy HUFF 50 2Q
Link Optimizer Tol:	0.0001 ft	Rainfall Amount:	3.52 in
Edge Length Option:	Automatic	Storm Duration:	12.0000 hr
		Dflt Damping (1D):	0.0050 ft
		Min Node Srf Area	100 ft2
		(1D):	
		Energy Switch (1D):	Energy

Comment:

#### Simulation: 10yr-24hr

Scenario: Scenario1  
Run Date/Time: 12/27/2020 5:30:19 PM  
Program Version: ICPR4 4.05.01

General				
Run Mode:	Normal			
	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	48.0000
	Hydrology [sec]	Surface Hydraulics [sec]		
Min Calculation Time:	60.0000	0.1000		
Max Calculation Time:		48.0000		

Output Time Increments
------------------------

## Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

## Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

## Restart File

Save Restart: False

## Resources &amp; Lookup Tables

## Resources

Rainfall Folder: Huff 24hr Dist

Unit Hydrograph  
Folder:

## Lookup Tables

Boundary Stage Set:  
Extern Hydrograph Set:  
Curve Number Set:Green-Ampt Set:  
Vertical Layers Set:  
Impervious Set:

## Tolerances &amp; Options

Time Marching: SAOR  
 Max Iterations: 6  
 Over-Relax Weight: 0.5 dec  
 Fact:  
 dZ Tolerance: 0.0010 ft  
 Max dZ: 1.0000 ft  
 Link Optimizer Tol: 0.0001 ft  
 Edge Length Option: Automatic

IA Recovery Time: 24.0000 hr  
 Smp/Man Basin Rain Opt: Global  
 Rainfall Name: Indy HUFF 50 3Q  
 Rainfall Amount: 4.08 in  
 Storm Duration: 24.0000 hr  
 Dflt Damping (1D): 0.0050 ft  
 Min Node Srf Area (1D): 100 ft2  
 Energy Switch (1D): Energy

Comment:

## Node Max Conditions [Scenario1]

Node Name	Sim Name	Warning Stage [ft]	Max Stage [ft]	Min/Max Delta Stage [ft]	Max Total Inflow [cfs]	Max Total Outflow [cfs]	Max Surface Area [ft2]
Amity Ditch Outfall	100yr-01hr	709.69	709.69	0.0000	165.17	0.00	0
Amity Ditch Outfall	100yr-02hr	709.69	709.69	0.0000	222.06	0.00	0
Amity Ditch Outfall	100yr-03hr	709.69	709.69	0.0000	243.21	0.00	0
Amity Ditch Outfall	100yr-06hr	709.69	709.69	0.0000	340.98	0.00	0
Amity Ditch Outfall	100yr-12hr	709.69	709.69	0.0000	356.49	0.00	0
Amity Ditch Outfall	100yr-24hr	709.69	709.69	0.0000	341.12	0.00	0
Amity Ditch Outfall	10yr-01hr	709.69	709.69	0.0000	75.21	0.00	0
Amity Ditch Outfall	10yr-02hr	709.69	709.69	0.0000	104.97	0.00	0
Amity Ditch Outfall	10yr-03hr	709.69	709.69	0.0000	119.45	0.00	0
Amity Ditch Outfall	10yr-06hr	709.69	709.69	0.0000	158.16	0.00	0
Amity Ditch Outfall	10yr-12hr	709.69	709.69	0.0000	189.54	0.00	0
Amity Ditch Outfall	10yr-24hr	709.69	709.69	0.0000	199.98	0.00	0
Basin Upstream	100yr-01hr	709.73	718.73	0.0010	187.95	193.65	521341
Basin Upstream	100yr-02hr	709.73	718.96	0.0010	254.03	258.42	542842
Basin Upstream	100yr-03hr	709.73	719.04	0.0010	282.04	284.55	550947
Basin Upstream	100yr-06hr	709.73	719.32	0.0010	372.98	373.95	577609
Basin Upstream	100yr-12hr	709.73	719.35	0.0010	386.15	384.93	581448
Basin Upstream	100yr-24hr	709.73	719.27	0.0010	360.82	359.33	575759
Basin Upstream	10yr-01hr	709.73	718.31	0.0010	93.97	95.88	483313
Basin Upstream	10yr-02hr	709.73	718.47	0.0010	125.50	128.16	497802
Basin Upstream	10yr-03hr	709.73	718.53	0.0010	139.68	142.88	503527
Basin Upstream	10yr-06hr	709.73	718.68	0.0010	179.17	183.69	517749
Basin Upstream	10yr-12hr	709.73	718.78	0.0010	210.98	213.68	528758

Node Name	Sim Name	Warning Stage [ft]	Max Stage [ft]	Min/Max Delta Stage [ft]	Max Total Inflow [cfs]	Max Total Outflow [cfs]	Max Surface Area [ft2]
Basin Upstream	10yr-24hr	709.73	718.79	0.0010	220.55	221.45	531822
Proposed Detention	100yr-01hr	719.50	715.40	0.0010	300.99	5.98	343071
Proposed Detention	100yr-02hr	719.50	715.60	0.0010	237.72	6.61	344778
Proposed Detention	100yr-03hr	719.50	715.72	0.0010	198.29	6.62	345794
Proposed Detention	100yr-06hr	719.50	716.07	0.0010	251.98	6.65	348809
Proposed Detention	100yr-12hr	719.50	716.48	0.0010	69.42	5.36	352345
Proposed Detention	100yr-24hr	719.50	717.02	0.0010	50.66	7.55	356968
Proposed Detention	10yr-01hr	719.50	714.46	0.0010	179.42	3.35	334952
Proposed Detention	10yr-02hr	719.50	714.87	0.0010	134.56	4.01	338472
Proposed Detention	10yr-03hr	719.50	715.05	0.0010	110.53	4.37	339997
Proposed Detention	10yr-06hr	719.50	715.45	0.0010	84.61	6.36	343516
Proposed Detention	10yr-12hr	719.50	715.63	0.0010	42.84	4.54	345032
Proposed Detention	10yr-24hr	719.50	716.05	0.0010	37.39	3.77	348676
Site Discharge to Amity	100yr-01hr	717.80	716.81	0.0010	193.65	179.65	824722
Site Discharge to Amity	100yr-02hr	717.80	717.15	0.0010	258.42	237.46	1262961
Site Discharge to Amity	100yr-03hr	717.80	717.30	0.0010	284.55	258.96	1541682
Site Discharge to Amity	100yr-06hr	717.80	717.64	0.0010	373.95	357.68	1612881
Site Discharge to Amity	100yr-12hr	717.80	717.69	0.0010	384.93	372.45	1621026
Site Discharge to Amity	100yr-24hr	717.80	717.64	0.0010	359.33	354.30	1612710
Site Discharge to Amity	10yr-01hr	717.80	716.19	0.0010	95.88	87.81	725772

Node Name	Sim Name	Warning Stage [ft]	Max Stage [ft]	Min/Max Delta Stage [ft]	Max Total Inflow [cfs]	Max Total Outflow [cfs]	Max Surface Area [ft2]
Site Discharge to Amity	10yr-02hr	717.80	716.42	0.0010	128.16	118.25	754034
Site Discharge to Amity	10yr-03hr	717.80	716.52	0.0010	142.88	133.01	765412
Site Discharge to Amity	10yr-06hr	717.80	716.77	0.0010	183.69	172.38	815198
Site Discharge to Amity	10yr-12hr	717.80	716.96	0.0010	213.68	204.18	871773
Site Discharge to Amity	10yr-24hr	717.80	717.02	0.0010	221.45	214.11	1113690

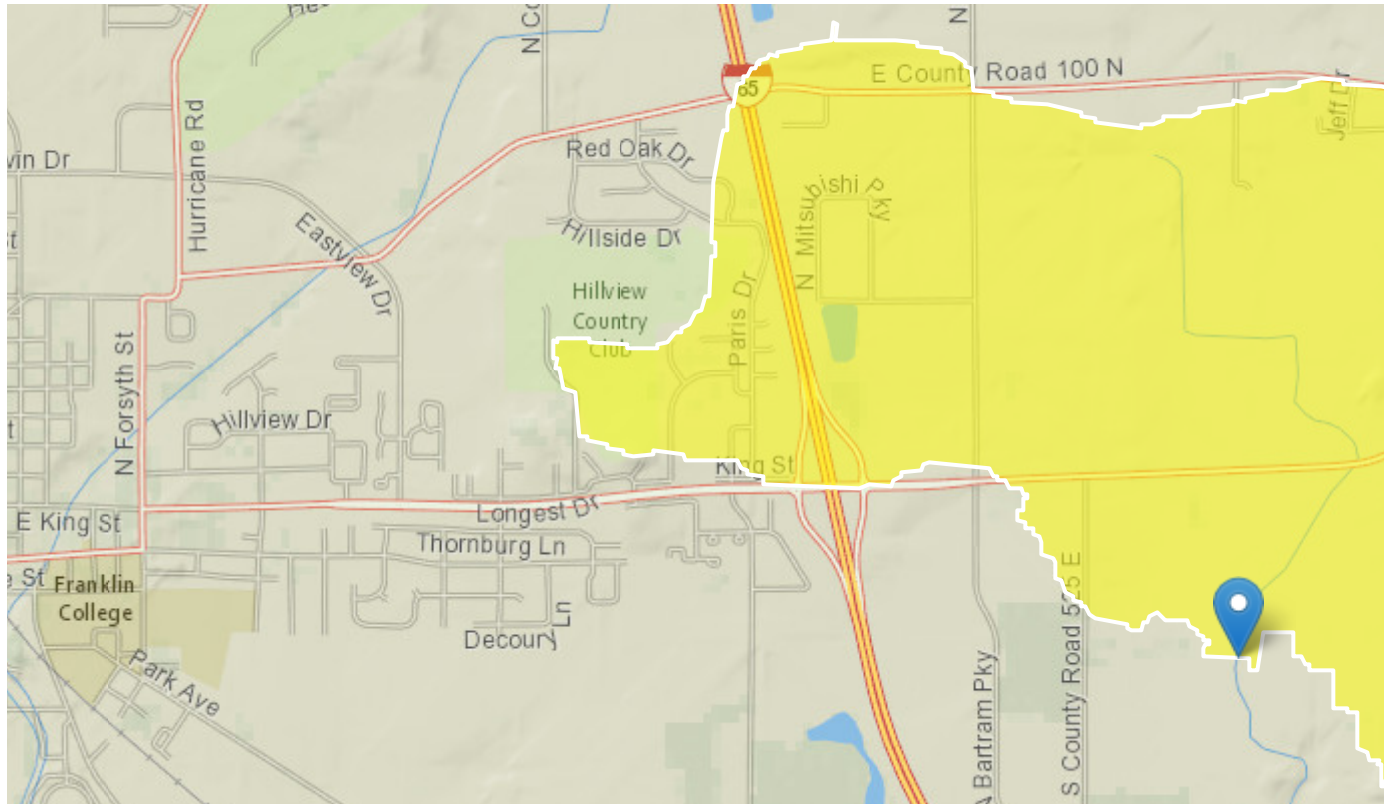
# StreamStats Report

Region ID: IN

Workspace ID: IN20200106215613764000

Clicked Point (Latitude, Longitude): 39.47758, -85.99647

Time: 2020-01-06 16:56:28 -0500



## Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
CONTDA	Area that contributes flow to a point on a stream	2.138	square miles
CSL10_85	Change in elevation divided by length between points 10 and 85 percent of distance along main channel to basin divide - main channel method not known	7.51	feet per mi
URBAN	Percentage of basin with urban development	2.8	percent
HIGHREG	HIGHREG	1008	dimensionless
DRNAREA	Area that drains to a point on a stream	2.138	square miles



Parameter Code	Parameter Description	Value	Unit
BFREGNO	BFREGNO	1566	dimensionless
K1INDNR	Average hydraulic conductivity (ft/d) for the top 70 ft of unconsolidated deposits from InDNR well database.	35	ft per day
BSLDEM10M	Mean basin slope computed from 10 m DEM	0.91	percent
QSSPERMTHK	Index of the permeability of surficial Quaternary sediments computed as in SIR 2014-5177	150	dimensionless
T2INDNR	Average transmissivity (ft <sup>2</sup> /d) for the full depth of unconsolidated deposits from InDNR well database.	3467	square feet per day
LOWREG	Low Flow Region Number	1729	dimensionless
K2INDNR	Average hydraulic conductivity (ft/d) for the full depth of unconsolidated deposits from InDNR well database.	46	ft per day
LC01FOREST	Percentage of forest from NLCD 2001 classes 41-43	1	percent
ST2INDNR	Average transmissivity (ft <sup>2</sup> /d) for the full depth of unconsolidated deposits within 1000 ft of stream channel from InDNR well database.	3760	square feet per day
LAT_OUT	Latitude of Basin Outlet	39.477562	degrees

#### Peak-Flow Statistics Parameters<sup>[Region 4 Peak Flow]</sup>

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
CONTDA	Contributing Drainage Area	2.138	square miles	0.31	2444
CSL10_85	Stream Slope 10 and 85 Method	7.51	feet per mi	2.7	48.7
URBAN	Percent Urban	2.8	percent	0	83.9
HIGHREG	HIGHREG	1008	dimensionless		

#### Peak-Flow Statistics Flow Report<sup>[Region 4 Peak Flow]</sup>

PII: Prediction Interval-Lower, Plu: Prediction Interval-Upper, SEp: Standard Error of Prediction, SE: Standard Error (other -- see report)

Statistic	Value	Unit	PII	Plu	SE	Equiv. Yrs.
10 Year Peak Flood	255	ft <sup>3</sup> /s	135	480	23.1	7.7
25 Year Peak Flood	319	ft <sup>3</sup> /s	213	478	22.5	10.6
50 Year Peak Flood	369	ft <sup>3</sup> /s	246	553	22.4	12.9
100 Year Peak Flood	418	ft <sup>3</sup> /s	277	630	22.4	15.1
200 Year Peak Flood	464	ft <sup>3</sup> /s	305	704	22.7	16.6
500 Year Peak Flood	525	ft <sup>3</sup> /s	341	808	23.5	18.2

#### *Peak-Flow Statistics Citations*

**Knipe, David, and Rao, A.R.,2005, Estimation of peak discharges of Indiana streams by using log-Pearson III distribution: U.S. Federal Highway Administration Joint Transportation Research Program Interim Report FHWA/IN/JTRP-2005/1, 194 p. ([http://in.water.usgs.gov/newreports/SPR\\_0518.pdf](http://in.water.usgs.gov/newreports/SPR_0518.pdf))**

#### Bankfull Statistics Parameters[Bankfull Central Till Plain Region 2013 5078]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	2.138	square miles	0.04	812
BFREGNO	BFREGNO	1566	dimensionless		

#### Bankfull Statistics Flow Report[Bankfull Central Till Plain Region 2013 5078]

Statistic	Value	Unit
Bankfull Width	23.3	ft
Bankfull Depth	1.81	ft
Bankfull Area	41.7	ft <sup>2</sup>

#### *Bankfull Statistics Citations*

**Robinson, B.A.,2013, Regional bankfull-channel dimensions of non-urban wadeable streams in Indiana: U.S. Geological Survey, Scientific Investigations Report 2013–5078, 33 p. (<http://pubs.usgs.gov/sir/2013/5078/>)**

#### Low-Flow Statistics Parameters[Statewide Lowflow 2016 5102]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	2.138	square miles	6.33	856
K1INDNR	Avg_Hydraulic_Conductivity_Upper_70ft	35	ft per day	5.78	76.9
BSLDEM10M	Mean Basin Slope from 10m DEM	0.91	percent	0.916	7.8
QSSPERMTHK	Permeability_Index	150	dimensionless	0	30000

Low-Flow Statistics Parameters[Statewide 30day Lowflow 2016 5102]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	2.138	square miles	6.33	856
K1INDNR	Avg_Hydraulic_Conductivity_Upper_70ft	35	ft per day	5.78	76.9
BSLDEM10M	Mean Basin Slope from 10m DEM	0.91	percent	0.916	7.8
QSSPERMTHK	Permeability_Index	150	dimensionless	0	30000

Low-Flow Statistics Disclaimers[Statewide Lowflow 2016 5102]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

Low-Flow Statistics Flow Report[Statewide Lowflow 2016 5102]

Statistic	Value	Unit
1 Day 10 Year Low Flow	0.0295	ft^3/s
7 Day 10 Year Low Flow	0.0425	ft^3/s

Low-Flow Statistics Disclaimers[Statewide 30day Lowflow 2016 5102]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

Low-Flow Statistics Flow Report[Statewide 30day Lowflow 2016 5102]

Statistic	Value	Unit
30 Day 10 Year Low Flow	0.0571	ft^3/s

Low-Flow Statistics Citations

**Martin, G.R., Fowler, K.K., and Arihood, L.D.,2016, Estimating selected low-flow frequency statistics and harmonic-mean flows for ungaged, unregulated streams in Indiana (ver 1.1, October 2016): U.S. Geological Survey Scientific Investigations Report 2016–5102, 45 p. (<http://dx.doi.org/10.3133/sir20165102>)**

#### General Flow Statistics Parameters[Harmonic Mean Central Region 2016 5102]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	2.138	square miles	2.99	828
K2INDNR	Avg_Hydraulic_Conductivity_Full_Depth	46	ft per day	6.36	45.9
QSSPERMTHK	Permeability_Index	150	dimensionless	43.8	5400
LOWREG	Low Flow Region Number	1729	dimensionless		

#### General Flow Statistics Disclaimers[Harmonic Mean Central Region 2016 5102]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

#### General Flow Statistics Flow Report[Harmonic Mean Central Region 2016 5102]

Statistic	Value	Unit
Harmonic Mean Streamflow	0.557	ft <sup>3</sup> /s

#### General Flow Statistics Citations

**Martin, G.R., Fowler, K.K., and Arihood, L.D.,2016, Estimating selected low-flow frequency statistics and harmonic-mean flows for ungaged, unregulated streams in Indiana (ver 1.1, October 2016): U.S. Geological Survey Scientific Investigations Report 2016–5102, 45 p. (<http://dx.doi.org/10.3133/sir20165102>)**

#### Probability Statistics Parameters[Prob Zero Flow Statewide Low Flow 2016 5102]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	2.138	square miles	2.99	856
ST2INDNR	Avg_Transmissivity_Near_Channel	3760	square feet per day	409	7650
LAT_OUT	Latitude of Basin Outlet	39.477562	degrees	38.1	41.8

## Probability Statistics Disclaimers[Prob Zero Flow Statewide Low Flow 2016 5102]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

## Probability Statistics Flow Report[Prob Zero Flow Statewide Low Flow 2016 5102]

Statistic	Value	Unit
Probability zero flow 1 day 10 year	0.922	dim
Probability zero flow 7 day 10 year	0.938	dim
Probability zero flow 30 day 10 year	0.654	dim

*Probability Statistics Citations*

**Martin, G.R., Fowler, K.K., and Arihood, L.D., 2016, Estimating selected low-flow frequency statistics and harmonic-mean flows for ungaged, unregulated streams in Indiana (ver 1.1, October 2016): U.S. Geological Survey Scientific Investigations Report 2016–5102, 45 p. (<http://dx.doi.org/10.3133/sir20165102>)**

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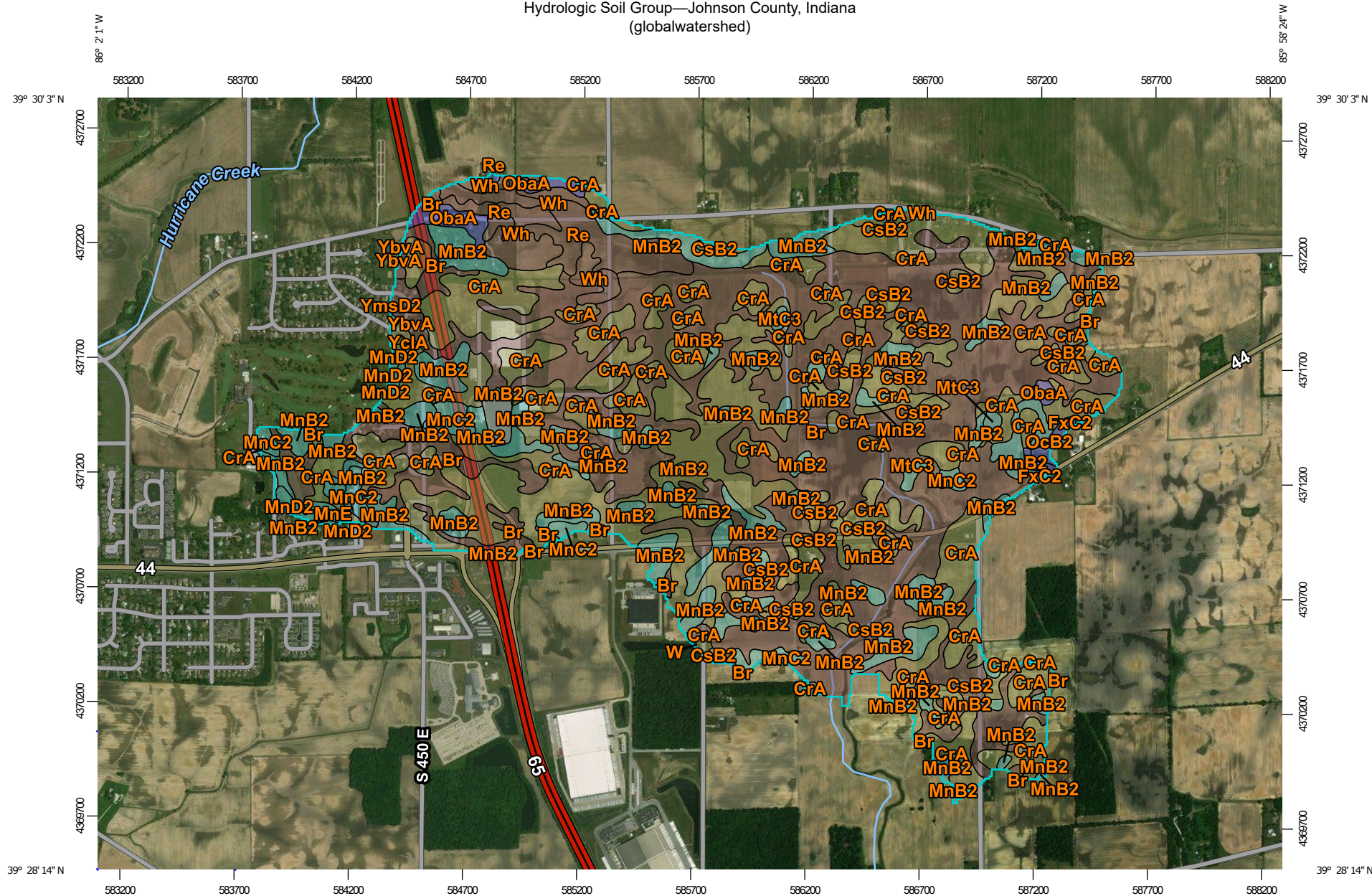
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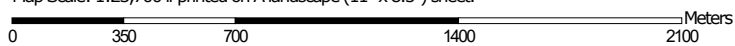
Application Version: 4.3.11



# Hydrologic Soil Group—Johnson County, Indiana (globalwatershed)



Map Scale: 1:23,700 if printed on A landscape (11" x 8.5") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 16N WGS84




Natural Resources  
Conservation Service

Web Soil Survey  
National Cooperative Soil Survey

1/7/2020  
Page 1 of 5

## MAP LEGEND

### Area of Interest (AOI)









 Area of Interest (AOI)

### Soils

#### Soil Rating Polygons





 A  
 A/D  
 B  
 B/D  
 C  
 C/D  
 D  
 Not rated or not available

#### Soil Rating Lines

 A  
 A/D  
 B  
 B/D  
 C  
 C/D  
 D  
 Not rated or not available

#### Soil Rating Points






 A  
 A/D  
 B  
 B/D

 C  
 C/D  
 D  
 Not rated or not available


### Water Features

 Streams and Canals

### Transportation

 Rails  
 Interstate Highways  
 US Routes  
 Major Roads  
 Local Roads

### Background

 Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service

Web Soil Survey URL:

Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Johnson County, Indiana

Survey Area Data: Version 27, Sep 16, 2019

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Sep 24, 2014—Mar 20, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

## Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
Br	Brookston silty clay loam, 0 to 2 percent slopes	B/D	542.7	39.6%
CrA	Crosby silt loam, fine-loamy subsoil, 0 to 2 percent slopes	C/D	475.7	34.7%
CsB2	Crosby-Miami silt loams, 2 to 4 percent slopes, eroded	C/D	37.4	2.7%
FxC2	Fox complex, 6 to 12 percent slopes, eroded	B	2.1	0.2%
MnB2	Miami silt loam, 2 to 6 percent slopes, eroded	C	176.1	12.9%
MnC2	Miami silt loam, 6 to 12 percent slopes, eroded	C	23.6	1.7%
MnD2	Miami silt loam, 12 to 18 percent slopes, eroded	C	3.8	0.3%
MnE	Miami silt loam, 18 to 25 percent slopes	C	1.8	0.1%
MtC3	Miami clay loam, 6 to 12 percent slopes, severely eroded	C	4.8	0.3%
ObaA	Ockley loam, 0 to 2 percent slopes	B	13.1	1.0%
OcB2	Ockley loam, 2 to 6 percent slopes, eroded	B	3.7	0.3%
Re	Rensselaer silty clay loam	B/D	36.8	2.7%
W	Water		5.5	0.4%
Wh	Whitaker silt loam, 0 to 2 percent slopes	B/D	32.2	2.4%
YbvA	Brookston silty clay loam-Urban land complex, 0 to 2 percent slopes	B/D	7.0	0.5%
YclA	Crosby silt loam, fine-loamy subsoil-Urban land complex, 0 to 2 percent slopes	C/D	1.8	0.1%



Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
YmsB2	Miami silt loam-Urban land complex, 2 to 6 percent slopes, eroded	C	0.6	0.0%
YmsC2	Miami silt loam-Urban land complex, 6 to 12 percent slopes, eroded	C	0.4	0.0%
YmsD2	Miami silt loam-Urban land complex, 12 to 18 percent slopes, eroded	C	0.0	0.0%
<b>Totals for Area of Interest</b>			<b>1,369.3</b>	<b>100.0%</b>

## Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

## Rating Options

*Aggregation Method:* Dominant Condition

*Component Percent Cutoff:* None Specified

*Tie-break Rule:* Higher

# Runoff Curve Number Calculation

47.2% B, 52.8% C

## Job Information

Description: Franklin Industrial  
Entity: City of Franklin  
Job #: 2019.02798  
Date: 1/9/2020

Basin:	Existing Upstream
CN Calculation Method:	Less Pervious Soil Group Than Actual
Site Condition:	Existing

Soil Name and Hydrologic Group		Area Description	Cover Description	Cover Condition	CN	Area	Product of CN x area
						(Acres)	
Br	B	Agricultural Land	Farmsteads	-	82	484.73	39748.0404
	B	Fully Developed	Residential	Residential - 1/3 Acre (30% Impervious)	81	161.58	13087.7694
CrA	C	Agricultural Land	Farmsteads	-	86	542.24	46632.8808
	C	Fully Developed	Residential	Residential - 1/3 Acre (30% Impervious)	86	180.75	15544.2936
Totals =						1369.30	115012.9842

CN (weighted) =  $\frac{\text{total product}}{\text{total area}}$  = 84.0

Use CN = 84

**PROPOSED STORMWATER SYSTEM**  
**EMERGENCY SPILLWAY CALCULATIONS**

**Job Information**

**Description:** I-65 Logistics Center  
**Reviewing Entity:** City of Franklin  
**Job #:** 2019.02798  
**Date:** 12/28/20  
**\*\*includes 155.99 from offsite west storm**  
**\*\*includes 20.11 from offsite south**

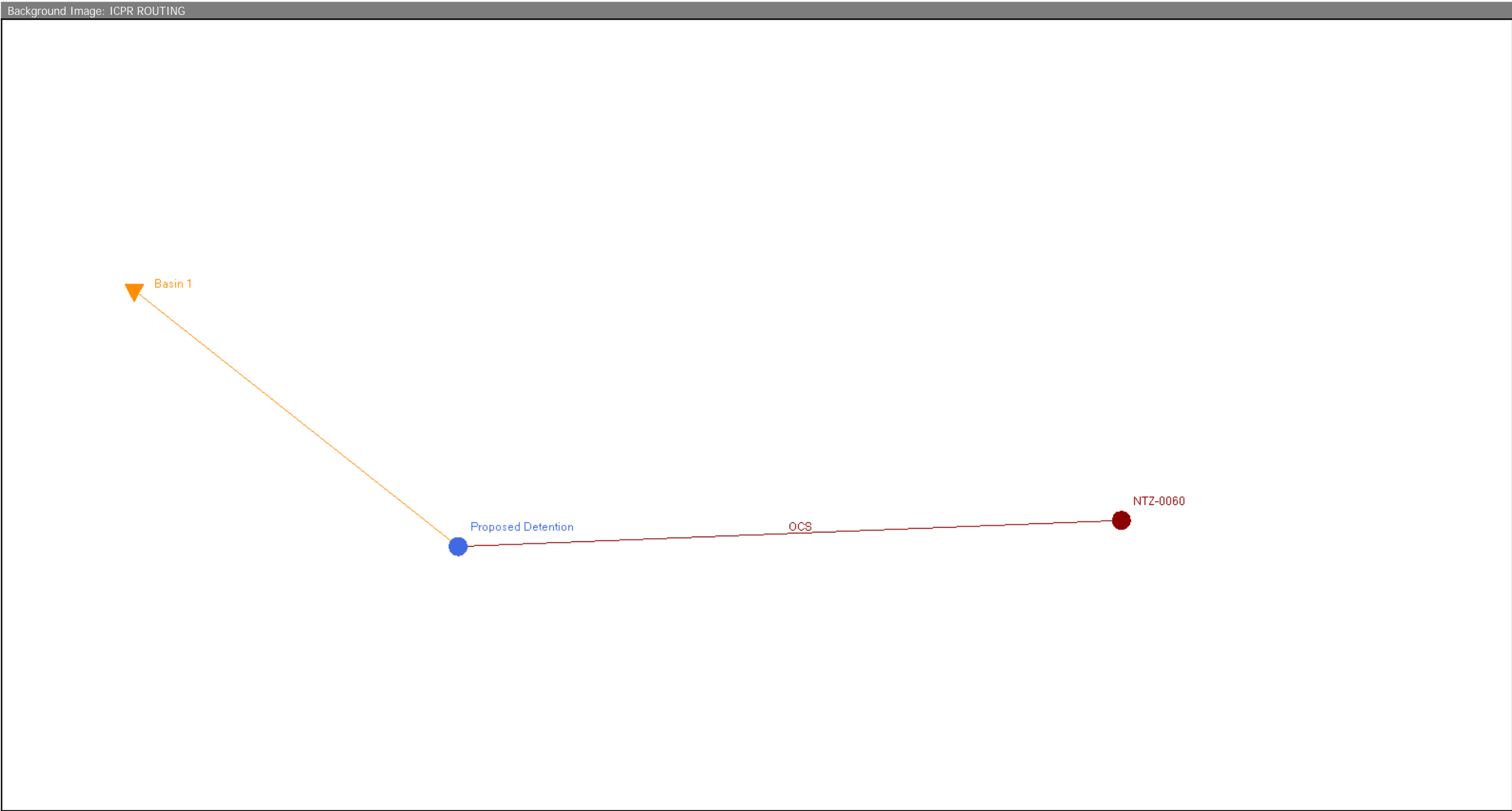
**\*Emergency spillway must carry peak 100 yr flow rate of the pond**

**Peak inflow to Pond 561.03**  
**125% of Peak inflow 701.29**

**Weir Formula→  $Q = C_{\text{weir}} * (L) * H^{3/2}$**

$C_{\text{weir}} = 3.00$   
 $Q = 701.29$   
 $L = 70.00$   
 $H = 2.23$   
**100 yr Flood Elev. = 717.80**  
**Spillway Elev. = 718.25**  
**Overflow Elev. = 720.48**  
**Berm Elevation = 720.50**

**\*OVERFLOW SPILLWAY WIDTH OF 70 FEET HAS SUFFICIENT CAPACITY TO CARRY 125% OF THE 100 YR FLOW RATE**



## Simple Basin: Basin 1

Scenario: Scenario1  
 Node: Proposed Detention  
 Hydrograph Method: NRCS Unit Hydrograph  
 Infiltration Method: Curve Number  
 Time of Concentration: 13.6000 min  
 Max Allowable Q: 999999999.00 cfs  
 Time Shift: 0.0000 hr  
 Unit Hydrograph: UH484  
 Peaking Factor: 484.0  
 Area: 63.7700 ac  
 Curve Number: 95.0  
 % Impervious: 0.00  
 % DCIA: 0.00  
 % Direct: 0.00  
 Rainfall Name: Indy HUFF 50 1Q

Comment:

## Node: NTZ-0060

Scenario: Scenario1  
 Type: Time/Stage  
 Base Flow: 0.00 cfs  
 Initial Stage: 717.80 ft  
 Warning Stage: 717.80 ft  
 Boundary Stage:

Year	Month	Day	Hour	Stage [ft]
0	0	0	0.0000	717.80
0	0	0	48.0000	717.80

Comment:

## Node: Proposed Detention

Scenario: Scenario1  
 Type: Stage/Area  
 Base Flow: 0.00 cfs  
 Initial Stage: 710.42 ft  
 Warning Stage: 719.50 ft

Stage [ft]	Area [ac]	Area [ft2]
717.80	8.3500	363726
719.50	8.7000	378972
720.50	8.9070	387989

Comment:
----------

Drop Structure Link: OCS		Upstream Pipe	Downstream Pipe
Scenario:	Scenario1	Invert: 710.42 ft	Invert: 710.03 ft
From Node:	Proposed	Manning's N: 0.0130	Manning's N: 0.0130
	Detention	Geometry: Circular	Geometry: Circular
To Node:	NTZ-0060	Max Depth: 2.00 ft	Max Depth: 2.00 ft
Link Count:	1	Bottom Clip	
Flow Direction:	Both	Default: 0.00 ft	Default: 0.00 ft
Solution:	Combine	Op Table:	Op Table:
Increments:	0	Ref Node:	Ref Node:
Pipe Count:	1	Manning's N: 0.0000	Manning's N: 0.0000
Damping:	0.0000 ft	Top Clip	
Length:	265.64 ft	Default: 0.00 ft	Default: 0.00 ft
FHWA Code:	0	Op Table:	Op Table:
Entr Loss Coef:	0.00	Ref Node:	Ref Node:
Exit Loss Coef:	1.00	Manning's N: 0.0000	Manning's N: 0.0000
Bend Loss Coef:	0.00		
Bend Location:	0.00 ft		
Energy Switch:	Energy		

Pipe Comment:
---------------

Weir Component	
Weir:	1
Weir Count:	1
Weir Flow Direction:	Both
Damping:	0.0000 ft
Weir Type:	Sharp Crested Vertical
Geometry Type:	Circular
Invert:	710.42 ft
Control Elevation:	710.42 ft
Max Depth:	1.33 ft
Bottom Clip	
Default: 0.00 ft	
Op Table:	
Ref Node:	
Top Clip	
Default: 0.00 ft	
Op Table:	
Ref Node:	
Discharge Coefficients	
Weir Default: 3.200	
Weir Table:	
Orifice Default: 0.600	
Orifice Table:	

Weir Comment:
---------------

Weir Component	
Weir:	2
Weir Count:	1
Weir Flow Direction:	Both
Damping:	0.0000 ft
Weir Type:	Sharp Crested Vertical
Geometry Type:	Rectangular
Invert:	714.75 ft
Control Elevation:	714.75 ft
Bottom Clip	
Default: 0.00 ft	
Op Table:	
Ref Node:	
Top Clip	
Default: 0.00 ft	
Op Table:	
Ref Node:	

Max Depth: 2.50 ft  
 Max Width: 3.00 ft  
 Fillet: 0.00 ft

## Discharge Coefficients

Weir Default: 3.200  
 Weir Table:  
 Orifice Default: 0.600  
 Orifice Table:

Weir Comment:

Drop Structure Comment:

Simulation: 100yr-01hr

Scenario: Scenario1  
 Run Date/Time: 12/27/2020 5:41:42 PM  
 Program Version: ICPR4 4.05.01

## General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	48.0000

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	60.0000	0.1000
Max Calculation Time:		48.0000

## Output Time Increments

## Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

## Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

## Restart File

Save Restart: False

## Resources &amp; Lookup Tables

## Resources

Rainfall Folder: Huff 24hr Dist

## Lookup Tables

Boundary Stage Set:  
 Extern Hydrograph Set:



Unit Hydrograph  
Folder:

Curve Number Set:

Green-Ampt Set:  
Vertical Layers Set:  
Impervious Set:

#### Tolerances & Options

Time Marching: SAOR	IA Recovery Time: 24.0000 hr
Max Iterations: 6	
Over-Relax Weight 0.5 dec	
Fact:	
dZ Tolerance: 0.0010 ft	Smp/Man Basin Rain Global
	Opt:
Max dZ: 1.0000 ft	Rainfall Name: Indy HUFF 50 1Q
Link Optimizer Tol: 0.0001 ft	Rainfall Amount: 3.00 in
	Storm Duration: 1.0000 hr
Edge Length Option: Automatic	
	Dflt Damping (1D): 0.0050 ft
	Min Node Srf Area 100 ft2
	(1D):
	Energy Switch (1D): Energy

Comment:

#### Simulation: 100yr-02hr

Scenario: Scenario1  
Run Date/Time: 12/27/2020 5:42:02 PM  
Program Version: ICPR4 4.05.01

#### General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	48.0000

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	60.0000	0.1000
Max Calculation Time:		48.0000

#### Output Time Increments

Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

## Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

## Restart File

Save Restart: False

## Resources &amp; Lookup Tables

## Resources

Rainfall Folder: Huff 24hr Dist

Unit Hydrograph  
Folder:

## Lookup Tables

Boundary Stage Set:  
Extern Hydrograph Set:  
Curve Number Set:Green-Ampt Set:  
Vertical Layers Set:  
Impervious Set:

## Tolerances &amp; Options

Time Marching: SAOR	IA Recovery Time: 24.0000 hr
Max Iterations: 6	
Over-Relax Weight: 0.5 dec	
Fact:	
dZ Tolerance: 0.0010 ft	Smp/Man Basin Rain Global
	Opt:
Max dZ: 1.0000 ft	Rainfall Name: Indy HUFF 50 1Q
Link Optimizer Tol: 0.0001 ft	Rainfall Amount: 3.64 in
	Storm Duration: 2.0000 hr
Edge Length Option: Automatic	
	Dflt Damping (1D): 0.0050 ft
	Min Node Srf Area 100 ft2
	(1D):
	Energy Switch (1D): Energy

Comment:

## Simulation: 100yr-03hr

Scenario: Scenario1  
Run Date/Time: 12/27/2020 5:42:24 PM  
Program Version: ICPR4 4.05.01

## General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	48.0000

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	60.0000	0.1000
Max Calculation Time:		48.0000

## Output Time Increments

## Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

## Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

## Restart File

Save Restart: False

## Resources &amp; Lookup Tables

## Resources

Rainfall Folder: Huff 24hr Dist

Unit Hydrograph  
Folder:

## Lookup Tables

Boundary Stage Set:  
Extern Hydrograph Set:  
Curve Number Set:Green-Ampt Set:  
Vertical Layers Set:  
Impervious Set:

## Tolerances &amp; Options

Time Marching: SAOR  
Max Iterations: 6  
Over-Relax Weight: 0.5 dec  
Fact:  
dZ Tolerance: 0.0010 ftMax dZ: 1.0000 ft  
Link Optimizer Tol: 0.0001 ft

Edge Length Option: Automatic

IA Recovery Time: 24.0000 hr

Smp/Man Basin Rain: Global  
Opt:Rainfall Name: Indy HUFF 50 1Q  
Rainfall Amount: 3.92 in  
Storm Duration: 3.0000 hr

Dflt Damping (1D): 0.0050 ft  
 Min Node Srf Area 100 ft2  
 (1D):  
 Energy Switch (1D): Energy

Comment:

Simulation: 100yr-06hr

Scenario: Scenario1  
 Run Date/Time: 12/27/2020 5:42:54 PM  
 Program Version: ICPR4 4.05.01

#### General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	48.0000

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	60.0000	0.1000
Max Calculation Time:		48.0000

#### Output Time Increments

##### Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

##### Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

##### Restart File

Save Restart: False

#### Resources & Lookup Tables

##### Resources

Rainfall Folder: Huff 24hr Dist

Unit Hydrograph  
Folder:

##### Lookup Tables

Boundary Stage Set:  
 Extern Hydrograph Set:  
 Curve Number Set:

Green-Ampt Set:  
Vertical Layers Set:  
Impervious Set:

## Tolerances &amp; Options

Time Marching: SAOR	IA Recovery Time: 24.0000 hr
Max Iterations: 6	
Over-Relax Weight 0.5 dec	
Fact:	
dZ Tolerance: 0.0010 ft	Smp/Man Basin Rain Global
	Opt:
Max dZ: 1.0000 ft	Rainfall Name: Indy HUFF 50 1Q
Link Optimizer Tol: 0.0001 ft	Rainfall Amount: 4.75 in
	Storm Duration: 6.0000 hr
Edge Length Option: Automatic	
	Dflt Damping (1D): 0.0050 ft
	Min Node Srf Area 100 ft2
	(1D):
	Energy Switch (1D): Energy

Comment:

## Simulation: 100yr-12hr

Scenario: Scenario1  
Run Date/Time: 12/27/2020 5:43:12 PM  
Program Version: ICPR4 4.05.01

## General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	48.0000

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	60.0000	0.1000
Max Calculation Time:		48.0000

## Output Time Increments

## Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

## Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

## Restart File

Save Restart: False

## Resources &amp; Lookup Tables

## Resources

Rainfall Folder: Huff 24hr Dist

Unit Hydrograph  
Folder:

## Lookup Tables

Boundary Stage Set:

Extern Hydrograph Set:

Curve Number Set:

Green-Ampt Set:

Vertical Layers Set:

Impervious Set:

## Tolerances &amp; Options

Time Marching: SAOR

Max Iterations: 6

Over-Relax Weight 0.5 dec

Fact:

dZ Tolerance: 0.0010 ft

Max dZ: 1.0000 ft

Link Optimizer Tol: 0.0001 ft

Edge Length Option: Automatic

IA Recovery Time: 24.0000 hr

Smp/Man Basin Rain Global  
Opt:

Rainfall Name: Indy HUFF 50 2Q

Rainfall Amount: 5.35 in

Storm Duration: 12.0000 hr

Dflt Damping (1D): 0.0050 ft

Min Node Srf Area 100 ft2

(1D):

Energy Switch (1D): Energy

Comment:

Simulation: 100yr-24hr

Scenario: Scenario1

Run Date/Time: 12/27/2020 5:43:27 PM

Program Version: ICPR4 4.05.01

## General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	48.0000
	Hydrology [sec]	Surface Hydraulics [sec]		
Min Calculation Time:	60.0000	0.1000		
Max Calculation Time:		48.0000		

## Output Time Increments

## Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

## Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

## Restart File

Save Restart: False

## Resources &amp; Lookup Tables

## Resources

Rainfall Folder: Huff 24hr Dist

Unit Hydrograph  
Folder:

## Lookup Tables

Boundary Stage Set:  
Extern Hydrograph Set:  
Curve Number Set:Green-Ampt Set:  
Vertical Layers Set:  
Impervious Set:

## Tolerances &amp; Options

Time Marching: SAOR	IA Recovery Time: 24.0000 hr
Max Iterations: 6	
Over-Relax Weight 0.5 dec	
Fact:	
dZ Tolerance: 0.0010 ft	Smp/Man Basin Rain Global
	Opt:
Max dZ: 1.0000 ft	Rainfall Name: Indy HUFF 50 3Q
Link Optimizer Tol: 0.0001 ft	Rainfall Amount: 5.88 in
Edge Length Option: Automatic	Storm Duration: 24.0000 hr
	Dflt Damping (1D): 0.0050 ft

Min Node Srf Area 100 ft2  
 (1D):  
 Energy Switch (1D): Energy

Comment:

Simulation: 10yr-01hr

Scenario: Scenario1  
 Run Date/Time: 12/27/2020 5:43:43 PM  
 Program Version: ICPR4 4.05.01

#### General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	48.0000

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	60.0000	0.1000
Max Calculation Time:		48.0000

#### Output Time Increments

##### Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

##### Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

##### Restart File

Save Restart: False

#### Resources & Lookup Tables

##### Resources

Rainfall Folder: Huff 24hr Dist  
 Unit Hydrograph Folder:

##### Lookup Tables

Boundary Stage Set:  
 Extern Hydrograph Set:  
 Curve Number Set:  
 Green-Ampt Set:  
 Vertical Layers Set:



Impervious Set:

## Tolerances &amp; Options

Time Marching: SAOR	IA Recovery Time: 24.0000 hr
Max Iterations: 6	
Over-Relax Weight 0.5 dec	
Fact:	
dZ Tolerance: 0.0010 ft	Smp/Man Basin Rain Global
	Opt:
Max dZ: 1.0000 ft	Rainfall Name: Indy HUFF 50 1Q
Link Optimizer Tol: 0.0001 ft	Rainfall Amount: 2.02 in
	Storm Duration: 1.0000 hr
Edge Length Option: Automatic	
	Dflt Damping (1D): 0.0050 ft
	Min Node Srf Area 100 ft2
	(1D):
	Energy Switch (1D): Energy

Comment:

## Simulation: 10yr-02hr

Scenario: Scenario1  
 Run Date/Time: 12/27/2020 5:43:59 PM  
 Program Version: ICPR4 4.05.01

## General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	48.0000

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	60.0000	0.1000
Max Calculation Time:		48.0000

## Output Time Increments

## Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

## Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Restart File

Save Restart: False

## Resources &amp; Lookup Tables

## Resources

Rainfall Folder: Huff 24hr Dist

Unit Hydrograph  
Folder:

## Lookup Tables

Boundary Stage Set:  
Extern Hydrograph Set:  
Curve Number Set:Green-Ampt Set:  
Vertical Layers Set:  
Impervious Set:

## Tolerances &amp; Options

Time Marching: SAOR  
Max Iterations: 6  
Over-Relax Weight: 0.5 dec  
Fact:  
dZ Tolerance: 0.0010 ft  
  
Max dZ: 1.0000 ft  
Link Optimizer Tol: 0.0001 ft  
  
Edge Length Option: Automatic

IA Recovery Time: 24.0000 hr

Smp/Man Basin Rain: Global  
Opt:Rainfall Name: Indy HUFF 50 1Q  
Rainfall Amount: 2.37 in  
Storm Duration: 2.0000 hrDflt Damping (1D): 0.0050 ft  
Min Node Srf Area: 100 ft2  
(1D):  
Energy Switch (1D): Energy

Comment:

Simulation: 10yr-03hr

Scenario: Scenario1  
Run Date/Time: 12/27/2020 5:44:18 PM  
Program Version: ICPR4 4.05.01

## General

Run Mode: Normal

Year	Month	Day	Hour [hr]
------	-------	-----	-----------

Start Time:	0	0	0	0.0000
End Time:	0	0	0	48.0000

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	60.0000	0.1000
Max Calculation Time:		48.0000

## Output Time Increments

## Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

## Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

## Restart File

Save Restart: False

## Resources &amp; Lookup Tables

## Resources

Rainfall Folder: Huff 24hr Dist

Unit Hydrograph  
Folder:

## Lookup Tables

Boundary Stage Set:  
Extern Hydrograph Set:  
Curve Number Set:Green-Ampt Set:  
Vertical Layers Set:  
Impervious Set:

## Tolerances &amp; Options

Time Marching: SAOR  
Max Iterations: 6  
Over-Relax Weight: 0.5 dec  
Fact:  
dZ Tolerance: 0.0010 ftMax dZ: 1.0000 ft  
Link Optimizer Tol: 0.0001 ft

Edge Length Option: Automatic

IA Recovery Time: 24.0000 hr

Smp/Man Basin Rain: Global  
Opt:Rainfall Name: Indy HUFF 50 1Q  
Rainfall Amount: 2.53 in  
Storm Duration: 3.0000 hrDflt Damping (1D): 0.0050 ft  
Min Node Srf Area: 100 ft2  
(1D):

Energy Switch (1D): Energy

Comment:
----------

Simulation: 10yr-06hr

Scenario: Scenario1  
 Run Date/Time: 12/27/2020 5:44:35 PM  
 Program Version: ICPR4 4.05.01

## General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	48.0000

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	60.0000	0.1000
Max Calculation Time:		48.0000

## Output Time Increments

## Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

## Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

## Restart File

Save Restart: False

## Resources &amp; Lookup Tables

## Resources

Rainfall Folder: Huff 24hr Dist

Unit Hydrograph Folder:

## Lookup Tables

Boundary Stage Set:

Extern Hydrograph Set:

Curve Number Set:

Green-Ampt Set:

Vertical Layers Set:

Impervious Set:

## Tolerances &amp; Options

Time Marching: SAOR	IA Recovery Time: 24.0000 hr
Max Iterations: 6	
Over-Relax Weight 0.5 dec	
Fact:	
dZ Tolerance: 0.0010 ft	Smp/Man Basin Rain Global
	Opt:
Max dZ: 1.0000 ft	Rainfall Name: Indy HUFF 50 1Q
Link Optimizer Tol: 0.0001 ft	Rainfall Amount: 3.03 in
	Storm Duration: 6.0000 hr
Edge Length Option: Automatic	
	Dflt Damping (1D): 0.0050 ft
	Min Node Srf Area 100 ft2
	(1D):
	Energy Switch (1D): Energy

Comment:

## Simulation: 10yr-12hr

Scenario: Scenario1  
Run Date/Time: 12/27/2020 5:44:48 PM  
Program Version: ICPR4 4.05.01

## General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	48.0000

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	60.0000	0.1000
Max Calculation Time:		48.0000

## Output Time Increments

## Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

## Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
------	-------	-----	-----------	----------------------

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Restart File

Save Restart: False

## Resources &amp; Lookup Tables

## Resources

Rainfall Folder: Huff 24hr Dist

Unit Hydrograph  
Folder:

## Lookup Tables

Boundary Stage Set:

Extern Hydrograph Set:

Curve Number Set:

Green-Ampt Set:

Vertical Layers Set:

Impervious Set:

## Tolerances &amp; Options

Time Marching: SAOR

Max Iterations: 6

Over-Relax Weight 0.5 dec

Fact:

dZ Tolerance: 0.0010 ft

Max dZ: 1.0000 ft

Link Optimizer Tol: 0.0001 ft

Edge Length Option: Automatic

IA Recovery Time: 24.0000 hr

Smp/Man Basin Rain Global  
Opt:

Rainfall Name: Indy HUFF 50 2Q

Rainfall Amount: 3.52 in

Storm Duration: 6.0000 hr

Dflt Damping (1D): 0.0050 ft

Min Node Srf Area 100 ft2

(1D):

Energy Switch (1D): Energy

Comment:

Simulation: 10yr-24hr

Scenario: Scenario1

Run Date/Time: 12/27/2020 5:45:12 PM

Program Version: ICPR4 4.05.01

## General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000

End Time: 0 0 0 48.0000

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	60.0000	0.1000
Max Calculation Time:		48.0000

## Output Time Increments

## Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

## Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

## Restart File

Save Restart: False

## Resources &amp; Lookup Tables

## Resources

Rainfall Folder: Huff 24hr Dist

Unit Hydrograph Folder:

## Lookup Tables

Boundary Stage Set:

Extern Hydrograph Set:

Curve Number Set:

Green-Ampt Set:

Vertical Layers Set:

Impervious Set:

## Tolerances &amp; Options

Time Marching: SAOR

Max Iterations: 6

Over-Relax Weight Fact: 0.5 dec

dZ Tolerance: 0.0010 ft

Max dZ: 1.0000 ft

Link Optimizer Tol: 0.0001 ft

Edge Length Option: Automatic

IA Recovery Time: 24.0000 hr

Smp/Man Basin Rain Global Opt:

Rainfall Name: Indy HUFF 50 3Q

Rainfall Amount: 4.08 in

Storm Duration: 24.0000 hr

Dflt Damping (1D): 0.0050 ft

Min Node Srf Area (1D): 100 ft2

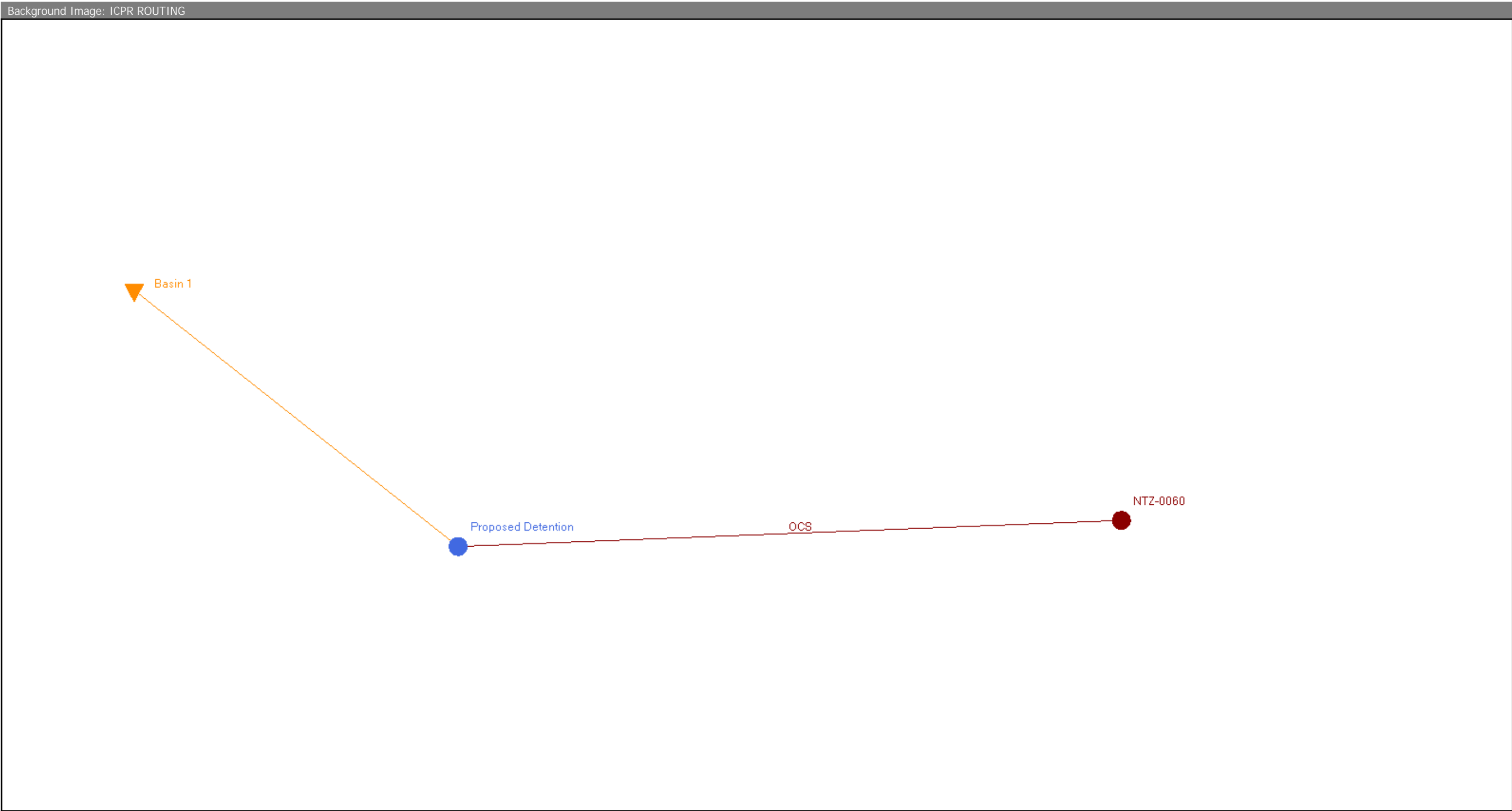
Energy Switch (1D): Energy

Comment:



## Node Max Conditions [Scenario1]

Node Name	Sim Name	Warning Stage [ft]	Max Stage [ft]	Min/Max Delta Stage [ft]	Max Total Inflow [cfs]	Max Total Outflow [cfs]	Max Surface Area [ft2]
NTZ-0060	100yr-01hr	717.80	717.80	0.0000	13.85	18.87	0
NTZ-0060	100yr-02hr	717.80	717.80	0.0000	15.08	18.87	0
NTZ-0060	100yr-03hr	717.80	717.80	0.0000	15.28	18.87	0
NTZ-0060	100yr-06hr	717.80	717.80	0.0000	15.77	18.87	0
NTZ-0060	100yr-12hr	717.80	717.80	0.0000	15.71	18.87	0
NTZ-0060	100yr-24hr	717.80	717.80	0.0000	14.47	18.87	0
NTZ-0060	10yr-01hr	717.80	717.80	0.0000	10.76	18.87	0
NTZ-0060	10yr-02hr	717.80	717.80	0.0000	11.48	18.87	0
NTZ-0060	10yr-03hr	717.80	717.80	0.0000	11.49	18.87	0
NTZ-0060	10yr-06hr	717.80	717.80	0.0000	11.64	18.87	0
NTZ-0060	10yr-12hr	717.80	717.80	0.0000	13.44	18.87	0
NTZ-0060	10yr-24hr	717.80	717.80	0.0000	11.20	18.87	0
Proposed Detention	100yr-01hr	719.50	719.20	0.0189	300.99	13.85	376309
Proposed Detention	100yr-02hr	719.50	719.46	0.0189	237.72	15.08	378647
Proposed Detention	100yr-03hr	719.50	719.51	0.0189	198.29	15.28	379043
Proposed Detention	100yr-06hr	719.50	719.62	0.0189	148.80	15.77	380049
Proposed Detention	100yr-12hr	719.50	719.60	0.0189	66.63	15.71	379913
Proposed Detention	100yr-24hr	719.50	719.33	0.0189	40.46	14.47	377452
Proposed Detention	10yr-01hr	719.50	718.65	0.0189	179.41	10.76	371323
Proposed Detention	10yr-02hr	719.50	718.76	0.0189	134.56	11.48	372363
Proposed Detention	10yr-03hr	719.50	718.77	0.0189	110.53	11.49	372388
Proposed Detention	10yr-06hr	719.50	718.79	0.0189	84.60	11.64	372613
Proposed Detention	10yr-12hr	719.50	719.12	0.0189	83.10	13.44	375565
Proposed Detention	10yr-24hr	719.50	718.72	0.0189	27.70	11.20	371950



## Simple Basin: Basin 1

Scenario: Scenario1  
 Node: Proposed Detention  
 Hydrograph Method: NRCS Unit Hydrograph  
 Infiltration Method: Curve Number  
 Time of Concentration: 13.6000 min  
 Max Allowable Q: 99999999.00 cfs  
 Time Shift: 0.0000 hr  
 Unit Hydrograph: UH484  
 Peaking Factor: 484.0  
 Area: 63.7700 ac  
 Curve Number: 95.0  
 % Impervious: 0.00  
 % DCIA: 0.00  
 % Direct: 0.00  
 Rainfall Name: Indy HUFF 50 1Q

Comment:

## Node: NTZ-0060

Scenario: Scenario1  
 Type: Time/Stage  
 Base Flow: 0.00 cfs  
 Initial Stage: 710.03 ft  
 Warning Stage: 717.80 ft  
 Boundary Stage:

Year	Month	Day	Hour	Stage [ft]
0	0	0	0.0000	710.03
0	0	0	48.0000	710.03

Comment:

## Node: Proposed Detention

Scenario: Scenario1  
 Type: Stage/Area  
 Base Flow: 0.00 cfs  
 Initial Stage: 710.42 ft  
 Warning Stage: 719.50 ft

Stage [ft]	Area [ac]	Area [ft2]
710.42	6.8900	300128
717.80	8.3500	363726
719.50	8.7000	378972
720.50	8.9070	387989

Comment:

Drop Structure Link: OCS		Upstream Pipe	Downstream Pipe
Scenario:	Scenario1	Invert: 710.42 ft	Invert: 710.03 ft
From Node:	Proposed	Manning's N: 0.0130	Manning's N: 0.0130
	Detention	Geometry: Circular	Geometry: Circular
To Node:	NTZ-0060	Max Depth: 2.00 ft	Max Depth: 2.00 ft
Link Count:	1	Bottom Clip	
Flow Direction:	Both	Default: 0.00 ft	Default: 0.00 ft
Solution:	Combine	Op Table:	Op Table:
Increments:	0	Ref Node:	Ref Node:
Pipe Count:	1	Manning's N: 0.0000	Manning's N: 0.0000
Damping:	0.0000 ft	Top Clip	
Length:	265.64 ft	Default: 0.00 ft	Default: 0.00 ft
FHWA Code:	0	Op Table:	Op Table:
Entr Loss Coef:	0.00	Ref Node:	Ref Node:
Exit Loss Coef:	1.00	Manning's N: 0.0000	Manning's N: 0.0000
Bend Loss Coef:	0.00		
Bend Location:	0.00 ft		
Energy Switch:	Energy		

Pipe Comment:

Weir Component		
Weir:	1	Bottom Clip
Weir Count:	1	Default: 0.00 ft
Weir Flow Direction:	Both	Op Table:
Damping:	0.0000 ft	Ref Node:
Weir Type:	Sharp Crested Vertical	Top Clip
Geometry Type:	Circular	Default: 0.00 ft
Invert:	710.42 ft	Op Table:
Control Elevation:	710.42 ft	Ref Node:
Max Depth:	1.33 ft	Discharge Coefficients
		Weir Default: 3.200
		Weir Table:
		Orifice Default: 0.600
		Orifice Table:

Weir Comment:

Weir Component		
Weir:	2	Bottom Clip
Weir Count:	1	Default: 0.00 ft
Weir Flow Direction:	Both	Op Table:
Damping:	0.0000 ft	Ref Node:
Weir Type:	Sharp Crested Vertical	Top Clip
Geometry Type:	Rectangular	Default: 0.00 ft
Invert:	714.75 ft	Op Table:

Control Elevation: 714.75 ft  
 Max Depth: 2.50 ft  
 Max Width: 3.00 ft  
 Fillet: 0.00 ft

Ref Node:

Discharge Coefficients

Weir Default: 3.200

Weir Table:

Orifice Default: 0.600

Orifice Table:

Weir Comment:

Drop Structure Comment:

Simulation: 100yr-01hr

Scenario: Scenario1

Run Date/Time: 12/27/2020 5:34:32 PM

Program Version: ICPR4 4.05.01

## General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	48.0000

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	60.0000	0.1000
Max Calculation Time:		48.0000

## Output Time Increments

## Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

## Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

## Restart File

Save Restart: False

## Resources &amp; Lookup Tables

## Resources

Rainfall Folder: Huff 24hr Dist

## Lookup Tables

Boundary Stage Set:

Unit Hydrograph  
Folder:

Extern Hydrograph Set:  
Curve Number Set:

Green-Ampt Set:  
Vertical Layers Set:  
Impervious Set:

#### Tolerances & Options

Time Marching: SAOR	IA Recovery Time: 24.0000 hr
Max Iterations: 6	
Over-Relax Weight 0.5 dec	
Fact:	
dZ Tolerance: 0.0010 ft	Smp/Man Basin Rain Global
	Opt:
Max dZ: 1.0000 ft	Rainfall Name: Indy HUFF 50 1Q
Link Optimizer Tol: 0.0001 ft	Rainfall Amount: 3.00 in
	Storm Duration: 1.0000 hr
Edge Length Option: Automatic	
	Dflt Damping (1D): 0.0050 ft
	Min Node Srf Area 100 ft2
	(1D):
	Energy Switch (1D): Energy

Comment:

#### Simulation: 100yr-02hr

Scenario: Scenario1  
Run Date/Time: 12/27/2020 5:35:01 PM  
Program Version: ICPR4 4.05.01

#### General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	48.0000

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	60.0000	0.1000
Max Calculation Time:		48.0000

#### Output Time Increments

#### Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

## Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

## Restart File

Save Restart: False

## Resources &amp; Lookup Tables

## Resources

Rainfall Folder: Huff 24hr Dist

Unit Hydrograph  
Folder:

## Lookup Tables

Boundary Stage Set:  
Extern Hydrograph Set:  
Curve Number Set:Green-Ampt Set:  
Vertical Layers Set:  
Impervious Set:

## Tolerances &amp; Options

Time Marching: SAOR  
 Max Iterations: 6  
 Over-Relax Weight: 0.5 dec  
 Fact:  
 dZ Tolerance: 0.0010 ft  
 Max dZ: 1.0000 ft  
 Link Optimizer Tol: 0.0001 ft  
 Edge Length Option: Automatic

IA Recovery Time: 24.0000 hr  
 Smp/Man Basin Rain Opt: Global  
 Rainfall Name: Indy HUFF 50 1Q  
 Rainfall Amount: 3.64 in  
 Storm Duration: 2.0000 hr  
 Dflt Damping (1D): 0.0050 ft  
 Min Node Srf Area (1D): 100 ft2  
 Energy Switch (1D): Energy

Comment:

Simulation: 100yr-03hr

Scenario: Scenario1  
 Run Date/Time: 12/27/2020 5:35:21 PM  
 Program Version: ICPR4 4.05.01

## General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	48.0000

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	60.0000	0.1000
Max Calculation Time:		48.0000

## Output Time Increments

## Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

## Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

## Restart File

Save Restart: False

## Resources &amp; Lookup Tables

## Resources

Rainfall Folder: Huff 24hr Dist

Unit Hydrograph  
Folder:

## Lookup Tables

Boundary Stage Set:  
Extern Hydrograph Set:  
Curve Number Set:Green-Ampt Set:  
Vertical Layers Set:  
Impervious Set:

## Tolerances &amp; Options

Time Marching: SAOR  
Max Iterations: 6  
Over-Relax Weight: 0.5 dec  
Fact:  
dZ Tolerance: 0.0010 ftMax dZ: 1.0000 ft  
Link Optimizer Tol: 0.0001 ft

IA Recovery Time: 24.0000 hr

Smp/Man Basin Rain: Global  
Opt:Rainfall Name: Indy HUFF 50 1Q  
Rainfall Amount: 3.92 in



Edge Length Option: Automatic

Storm Duration: 3.0000 hr

Dflt Damping (1D): 0.0050 ft

Min Node Srf Area 100 ft2

(1D):

Energy Switch (1D): Energy

Comment:
----------

Simulation: 100yr-06hr

Scenario: Scenario1

Run Date/Time: 12/27/2020 5:35:37 PM

Program Version: ICPR4 4.05.01

## General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	48.0000

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	60.0000	0.1000
Max Calculation Time:		48.0000

## Output Time Increments

## Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

## Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

## Restart File

Save Restart: False

## Resources &amp; Lookup Tables

## Resources

Rainfall Folder: Huff 24hr Dist

Unit Hydrograph

## Lookup Tables

Boundary Stage Set:

Extern Hydrograph Set:

Curve Number Set:

Folder:

Green-Ampt Set:  
Vertical Layers Set:  
Impervious Set:

## Tolerances &amp; Options

Time Marching: SAOR	IA Recovery Time: 24.0000 hr
Max Iterations: 6	
Over-Relax Weight 0.5 dec	
Fact:	
dZ Tolerance: 0.0010 ft	Smp/Man Basin Rain Global
	Opt:
Max dZ: 1.0000 ft	Rainfall Name: Indy HUFF 50 1Q
Link Optimizer Tol: 0.0001 ft	Rainfall Amount: 4.75 in
	Storm Duration: 6.0000 hr
Edge Length Option: Automatic	
	Dflt Damping (1D): 0.0050 ft
	Min Node Srf Area 100 ft2
	(1D):
	Energy Switch (1D): Energy

Comment:

## Simulation: 100yr-12hr

Scenario: Scenario1  
Run Date/Time: 12/27/2020 5:35:58 PM  
Program Version: ICPR4 4.05.01

## General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	48.0000

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	60.0000	0.1000
Max Calculation Time:		48.0000

## Output Time Increments

## Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
------	-------	-----	-----------	----------------------

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

## Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

## Restart File

Save Restart: False

## Resources &amp; Lookup Tables

## Resources

Rainfall Folder: Huff 24hr Dist

Unit Hydrograph  
Folder:

## Lookup Tables

Boundary Stage Set:  
Extern Hydrograph Set:  
Curve Number Set:Green-Ampt Set:  
Vertical Layers Set:  
Impervious Set:

## Tolerances &amp; Options

Time Marching: SAOR	IA Recovery Time: 24.0000 hr
Max Iterations: 6	
Over-Relax Weight: 0.5 dec	
Fact:	
dZ Tolerance: 0.0010 ft	Smp/Man Basin Rain Global
	Opt:
Max dZ: 1.0000 ft	
Link Optimizer Tol: 0.0001 ft	Rainfall Name: Indy HUFF 50 2Q
	Rainfall Amount: 5.35 in
Edge Length Option: Automatic	Storm Duration: 12.0000 hr
	Dflt Damping (1D): 0.0050 ft
	Min Node Srf Area 100 ft2
	(1D):
	Energy Switch (1D): Energy

Comment:

## Simulation: 100yr-24hr

Scenario: Scenario1  
Run Date/Time: 12/27/2020 5:36:14 PM  
Program Version: ICPR4 4.05.01

General
---------

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	48.0000

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	60.0000	0.1000
Max Calculation Time:		48.0000

Output Time Increments
------------------------

Hydrology
-----------

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Surface Hydraulics
--------------------

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Restart File
--------------

Save Restart: False

Resources & Lookup Tables
---------------------------

Resources
-----------

Rainfall Folder: Huff 24hr Dist

Unit Hydrograph  
Folder:

Lookup Tables
---------------

Boundary Stage Set:  
Extern Hydrograph Set:  
Curve Number Set:Green-Ampt Set:  
Vertical Layers Set:  
Impervious Set:

Tolerances & Options
----------------------

Time Marching: SAOR  
Max Iterations: 6  
Over-Relax Weight: 0.5 dec  
Fact:  
dZ Tolerance: 0.0010 ftMax dZ: 1.0000 ft  
Link Optimizer Tol: 0.0001 ft

Edge Length Option: Automatic

IA Recovery Time: 24.0000 hr

Smp/Man Basin Rain: Global  
Opt:Rainfall Name: Indy HUFF 50 3Q  
Rainfall Amount: 5.88 in  
Storm Duration: 24.0000 hr

Dflt Damping (1D): 0.0050 ft  
 Min Node Srf Area 100 ft2  
 (1D):  
 Energy Switch (1D): Energy

Comment:

Simulation: 10yr-01hr

Scenario: Scenario1  
 Run Date/Time: 12/27/2020 5:36:33 PM  
 Program Version: ICPR4 4.05.01

#### General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	48.0000

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	60.0000	0.1000
Max Calculation Time:		48.0000

#### Output Time Increments

##### Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

##### Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

##### Restart File

Save Restart: False

#### Resources & Lookup Tables

##### Resources

Rainfall Folder: Huff 24hr Dist

Unit Hydrograph  
Folder:

##### Lookup Tables

Boundary Stage Set:  
 Extern Hydrograph Set:  
 Curve Number Set:

Green-Ampt Set:  
Vertical Layers Set:  
Impervious Set:

## Tolerances &amp; Options

Time Marching: SAOR	IA Recovery Time: 24.0000 hr
Max Iterations: 6	
Over-Relax Weight Fact: 0.5 dec	
dZ Tolerance: 0.0010 ft	Smp/Man Basin Rain Opt: Global
Max dZ: 1.0000 ft	
Link Optimizer Tol: 0.0001 ft	Rainfall Name: Indy HUFF 50 1Q
	Rainfall Amount: 2.02 in
Edge Length Option: Automatic	Storm Duration: 1.0000 hr
	Dflt Damping (1D): 0.0050 ft
	Min Node Srf Area (1D): 100 ft2
	Energy Switch (1D): Energy

Comment:

## Simulation: 10yr-02hr

Scenario: Scenario1  
Run Date/Time: 12/27/2020 5:36:53 PM  
Program Version: ICPR4 4.05.01

## General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	48.0000

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	60.0000	0.1000
Max Calculation Time:		48.0000

## Output Time Increments

## Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

## Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

## Restart File

Save Restart: False

## Resources &amp; Lookup Tables

## Resources

Rainfall Folder: Huff 24hr Dist

Unit Hydrograph  
Folder:

## Lookup Tables

Boundary Stage Set:

Extern Hydrograph Set:

Curve Number Set:

Green-Ampt Set:

Vertical Layers Set:

Impervious Set:

## Tolerances &amp; Options

Time Marching: SAOR

Max Iterations: 6

Over-Relax Weight 0.5 dec

Fact:

dZ Tolerance: 0.0010 ft

Max dZ: 1.0000 ft

Link Optimizer Tol: 0.0001 ft

Edge Length Option: Automatic

IA Recovery Time: 24.0000 hr

Smp/Man Basin Rain Global  
Opt:

Rainfall Name: Indy HUFF 50 1Q

Rainfall Amount: 2.37 in

Storm Duration: 2.0000 hr

Dflt Damping (1D): 0.0050 ft

Min Node Srf Area 100 ft2

(1D):

Energy Switch (1D): Energy

Comment:

Simulation: 10yr-03hr

Scenario: Scenario1

Run Date/Time: 12/27/2020 5:37:12 PM

Program Version: ICPR4 4.05.01

## General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	48.0000
	Hydrology [sec]	Surface Hydraulics [sec]		
Min Calculation Time:	60.0000	0.1000		
Max Calculation Time:		48.0000		

## Output Time Increments

## Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

## Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

## Restart File

Save Restart: False

## Resources &amp; Lookup Tables

## Resources

Rainfall Folder: Huff 24hr Dist

Unit Hydrograph  
Folder:

## Lookup Tables

Boundary Stage Set:  
Extern Hydrograph Set:  
Curve Number Set:Green-Ampt Set:  
Vertical Layers Set:  
Impervious Set:

## Tolerances &amp; Options

Time Marching: SAOR	IA Recovery Time: 24.0000 hr
Max Iterations: 6	
Over-Relax Weight 0.5 dec	
Fact:	
dZ Tolerance: 0.0010 ft	Smp/Man Basin Rain Global
	Opt:
Max dZ: 1.0000 ft	Rainfall Name: Indy HUFF 50 1Q
Link Optimizer Tol: 0.0001 ft	Rainfall Amount: 2.53 in
Edge Length Option: Automatic	Storm Duration: 3.0000 hr
	Dflt Damping (1D): 0.0050 ft



Min Node Srf Area 100 ft2  
 (1D):  
 Energy Switch (1D): Energy

Comment:

Simulation: 10yr-06hr

Scenario: Scenario1  
 Run Date/Time: 12/27/2020 5:37:28 PM  
 Program Version: ICPR4 4.05.01

#### General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	48.0000

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	60.0000	0.1000
Max Calculation Time:		48.0000

#### Output Time Increments

##### Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

##### Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

##### Restart File

Save Restart: False

#### Resources & Lookup Tables

##### Resources

Rainfall Folder: Huff 24hr Dist

Unit Hydrograph  
Folder:

##### Lookup Tables

Boundary Stage Set:  
 Extern Hydrograph Set:  
 Curve Number Set:

Green-Ampt Set:  
 Vertical Layers Set:

Impervious Set:

## Tolerances &amp; Options

Time Marching: SAOR	IA Recovery Time: 24.0000 hr
Max Iterations: 6	
Over-Relax Weight 0.5 dec	
Fact:	
dZ Tolerance: 0.0010 ft	Smp/Man Basin Rain Global
	Opt:
Max dZ: 1.0000 ft	Rainfall Name: Indy HUFF 50 1Q
Link Optimizer Tol: 0.0001 ft	Rainfall Amount: 3.03 in
	Storm Duration: 6.0000 hr
Edge Length Option: Automatic	
	Dflt Damping (1D): 0.0050 ft
	Min Node Srf Area 100 ft2
	(1D):
	Energy Switch (1D): Energy

Comment:

## Simulation: 10yr-12hr

Scenario: Scenario1  
 Run Date/Time: 12/27/2020 5:37:43 PM  
 Program Version: ICPR4 4.05.01

## General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	48.0000

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	60.0000	0.1000
Max Calculation Time:		48.0000

## Output Time Increments

## Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

## Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Restart File

Save Restart: False

## Resources &amp; Lookup Tables

## Resources

Rainfall Folder: Huff 24hr Dist

Unit Hydrograph  
Folder:

## Lookup Tables

Boundary Stage Set:  
Extern Hydrograph Set:  
Curve Number Set:Green-Ampt Set:  
Vertical Layers Set:  
Impervious Set:

## Tolerances &amp; Options

Time Marching: SAOR  
Max Iterations: 6  
Over-Relax Weight: 0.5 dec  
Fact:  
dZ Tolerance: 0.0010 ft  
  
Max dZ: 1.0000 ft  
Link Optimizer Tol: 0.0001 ft  
  
Edge Length Option: Automatic

IA Recovery Time: 24.0000 hr

Smp/Man Basin Rain: Global  
Opt:Rainfall Name: Indy HUFF 50 2Q  
Rainfall Amount: 3.52 in  
Storm Duration: 6.0000 hrDflt Damping (1D): 0.0050 ft  
Min Node Srf Area: 100 ft2  
(1D):  
Energy Switch (1D): Energy

Comment:

Simulation: 10yr-24hr

Scenario: Scenario1  
Run Date/Time: 12/27/2020 5:38:01 PM  
Program Version: ICPR4 4.05.01

## General

Run Mode: Normal

Year	Month	Day	Hour [hr]
------	-------	-----	-----------

Start Time:	0	0	0	0.0000
End Time:	0	0	0	48.0000

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	60.0000	0.1000
Max Calculation Time:		48.0000

## Output Time Increments

## Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

## Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

## Restart File

Save Restart: False

## Resources &amp; Lookup Tables

## Resources

Rainfall Folder: Huff 24hr Dist

Unit Hydrograph  
Folder:

## Lookup Tables

Boundary Stage Set:  
Extern Hydrograph Set:  
Curve Number Set:Green-Ampt Set:  
Vertical Layers Set:  
Impervious Set:

## Tolerances &amp; Options

Time Marching: SAOR  
Max Iterations: 6  
Over-Relax Weight: 0.5 dec  
Fact:  
dZ Tolerance: 0.0010 ftMax dZ: 1.0000 ft  
Link Optimizer Tol: 0.0001 ft

Edge Length Option: Automatic

IA Recovery Time: 24.0000 hr

Smp/Man Basin Rain: Global  
Opt:Rainfall Name: Indy HUFF 50 3Q  
Rainfall Amount: 4.08 in  
Storm Duration: 24.0000 hrDflt Damping (1D): 0.0050 ft  
Min Node Srf Area: 100 ft2  
(1D):

Energy Switch (1D): Energy

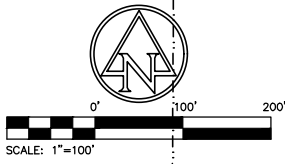
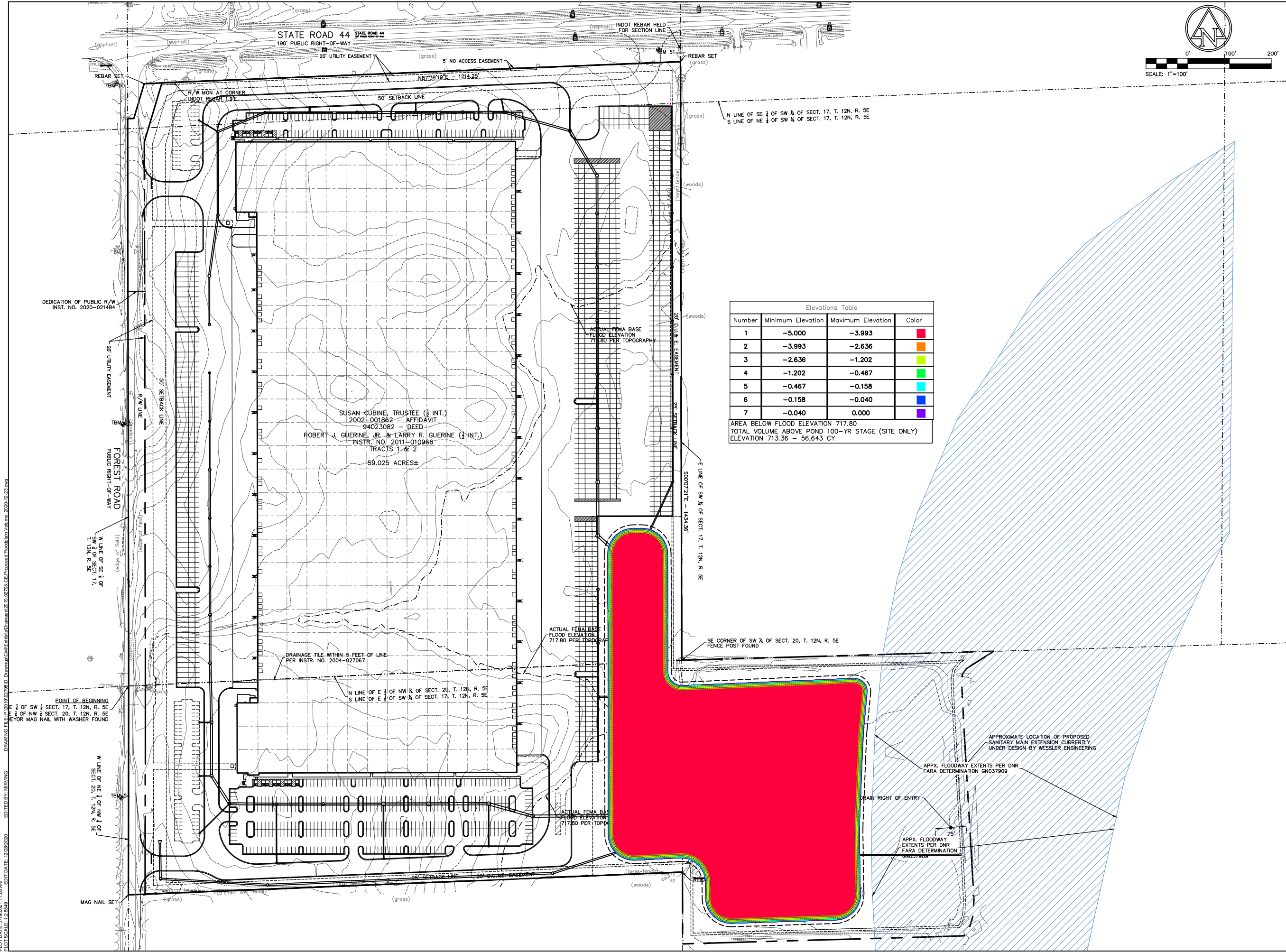
Comment:

## Node Max Conditions [Scenario1]

Node Name	Sim Name	Warning Stage [ft]	Max Stage [ft]	Min/Max Delta Stage [ft]	Max Total Inflow [cfs]	Max Total Outflow [cfs]	Max Surface Area [ft2]
NTZ-0060	100yr-01hr	717.80	710.03	0.0000	4.87	0.00	0
NTZ-0060	100yr-02hr	717.80	710.03	0.0000	5.89	0.00	0
NTZ-0060	100yr-03hr	717.80	710.03	0.0000	6.22	0.00	0
NTZ-0060	100yr-06hr	717.80	710.03	0.0000	7.07	0.00	0
NTZ-0060	100yr-12hr	717.80	710.03	0.0000	7.47	0.00	0
NTZ-0060	100yr-24hr	717.80	710.03	0.0000	7.51	0.00	0
NTZ-0060	10yr-01hr	717.80	710.03	0.0000	2.55	0.00	0
NTZ-0060	10yr-02hr	717.80	710.03	0.0000	3.18	0.00	0
NTZ-0060	10yr-03hr	717.80	710.03	0.0000	3.55	0.00	0
NTZ-0060	10yr-06hr	717.80	710.03	0.0000	4.50	0.00	0
NTZ-0060	10yr-12hr	717.80	710.03	0.0000	5.43	0.00	0
NTZ-0060	10yr-24hr	717.80	710.03	0.0000	5.36	0.00	0
Proposed Detention	100yr-01hr	719.50	712.22	0.0010	300.99	4.87	315606
Proposed Detention	100yr-02hr	719.50	712.62	0.0010	237.72	5.89	319078
Proposed Detention	100yr-03hr	719.50	712.76	0.0010	198.29	6.22	320321
Proposed Detention	100yr-06hr	719.50	713.15	0.0010	148.80	7.07	323653
Proposed Detention	100yr-12hr	719.50	713.34	0.0010	66.63	7.47	325277
Proposed Detention	100yr-24hr	719.50	713.36	0.0010	40.46	7.51	325454
Proposed Detention	10yr-01hr	719.50	711.54	0.0010	179.42	2.55	309760
Proposed Detention	10yr-02hr	719.50	711.76	0.0010	134.56	3.18	311670
Proposed Detention	10yr-03hr	719.50	711.84	0.0010	110.53	3.55	312401
Proposed Detention	10yr-06hr	719.50	712.08	0.0010	84.61	4.50	314412
Proposed Detention	10yr-12hr	719.50	712.43	0.0010	83.10	5.43	317485
Proposed Detention	10yr-24hr	719.50	712.40	0.0010	27.70	5.36	317212







Elevations Table			
Number	Minimum Elevation	Maximum Elevation	Color
1	-5.000	-3.993	Red
2	-3.993	-2.636	Orange
3	-2.636	-1.202	Yellow
4	-1.202	-0.467	Green
5	-0.467	-0.158	Cyan
6	-0.158	-0.040	Blue
7	-0.040	0.000	Purple
AREA BELOW FLOOD ELEVATION 717.80 TOTAL VOLUME ABOVE POND 100-YR STAGE (SITE ONLY) ELEVATION 713.36 - 56,643 CY			




**GDI CONSTRUCTION**  
9775 Crosspoint Blvd  
Suite 105  
Indianapolis, IN 46256  
317.567.6100



9025 River Road, Suite 200 | Indianapolis, Indiana 46240  
TEL 317.547.5580 | FAX 317.543.0270  
www.structurepoint.com

**I-65 SOUTH  
LOGISTICS CENTER  
LOT 1**

81/89 Forest Road  
Franklin, Indiana



*Justin Oshel*  
CERTIFIED BY

ISSUANCE INDEX

DATE:	03/25/2021
PROJECT PHASE:	CONSTRUCTION DOCUMENTS

REVISION SCHEDULE

NO.	DESCRIPTION	DATE

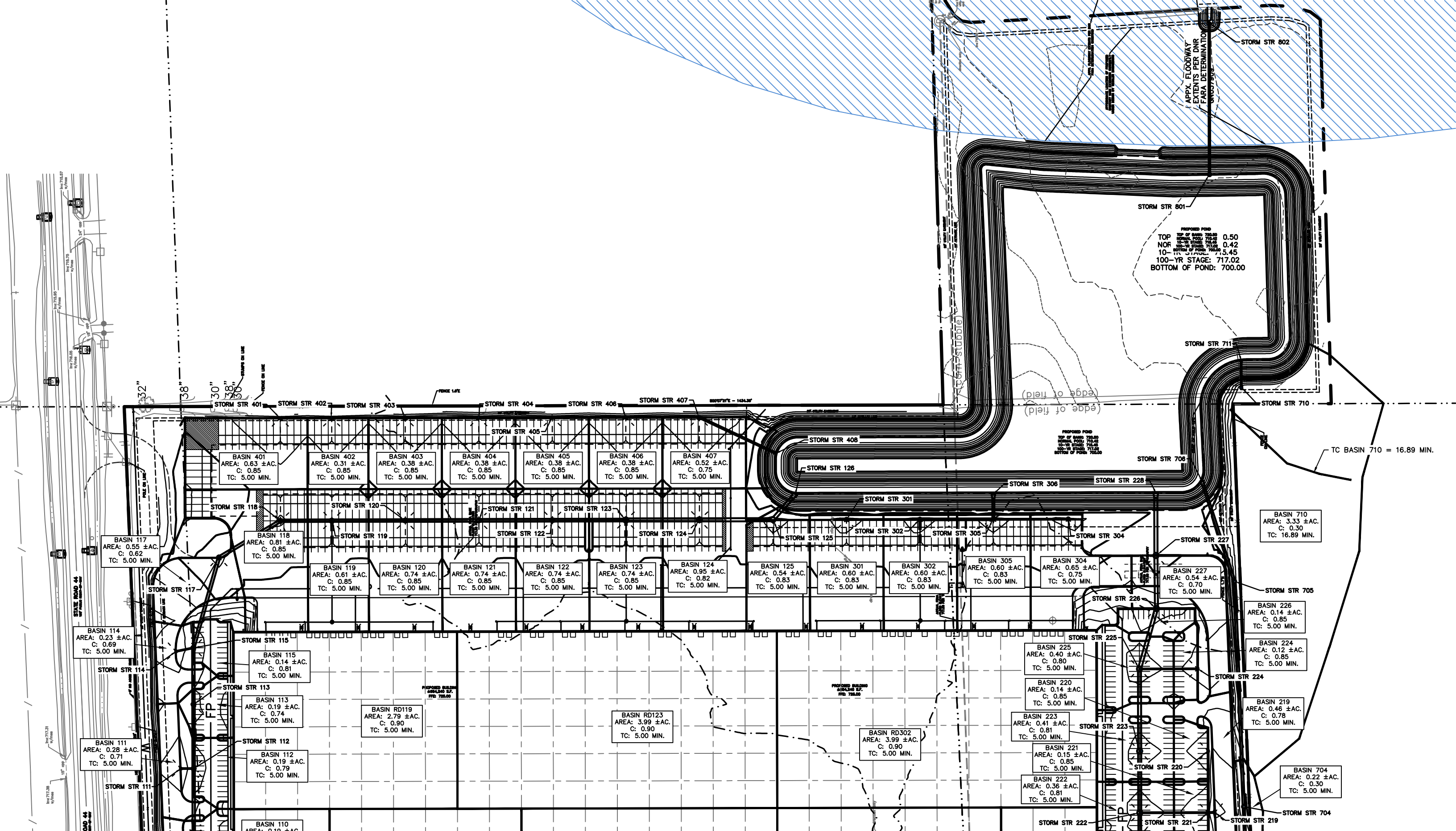
Project Number 2019.02798

**PROPOSED  
FLOODPLAIN  
VOLUME**



## **APPENDIX D**

### **PROPOSED CONDITIONS – STORM SEWER**



0' 75' 150'

SCALE: 1" = 150'

March 19, 2021



## East Inlet Basins Exhibit

I-65 South Logistics Center  
State Road 44 & Forest Road  
Franklin, Indiana



PROPOSED STORM SEWER SYSTEM  
STORM SEWER DESIGN TABLE - RATIONAL METHOD

Job Information  
Description: I-65 Logistics Center  
Reviewing Entity: City of Franklin  
Job #: 2019.02798  
Date: 03/19/21

Design Parameters	
Design Storm:	10-yr
Intensity Calculation Method:	Entity Data
Invert Calculation Method:	Match Invert
Drop Amount:	-

STR.	TO STR.	LENGTH	PIPE MATERIAL	FLOW				ENTITY DATA														RIM		INVERT		COVER					
				DIRECT TO CASTING		DIRECT TO INLET		cA		INLET	CASTING	TO INLET	i		CASTING	INLET	PIPE DIAMETER	PIPE SLOPE	MANNING'S N	FULL PIPE CAPACITY	CAPACITY UTILIZATION	FULL FLOW VELOCITY	FLOW DEPTH	FLOW VELOCITY	TRAVEL TIME			ELEV.		ELEV.	
				c	AREA	c	AREA	INLET	CASTING	CUM. cA	Tc	Tcum	CASTING	INLET	Q	CUM. Q												U.S.	D.S.	U.S.	D.S.
				(ft)	(acres)	(ft)	(acres)	(min)	(min)	(in/hr)	(min)	(min)	(in/hr)	(CFS)	(CFS)	(inches)	(%)	(cfs)	(%)	(ft/sec)	(ft)	(ft/sec)	(min)	(ft)	(ft)	(ft)	(ft)	(ft)			
101	102	116.0	RCP	0.68	0.81	-	-	0.55	0.55	0.55	5.00	5.00	7.20	7.20	3.99	3.99	18	0.20	0.013	4.70	85%	2.66	1.06	2.98	0.73	719.53	719.53	715.29	715.05	2.53	2.76
102	103	147.0	RCP	0.49	2.94	0.90	2.39	3.59	1.43	4.14	18.38	18.38	4.56	4.56	6.54	18.87	36	0.10	0.013	21.09	89%	2.98	2.21	3.37	0.82	719.53	722.79	713.85	713.71	2.34	5.75
103	105	200.4	RCP	0.74	0.37	0.90	1.39	1.52	0.27	5.66	5.00	19.20	7.20	4.46	1.94	25.24	36	0.15	0.013	25.83	98%	3.65	2.40	4.17	0.91	722.79	721.82	713.71	713.41	5.75	5.08
104	105	52.5	RCP	0.57	0.33	-	-	0.19	0.19	0.19	5.00	5.00	7.20	7.20	1.35	1.35	12	0.40	0.013	2.25	60%	2.87	0.56	3.00	0.31	722.04	721.82	717.92	717.71	2.95	2.95
105	107	121.7	RCP	0.59	0.73	-	-	0.43	0.43	6.27	5.00	20.12	7.20	4.35	3.07	27.29	36	0.18	0.013	27.90	98%	3.95	2.40	4.50	0.51	721.82	723.16	713.41	713.19	5.08	6.64
107	109	108.0	RCP	0.82	0.19	-	-	0.15	0.15	6.43	5.00	20.63	7.20	4.29	1.10	27.57	36	0.19	0.013	28.69	96%	4.06	2.36	4.62	0.44	723.16	722.69	713.19	712.99	6.64	6.36
108	109	12.7	RCP	0.72	0.38	-	-	0.27	0.27	0.27	5.00	5.00	7.20	7.20	1.98	1.98	12	0.35	0.013	2.11	94%	2.68	0.77	3.05	0.08	720.70	722.69	717.04	716.99	2.50	4.52
109	110	112.5	RCP	0.82	0.19	-	-	0.15	0.15	6.85	5.00	21.07	7.20	4.24	1.11	29.04	36	0.20	0.013	29.83	97%	4.22	2.39	4.81	0.44	722.69	722.68	712.99	712.77	6.36	6.58
110	112	141.0	RCP	0.80	0.19	-	-	0.15	0.15	7.00	5.00	21.52	7.20	4.18	1.07	29.30	42	0.10	0.013	31.82	92%	3.31	2.65	3.75	0.71	722.68	722.53	712.77	712.63	6.04	6.03
111	112	22.6	RCP	0.71	0.28	-	-	0.20	0.20	0.20	5.00	5.00	7.20	7.20	1.43	1.43	12	0.35	0.013	2.11	68%	2.68	0.60	2.89	0.14	721.37	722.53	717.71	717.63	2.50	3.74
112	113	112.5	RCP	0.79	0.19	-	-	0.15	0.15	7.35	5.00	22.23	7.20	4.10	1.08	30.14	42	0.10	0.013	31.82	95%	3.31	2.72	3.76	0.57	722.53	722.66	712.63	712.52	6.03	6.27
113	115	99.0	RCP	0.74	0.19	-	-	0.14	0.14	7.49	5.00	22.79	7.20	4.03	1.00	30.20	42	0.10	0.013	31.82	95%	3.31	2.72	3.76	0.50	722.66	722.57	712.52	712.42	6.27	6.28
114	115	31.2	RCP	0.69	0.23	-	-	0.16	0.16	0.16	5.00	5.00	7.20	7.20	1.15	1.15	12	0.35	0.013	2.11	54%	2.68	0.53	2.74	0.19	721.24	722.57	717.53	717.42	2.55	3.99
115	117	164.3	RCP	0.81	0.14	-	-	0.11	0.11	7.76	5.00	23.29	7.20	3.97	0.81	30.83	42	0.10	0.013	31.82	97%	3.31	2.78	3.77	0.83	722.57	718.75	712.42	712.25	6.28	2.62
117	118	125.4	RCP	0.62	0.55	-	-	0.34	0.34	8.10	5.00	24.12	7.20	3.87	2.46	31.39	42	0.11	0.013	32.60	96%	3.39	2.76	3.86	0.62	718.75	718.90	712.25	712.12	2.62	2.91
118	119	90.1	RCP	0.85	0.81	-	-	0.69	0.69	8.79	5.00	24.74	7.20	3.80	4.94	33.40	42	0.12	0.013	34.85	96%	3.62	2.75	4.12	0.41	718.90	718.96	712.12	712.01	2.91	3.07
119	120	128.8	RCP	0.85	0.61	0.90	2.79	3.03	0.52	11.82	5.00	25.15	7.20	3.75	3.73	44.32	42	0.21	0.013	45.55	97%	4.73	2.79	5.40	0.45	718.96	718.96	712.01	711.75	3.07	3.34
120	121	128.8	RCP	0.85	0.74	-	-	0.63	0.63	12.45	5.00	25.61	7.20	3.70	4.51	46.00	48	0.11	0.013	47.64	97%	3.79	3.16	4.32	0.57	718.96	718.96	711.75	711.61	2.80	2.94
121	122	128.8	RCP	0.85	0.74	-	-	0.63	0.63	13.07	5.00	26.17	7.20	3.63	4.51	47.43	48	0.12	0.013	49.76	95%	3.96	3.12	4.51	0.54	718.96	718.96	711.61	711.45	2.94	3.09
122	123	128.8	RCP	0.85	0.74	-	-	0.63	0.63	13.70	5.00	26.71	7.20	3.56	4.51	48.81	48	0.13	0.013	51.79	94%	4.12	3.09	4.69	0.52	718.96	718.96	711.45	711.28	3.09	3.26
123	124	128.8	RCP	0.85	0.74	0.90	3.99	4.21	0.63	17.92	5.00	27.23	7.20	3.50	4.51	62.71	54	0.12	0.013	66.69	94%	4.19	3.47	4.77	0.51	718.96	718.96	711.28	711.14	2.72	2.87
124	125	128.8	RCP	0.82	0.95	-	-	0.78	0.78	18.69	5.00	27.75	7.20	3.44	5.58	64.28	54	0.12	0.013	66.69	96%	4.19	3.55	4.78	0.51	718.96	718.71	711.14	710.99	2.87	2.77
125	126	59.7	RCP	0.83	0.54	-	-	0.45	0.45	19.14	5.00	28.26	7.20	3.38	3.24	64.66	54	0.12	0.013	66.69	97%	4.19	3.57	4.78	0.24	718.71	-	710.99	710.92	2.77	-
201	202	116.0	RCP	0.67	0.84	-	-	0.56	0.56	0.56	8.68	8.68	5.99	5.99	3.37	3.37	18	0.18	0.013	4.46	76%	2.52	0.97	2.77	0.77	719.53	719.53	715.31	715.10	2.51	2.72
202	203	116.0	RCP	0.69	0.79	-	-	0.54	0.54	1.10	7.39	9.45	6.42	5.74	3.48	6.34	18	0.40	0.013	6.64	95%	3.76	1.17	4.28	0.51	719.53	719.53	715.10	714.63	2.72	3.18
203	204	116.0	RCP	0.72	0.69	0.90	3.19	3.36	0.49	4.46	5.00	9.96	7.20	5.57	3.54	24.88	36	0.15	0.013	25.40	98%	3.59	2.41	4.10	0.54	719.53	719.53	713.88	713.72	2.31	2.48
204	205	116.0	RCP	0.81	0.56	-	-	0.45	0.45	4.92	5.00	10.50	7.20	5.50	3.27	27.05	36	0.17	0.013	27.50	98%	3.89	2.42	4.43	0.50	719.53	719.53	713.72	713.52	2.48	2.67
205	206	116.0	RCP	0.81	0.56	-	-	0.45	0.45	5.37	5.00	11.00	7.20	5.44	3.26	29.22	36	0.21	0.013	30.20	97%	4.27	2.38	4.87	0.45	719.53	719.53	713.52	713.28	2.67	2.91
206	207	116.0	RCP	0.82	0.55	-	-	0.45	0.45	5.82	5.00	11.45	7.20	5.39	3.25	31.37	42	0.11	0.013	32.60	96%	3.39	2.76	3.86	0.57	719.53	719.53	713.28	713.16	2.37	2.49
207	208	141.8	RCP	0.85	0.53	0.90	2.79	2.96	0.45	8.78	5.00	12.02	7.20	5.32	3.24	46.72	42	0.23	0.013	48.25	97%	5.02	2.77	5.71	0.47	719.53	719.20	713.16	712.83	2.49	2.49
208A	208	29.0	RCP	0.85	0.15	-	-	0.13	0.13	0.13	5.00	5.00	7.20	7.20	0.92	0.92	12	0.35	0.013	2.11	43%	2.68	0.46	2.59	0.18	719.82	719.20	715.64	715.53	3.01	2.50
208	210																														



### PROPOSED STORM SEWER SYSTEM HYDRAULIC GRADE LINE (HGL) CALCULATIONS

### Job Information

**Description:** I-65 Logistics Center  
**Entity:** City of Franklin  
**Job #:** 2019.02798  
**Date:** 03/19/21

Design Parameters	
Design Storm:	10-yr
Intensity Calculation Method:	Entity Data
Starting Elevation:	(dc+D)/2
Calculation Method:	Structure Coefficient

		INTENSITY																												
D.S. STR.	U.S. STR.	D.S. INV. ELEV. (ft)	D.S. CROWN ELEV. (ft)	(dc+D)/2 ELEV. (ft)	STARTING ELEV. (ft)	Tc (min)	ENTITY (in/hr)	FLOW (cfs)	DIAMETER (in.)	SLOPE %	AREA (sq. ft)	WETTED PERIMETER (ft)	HYDRAULIC RADIUS (ft.)	FLOW DEPTH (ft.)	CRITICAL DEPTH (ft)	VELOCITY (ft/s)	LENGTH (ft)	MANNING'S N	FRICTION LOSS (ft)	UPSTREAM MAXIMUM INFLUENT VELOCITY (ft/s)	OUTLET STRUCTURE COEFFICIENT	UPSTREAM STRUCTURE COEFFICIENT	EFFLUENT PIPE VELOCITY (ft/s)	OUTLET STRUCTURE LOSS (ft)	UPSTREAM STRUCTURE LOSS (ft)	TOTAL LOSS (ft)	U.S. HGL ELEV. (ft.)	U.S. STR. T.R. (ft.)	U.S. STR. CROWN (ft.)	
102	101	715.05	716.55	716.19	718.02	5.00	7.20	3.99	18	0.20	1.336	2.998	0.446	1.061	0.764	2.98	116	0.013	0.231	-	-	1.25	3.37	-	-	0.173	0.403	718.43	719.53	716.79
103	102	713.71	716.71	715.90	717.86	18.38	4.56	18.87	36	0.10	5.592	6.201	0.902	2.214	1.392	3.37	147	0.013	0.146	2.98	-	0.50	4.17	-	-	0.019	718.02	719.53	716.85	
105	103	713.41	716.41	715.72	717.51	19.20	4.46	25.24	36	0.15	6.059	6.640	0.913	2.399	1.621	4.17	200	0.013	0.299	3.37	-	0.50	4.50	-	-	0.046	0.345	717.86	722.79	716.71
105	104	717.71	718.71	718.45	718.45	5.00	7.20	1.35	12	0.40	0.451	1.688	0.267	0.559	0.492	3.00	53	0.013	0.209	-	-	1.25	4.50	-	-	0.175	0.384	718.84	722.04	718.92
107	105	713.19	716.19	715.54	717.28	20.12	4.35	27.29	36	0.18	6.067	6.648	0.913	2.402	1.689	4.50	122	0.013	0.212	4.17	-	0.50	4.62	-	-	0.022	0.234	717.51	721.82	716.41
109	107	712.99	715.99	715.34	717.07	20.63	4.29	27.57	36	0.19	5.965	6.544	0.912	2.360	1.697	4.62	108	0.013	0.199	4.50	-	0.50	4.81	-	-	0.009	0.207	717.28	723.16	716.19
109	108	716.99	717.99	717.79	717.79	5.00	7.20	1.98	12	0.35	0.648	2.137	0.303	0.768	0.600	3.05	13	0.013	0.044	-	-	1.25	4.81	-	-	0.181	0.225	718.02	720.70	718.04
110	109	712.77	715.77	715.14	716.83	21.07	4.24	29.04	36	0.20	6.040	6.619	0.912	2.391	1.744	4.81	112	0.013	0.224	4.62	-	0.50	3.75	-	-	0.014	0.237	717.07	722.69	715.99
112	110	712.63	716.13	715.21	716.62	21.52	4.18	29.30	42	0.10	7.809	7.384	1.058	2.648	1.671	3.75	141	0.013	0.140	4.81	-	0.50	3.76	-	-	0.070	0.211	716.83	722.68	716.27
112	111	717.63	718.63	718.38	718.38	5.00	7.20	1.43	12	0.35	0.497	1.782	0.279	0.605	0.507	2.89	23	0.013	0.079	-	-	1.25	3.76	-	-	0.162	0.240	718.62	721.37	718.71
113	112	712.52	716.02	715.11	716.51	22.23	4.10	30.14	42	0.10	8.010	7.544	1.062	2.716	1.696	3.76	112	0.013	0.112	3.75	-	0.50	3.76	-	-	0.001	0.112	716.62	722.53	716.13
115	113	712.42	715.92	715.02	716.41	22.79	4.03	30.20	42	0.10	8.025	7.556	1.062	2.721	1.698	3.76	99	0.013	0.098	3.76	-	0.50	3.77	-	-	0.000	0.099	716.51	722.66	716.02
115	114	717.42	718.42	718.14	718.14	5.00	7.20	1.15	12	0.35	0.419	1.623	0.258	0.526	0.451	2.74	31	0.013	0.108	-	-	1.25	3.77	-	-	0.146	0.254	718.40	721.24	718.53
117	115	712.25	715.75	714.86	716.25	23.29	3.97	30.83	42	0.10	8.183	7.690	1.064	2.776	1.716	3.77	164	0.013	0.163	3.76	-	0.50	3.86	-	-	0.000	0.164	718.40	722.57	715.92
118	117	712.12	715.62	714.74	716.11	24.12	3.87	31.39	42	0.11	8.132	7.646	1.064	2.758	1.732	3.86	125	0.013	0.131	3.77	-	0.50	4.12	-	-	0.005	0.136	716.25	718.75	715.75
119	118	712.01	715.51	714.66	715.99	24.74	3.80	33.40	42	0.12	8.097	7.616	1.063	2.746	1.790	4.12	90	0.013	0.108	3.86	-	0.50	5.40	-	-	0.016	0.124	716.11	718.90	715.62
120	119	711.75	715.25	714.54	715.63	25.15	3.75	44.32	42	0.21	8.214	7.717	1.064	2.787	2.075	5.40	129	0.013	0.263	4.12	-	0.50	4.32	-	-	0.094	0.356	715.99	718.96	715.51
121	120	711.61	715.61	714.62	715.41	25.61	3.70	46.00	48	0.11	10.651	8.760	1.216	3.161	2.030	4.32	129	0.013	0.141	5.40	-	0.50	4.51	-	-	0.081	0.222	715.63	718.96	715.75
122	121	711.45	715.45	714.48	715.24	26.17	3.63	47.43	48	0.12	10.523	8.665	1.214	3.122	2.063	4.51	129	0.013	0.154	4.32	-	0.50	4.69	-	-	0.013	0.167	715.41	718.96	715.61
123	121	711.28	715.28	714.33	715.06	26.71	3.56	48.81	48	0.13	10.415	8.588	1.213	3.090	2.095	4.69	129	0.013	0.166	4.51	-	0.50	4.77	-	-	0.013	0.179	715.24	718.96	715.45
124	123	711.14	715.64	714.54	714.91	27.23	3.50	62.71	54	0.12	13.154	9.644	1.364	3.469	2.303	4.77	129	0.013	0.147	4.69	-	0.50	4.78	-	-	0.006	0.153	715.06	718.96	715.78
125	124	710.99	715.49	714.41	714.76	27.75	3.44	64.28	54	0.12	13.460	9.842	1.368	3.550	2.333	4.78	129	0.013	0.147	4.77	-	0.50	4.78	-	-	0.001	0.148	714.91	718.96	715.64
126	125	710.92	715.42	714.34	714.34	28.26	3.38	64.66	54	0.12	13.534	9.892	1.368	3.571	2.340	4.78	60	0.013	0.068	4.78	1.00	0.50	-	0.354	-	0.000	0.423	714.76	718.71	715.49
202	201	715.10	716.60	716.20	718.91	8.68	5.99	3.37	18	0.18	1.215	2.812	0.432	0.974	0.699	2.77	116	0.013	0.208	-	-	1.25	4.28	-	-	0.149	0.357	719.27	719.53	716.81
203	202	714.63	716.13	715.87	718.36	9.45	5.74	6.34	18	0.40	1.481	3.252	0.455	1.172	0.973	4.28	116	0.013	0.462	2.77	-	0.50	4.10	-	-	0.083	0.544	718.91	719.53	716.60
204	203	713.72	716.72	716.02	718.19	9.96	5.57	24.88	36	0.15	6.075	6.657	0.913	2.406	1.609	4.10	116	0.013	0.167	4.28	-	0.50	4.43	-	-	0.012	0.179	718.36	719.53	716.88
205	204	713.52	716.52	715.86	717.97	10.50	5.50	27.05	36	0.17	6.100	6.683	0.913	2.416	1.681	4.43	116	0.013	0.196	4.10	-	0.50	4.87	-	-	0.022	0.219	718.19	719.53	716.72
206	205	713.28	716.28	715.66	717.70	11.00	5.44	29.22	36	0.21	6.004	6.583	0.912	2.376	1.750	4.87	116	0.013	0.237	4.43	-	0.50	3.86	-	-	0.031	0.268	717.97	719.53	716.52
207	206	713.16	716.66	715.78	717.51	11.45	5.39	31.37	42	0.11	8.128	7.643	1.064	2.757	1.732	3.86	116	0.013	0.121	4.87	-	0.50	5.71	-	-	0.068	0.189	717.70	719.53	716.78
208	207	712.83	716.33	715.65	717.05	12.02	5.32	46.72	42	0.23	8.176	7.684	1.064	2.773	2.133	5.71	142	0.013	0.324	3.86	-	0.50	6.63	-	-	0.138	0.462	717.51	719.53	716.66
208	208A	715.53	716.53	716.23	717.05	5.00	7.20	0.92	12	0.35	0.354	1.493	0.237	0.461	0.401	2.59	29	0.013	0.101	-	-	1.25	6.63	-	-	0.130	0.231	717.28	719.82	716.64
210	208	712.44	715.94	715.34	716.56	12.49	5.26	54.44	42	0.31	8.206	7.710	1.064	2.784	2.309	6.63	128	0.013	0.395	5.71	-	0.50	5.29	-	-	0.088	0.484	717.05	719.20	716.33
210	209	715.84	716.84	716.57	716.57	5.00	7.20	1.27	12	0.35	0.453	1.692	0.268	0.560	0.476	2.81	29	0.013	0.101	-	-	1.25	5.29	-	-	0.153	0.254	716.83	719.61	716.94
213	210	712.31	716.31	715.43	716.31	12.86	5.22	56.30	48	0.17	10.645	8.756	1.216	3.159	2.257	5.29	79	0.013	0.130	6.63	-	0.50	5.29	-	-	0.125	0.254	716.56	719.54	716.44
213	211	716.21	717.21	716.90	716.90	5.00	7.20	0.87	12	0.35	0.340	1.466	0.232	0.448	0.390	2.55	101	0.013	0.350	-	-	1.25	5.29	-	-	0.127	0.477	717.38	720.31	717.56
213	212	719.42	719.81	719.42	719.42	5.00	7.20	0.29	12	0.35	0.153	1.047	0.147	0.250	0.221	1.88	75	0.013	0.261	-	-	1.25	5.29	-	-	0.069	0.329	719.75	722.87	720.07
217	213	712.12	716.12	715.26	716.12	13.14	5.18	57.11	48	0.17	10.791	8.868	1.217	3.204	2.274	5.29	113	0.013	0.185	5.29	-	0.50	5.68	-	-	0.000	0.185	716.31	722.54	716.31
216	214	716.34	717.59	717.30	717.50	5.00	7.20	2.79	15	0.25	0.943	2.528	0.373	0.898	0.671	2.96	21	0.013	0.053	-	-	1.25	4.64	-	-	0.170	0.223	717.73	720.44	717.64
216	215	718.34	719.34	719.05	719.05	5.00	7.20	0.97	12	0.35	0.370	1.526	0.243	0.478	0.414	2.63	113	0.013	0.392	-	-	1.25	4.64	-	-	0.134	0.526	719.57	722.42	719.73
217	216	715.62	716.87	716.69	716.69	5.70	6.97	4.76	15	0.60	1.025	2.702	0.379	0.973	0.884	4.64	120	0.013	0.716	2.96	-	0.50	5.68	-	-	0.099	0.815	717.50	722.74	717.59
218	217	711.91	715.91	715.09	715.88	13.54	5.14	61.56	48	0.19	10.839	8.906	1.217	3.219	2.365	5.68	113	0.013	0.213	5.29	-	0.50	5.83	-	-	0.033	0.246	716.12	723.09	716.12
222	218	711.62	715.62	714.81	715.58	13.92	5.09	62.81	48	0.2																				

# Runoff Coefficient and Runoff Curve Number Calculation

**Description:** I-65 Logistics Center  
**Entity:** City of Franklin  
**Job #:** 2019.02798  
**Date:** 3/19/2021

## Job Information

	Runoff Coefficient	Runoff Curve Number
Roof	0.90	98
Grass	0.30	77
Pavement	0.85	98
Water	1.00	100

Basin	Structure	Roof Area	Pervious Area	Pavement Area	Water Area	Total Area	Weighted Runoff Coefficient	Weighted Curve Number
		(acres)	(acres)	(acres)	(acres)	(acres)	C	CN
101	101	-	0.24	0.57	-	0.81	0.68	92
102	102	-	1.94	1.00	-	2.94	0.49	84
103	103	-	0.08	0.29	-	0.37	0.74	94
104	104	-	0.16	0.16	-	0.33	0.57	87
105	105	-	0.35	0.38	-	0.73	0.59	88
107	107	-	0.01	0.18	-	0.19	0.82	97
108	108	-	0.09	0.29	-	0.38	0.72	93
109	109	-	0.01	0.18	-	0.19	0.82	97
110	110	-	0.02	0.17	-	0.19	0.80	96
111	111	-	0.07	0.21	-	0.28	0.71	93
112	112	-	0.02	0.17	-	0.19	0.79	96
113	113	-	0.04	0.15	-	0.19	0.74	94
114	114	-	0.07	0.16	-	0.23	0.69	92
115	115	-	0.01	0.13	-	0.14	0.81	96
117	117	-	0.23	0.32	-	0.55	0.62	89
118	118	-	0.00	0.81	-	0.81	0.85	98
119	119	-	-	0.61	-	0.61	0.85	98
120	120	-	-	0.74	-	0.74	0.85	98
121	121	-	-	0.74	-	0.74	0.85	98
122	122	-	-	0.74	-	0.74	0.85	98
123	123	-	-	0.74	-	0.74	0.85	98
124	124	-	0.05	0.89	-	0.95	0.82	97
125	125	-	0.02	0.52	-	0.54	0.83	97
201	201	-	0.27	0.56	-	0.84	0.67	91
202	202	-	0.23	0.56	-	0.79	0.69	92
203	203	-	0.17	0.52	-	0.69	0.72	93
204	204	-	0.04	0.52	-	0.56	0.81	96
205	205	-	0.04	0.52	-	0.56	0.81	96
206	206	-	0.03	0.52	-	0.55	0.82	97
207	207	-	-	0.53	-	0.53	0.85	98
208A	208A	-	-	0.15	-	0.15	0.85	98
208	208	-	0.22	0.14	-	0.36	0.51	85
209	209	-	0.02	0.20	-	0.22	0.79	96
210	210	-	0.15	0.26	-	0.41	0.65	90
211	211	-	0.06	0.12	-	0.18	0.68	91
212	212	-	-	0.05	-	0.05	0.85	98
213	213	-	0.00	0.08	-	0.08	0.85	98
214	214	-	0.12	0.42	-	0.53	0.73	93
215	215	-	0.02	0.15	-	0.17	0.79	96
216	216	-	0.00	0.19	-	0.19	0.85	98
217	217	-	0.02	0.33	-	0.35	0.82	97
218	218	-	0.03	0.40	-	0.43	0.81	96
219	219	-	0.06	0.40	-	0.46	0.78	95
220	220	-	0.00	0.14	-	0.14	0.85	98
221	221	-	0.00	0.15	-	0.15	0.85	98
222	222	-	0.03	0.34	-	0.36	0.81	96
223	223	-	0.03	0.39	-	0.41	0.81	97
224	224	-	-	0.12	-	0.12	0.85	98
225	225	-	0.03	0.37	-	0.40	0.80	96
226	226	-	-	0.14	-	0.14	0.85	98
227	227	-	0.15	0.40	-	0.54	0.70	92
301	301	-	0.02	0.58	-	0.60	0.83	97
302	302	-	0.02	0.58	-	0.60	0.83	97
304	304	-	0.12	0.54	-	0.65	0.75	94
305	305	-	0.02	0.58	-	0.60	0.83	97
401	401	-	-	0.63	-	0.63	0.85	98
402	402	-	-	0.31	-	0.31	0.85	98
403	403	-	-	0.38	-	0.38	0.85	98
404	404	-	-	0.38	-	0.38	0.85	98
405	405	-	-	0.38	-	0.38	0.85	98
406	406	-	-	0.38	-	0.38	0.85	98
407	407	-	0.09	0.43	-	0.52	0.75	94
701	701	-	4.81	0.70	-	5.51	0.37	80
702	702	-	0.51	-	-	0.51	0.30	77
703	703	-	0.46	-	-	0.46	0.30	77
704	704	-	0.22	-	-	0.22	0.30	77
705	705	-	-	-	-	-	-	-
710	710	-	3.33	-	-	3.33	0.30	77
RD102	RD102	2.39	-	-	-	2.39	0.90	98
RD203	RD203	3.19	-	-	-	3.19	0.90	98
RD103	RD103	1.39	-	-	-	1.39	0.90	98
RD207	RD207	2.79	-	-	-	2.79	0.90	98
RD208	RD208	1.39	-	-	-	1.39	0.90	98
RD302	RD302	3.99	-	-	-	3.99	0.90	98
RD123	RD123	3.99	-	-	-	3.99	0.90	98
RD119	RD119	2.79	-	-	-	2.79	0.90	98

TOTAL	TOTAL	21.91	14.75	24.62	-	61.27	0.74	93
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**Time of Concentration ( $T_c$ ) or Travel Time ( $T_t$ )**

Project:	I-65 Logistics Center
Location:	City of Franklin
Basin:	TC 202

By: \_\_\_\_\_  
Checked: \_\_\_\_\_

Date: \_\_\_\_\_  
Date: \_\_\_\_\_

$$\begin{array}{cc} \text{Present} & \frac{-}{T_c} & \text{Developed} & \frac{X}{T_t} & \text{through subarea} \end{array}$$

## Sheet Flow

Surface description  
Manning's roughness coeff.,  $n$   
Flow Length,  $L$  ( $L < 300$  ft)  
Rainfall Calculation Method  
Two-year 24-hr rainfall,  $P_2$   
Land slope,  $s$

$$T_t = \frac{.007 (nL)^{0.8}}{(P_2)^{0.5} s^{0.4}}$$

Segment ID	
	Unpaved
	0.24
ft	94
	Entity Rainfall Data
in	2.90
ft/ft	0.12
hr	0.12

+

+

	=

0.12

### Shallow Concentrated Flow

Surface description, (paved or unpaved)  
Flow length, L  
Watercourse slope, s  
Average velocity, V

$$T_t = \frac{L}{3600 \text{ V}}$$

Segment ID	
	Paved
ft	70
ft/ft	0.015
ft/s	2.49
hr	0.01

+

+

2

0.01

### Channel Flow

Channel Geometry  
Discharge (cfs)  
Diameter (ft)  
Bottom Width (ft)  
Side Slope (x:1) (ft)  
Slope of Channel (ft)  
Manning's Roughness Coefficient  
Depth (ft)  
Cross Sectional Area (ft<sup>2</sup>)  
Wetted Perimeter (ft)  
Hydraulic Radius (ft)  
Velocity (ft/s)  
Flow length, L

$$T_t = \frac{L}{3600 V}$$

$$T_t = \frac{L}{3600 V}$$

Segment ID	
	-
	-
	-
	-
	-
	-
	-
	-
	-
	-
	-
ft	-
hr	-

+

+

$$=$$

0.00

Watershed or subarea  $T_c$  or  $T_t$ 

---

0.12

min

7.39

\*A velocity of 5 ft/s was assumed for pipe travel time.



**Time of Concentration ( $T_c$ ) or Travel Time ( $T_t$ )**

Project:	I-65 Logistics Center
Location:	City of Franklin
Basin:	Offsite 12" to 102

By: \_\_\_\_\_  
Checked: \_\_\_\_\_

Date: \_\_\_\_\_  
Date: \_\_\_\_\_

Present  $\frac{-}{T_c}$  Developed  $\frac{X}{T_t}$  through subarea

## Sheet Flow

Surface description  
Manning's roughness coeff., n  
Flow Length, L (L < 300 ft)  
Rainfall Calculation Method  
Two-year 24-hr rainfall, P2  
Land slope, s

$$T_t = \frac{.007 (nL)^{0.8}}{(P_2)^{0.5} s^{0.4}}$$

Segment ID	
	Unpaved
	0.24
ft	100
	Entity Rainfall Data
in	2.90
ft/ft	0.02
hr	0.27

+

+

11

0.27

### Shallow Concentrated Flow

Surface description, (paved or unpaved)  
Flow length, L  
Watercourse slope, s  
Average velocity, V

$$T_t = \frac{L}{3600 V}$$

Segment ID	
	Unpaved
ft	296
ft/ft	0.017
ft/s	2.10
hr	0.04

+

+

11

0.04

### Channel Flow

Channel Geometry  
Discharge (cfs)  
Diameter (ft)  
Bottom Width (ft)  
Side Slope (x:1) (ft)  
Slope of Channel (ft)  
Manning's Roughness Coefficient  
Depth (ft)  
Cross Sectional Area (ft<sup>2</sup>)  
Wetted Perimeter (ft)  
Hydraulic Radius (ft)  
Velocity (ft/s)  
Flow length, L  
$$T_t = \frac{L}{3600 V}$$

Segment ID	
	-
	-
	-
	-
	-
	-
	-
	-
	-
	-
	-
ft	-
hr	-

+

+

11

0.00

Watershed or subarea  $T_c$  or  $T_t$ 

hr  
min

0.31

18.38

\*A velocity of 5 ft/s was assumed for pipe travel time.



**Time of Concentration ( $T_c$ ) or Travel Time ( $T_t$ )**

Project:	I-65 Logistics Center
Location:	City of Franklin
Basin:	710

By: \_\_\_\_\_  
Checked: \_\_\_\_\_

Date: \_\_\_\_\_  
Date: \_\_\_\_\_

$$\begin{array}{cc} \text{Present} & \frac{-}{T_c} & \text{Developed} & \frac{X}{T_t} & \text{through subarea} \end{array}$$

## Sheet Flow

Surface description  
Manning's roughness coeff.,  $n$   
Flow Length,  $L$  ( $L < 300$  ft)  
Rainfall Calculation Method  
Two-year 24-hr rainfall,  $P_2$   
Land slope,  $s$

$$T_t = \frac{.007 (nL)^{0.8}}{(P_2)^{0.5} s^{0.4}}$$

Segment ID	
	Unpaved
	0.24
ft	100
	Entity Rainfall Data
in	2.90
ft/ft	0.02
hr	0.26

+

+

2

0.26

### Shallow Concentrated Flow

Surface description, (paved or unpaved)  
Flow length, L  
Watercourse slope, s  
Average velocity, V

$$T_t = \frac{L}{3600 \text{ V}}$$

Segment ID	
	Unpaved
ft	155
ft/ft	0.018
ft/s	2.15
hr	0.02

+

+

二

0.02

### Channel Flow

Channel Geometry  
Discharge (cfs)  
Diameter (ft)  
Bottom Width (ft)  
Side Slope (x:1) (ft)  
Slope of Channel (ft)  
Manning's Roughness Coefficient  
Depth (ft)  
Cross Sectional Area (ft<sup>2</sup>)  
Wetted Perimeter (ft)  
Hydraulic Radius (ft)  
Velocity (ft/s)  
Flow length, L  
$$T_t = \frac{L}{3600 \text{ V}}$$

$$T_t = \frac{L}{3600 V}$$

Segment ID	
	-
	-
	-
	-
	-
	-
	-
	-
	-
	-
	-
ft	-
hr	-

+

+

2

0.00

Watershed or subarea  $T_c$  or  $T_t$ hr  
min

0.28

16.89

\*A velocity of 5 ft/s was assumed for pipe travel time.

**PROPOSED STORM SEWER SYSTEM**  
**ORIFICE FLOW CASTING CAPACITY CALCULATIONS**

**Job Information**

**Description:** I-65 Logistics Center  
**Reviewing Entity:** City of Franklin  
**Job #:** 2019.02798  
**Date:** 03/19/21

Design Parameters	
Design Storm:	10-yr
Clogging (%):	50%
Intensity Calculation Method:	Entity Data

STR. NO.	SPECIFIED STRUCTURE TYPE	SPECIFIED CASTING TYPE	PIPE COVER (ft)	STRUCTURE DEPTH (ft)	CASTING c	CASTING A (acres)	CASTING Tc (min)	ENTITY DATA I (in/hr)	CASTING FLOW (cfs)	ORIFICE FLOW DEPTH (ft)	WEIR FLOW DEPTH (ft)	PONDING DEPTH (ft)
101	TYPE "J" MANHOLE	R-3455-C	2.53	4.24	0.68	0.81	5.00	7.20	3.99	0.41	0.41	0.41
102	TYPE "K" MANHOLE	R-3457-C2	2.34	5.67	0.49	2.94	18.38	4.56	6.54	0.20	0.45	0.45
103	TYPE "J" MANHOLE	R-3287-10V	5.75	9.08	0.74	0.37	5.00	7.20	1.94	0.15	0.38	0.38
104	TYPE "A" INLET	R-4342	2.95	4.12	0.57	0.33	5.00	7.20	1.35	0.08	0.29	0.29
105	TYPE "J" MANHOLE	R-3287-15	5.08	8.42	0.59	0.73	5.00	7.20	3.07	0.16	0.42	0.42
107	TYPE "J" MANHOLE	R-3010	6.64	9.97	0.82	0.19	5.00	7.20	1.10	0.21	0.30	0.30
108	TYPE "J" INLET	R-3287-SB10	2.50	3.66	0.72	0.38	5.00	7.20	1.98	0.30	0.39	0.39
109	TYPE "J" MANHOLE	R-3010	6.36	9.69	0.82	0.19	5.00	7.20	1.11	0.21	0.30	0.30
110	TYPE "K" MANHOLE	R-3010	6.04	9.92	0.80	0.19	5.00	7.20	1.07	0.20	0.29	0.29
111	TYPE "A" INLET	R-3010	2.50	3.67	0.71	0.28	5.00	7.20	1.43	0.35	0.35	0.35
112	TYPE "K" MANHOLE	R-3010	6.03	9.90	0.79	0.19	5.00	7.20	1.08	0.20	0.29	0.29
113	TYPE "K" MANHOLE	R-3010	6.27	10.14	0.74	0.19	5.00	7.20	1.00	0.17	0.28	0.28
114	TYPE "A" INLET	R-3010	2.55	3.72	0.69	0.23	5.00	7.20	1.15	0.23	0.31	0.31
115	TYPE "K" MANHOLE	R-3010	6.28	10.16	0.81	0.14	5.00	7.20	0.81	0.11	0.25	0.25
117	TYPE "K" MANHOLE	R-3287-SB10	2.62	6.49	0.62	0.55	5.00	7.20	2.46	0.46	0.44	0.46
118	TYPE "K" MANHOLE	R-3457-C2	2.91	6.78	0.85	0.81	5.00	7.20	4.94	0.12	0.38	0.38
119	TYPE "K" MANHOLE	R-3455-C	3.07	6.95	0.85	0.61	5.00	7.20	3.73	0.36	0.40	0.40
120	TYPE "K" MANHOLE	R-3455-C	2.80	7.21	0.85	0.74	5.00	7.20	4.51	0.52	0.44	0.52
121	TYPE "K" MANHOLE	R-3455-C	2.94	7.35	0.85	0.74	5.00	7.20	4.51	0.52	0.44	0.52
122	TYPE "K" MANHOLE	R-3455-C	3.09	7.51	0.85	0.74	5.00	7.20	4.51	0.52	0.44	0.52
123	TYPE "L" MANHOLE	R-3455-C	2.72	7.68	0.85	0.74	5.00	7.20	4.51	0.52	0.44	0.52
124	TYPE "L" MANHOLE	R-3457-C2	2.87	7.82	0.82	0.95	5.00	7.20	5.58	0.15	0.41	0.41
125	TYPE "L" MANHOLE	R-3287-15	2.77	7.73	0.83	0.54	5.00	7.20	3.24	0.18	0.43	0.43
201	TYPE "C" MANHOLE	R-3455-C	2.51	4.22	0.67	0.84	8.68	5.99	3.37	0.29	0.37	0.37
202	TYPE "C" MANHOLE	R-3455-C	2.72	4.43	0.69	0.79	7.39	6.42	3.48	0.31	0.38	0.38
203	TYPE "J" MANHOLE	R-3455-C	2.31	5.64	0.72	0.69	5.00	7.20	3.54	0.32	0.38	0.38
204	TYPE "J" MANHOLE	R-3455-C	2.48	5.81	0.81	0.56	5.00	7.20	3.27	0.27	0.36	0.36
205	TYPE "J" MANHOLE	R-3455-C	2.67	6.01	0.81	0.56	5.00	7.20	3.26	0.27	0.36	0.36
206	TYPE "K" MANHOLE	R-3455-C	2.37	6.25	0.82	0.55	5.00	7.20	3.25	0.27	0.36	0.36
207	TYPE "K" MANHOLE	R-3455-C	2.49	6.37	0.85	0.53	5.00	7.20	3.24	0.27	0.36	0.36
208A	TYPE "A" INLET	R-4342	3.01	4.18	0.85	0.15	5.00	7.20	0.92	0.04	0.23	0.23
208	TYPE "K" MANHOLE	R-3472	2.49	6.37	0.51	0.36	5.00	7.20	1.32	0.18	0.25	0.25
209	TYPE "A" INLET	R-4342	2.51	3.68	0.79	0.22	5.00	7.20	1.27	0.07	0.28	0.28
210	TYPE "K" MANHOLE	R-3472	2.68	7.10	0.65	0.41	5.00	7.20	1.92	0.37	0.32	0.37
211	TYPE "A" INLET	R-4342	2.58	3.75	0.68	0.18	5.00	7.20	0.87	0.03	0.22	0.22
212	TYPE "A" INLET	R-3010	2.63	3.80	0.85	0.05	5.00	7.20	0.29	0.01	0.13	0.13
213	TYPE "K" MANHOLE	R-3010	5.62	10.23	0.85	0.08	5.00	7.20	0.47	0.04	0.18	0.18
214	TYPE "B" INLET	R-3287-15	2.61	4.05	0.73	0.53	5.00	7.20	2.79	0.13	0.39	0.39
215	TYPE "A" INLET	R-3010	2.52	3.69	0.79	0.17	5.00	7.20	0.97	0.16	0.28	0.28
216	TYPE "C" MANHOLE	R-3010	4.96	6.40	0.85	0.19	5.00	7.20	1.14	0.23	0.31	0.31
217	TYPE "K" MANHOLE	R-3472	6.56	10.97	0.82	0.35	5.00	7.20	2.07	0.44	0.33	0.44
218	TYPE "K" MANHOLE	R-3455-C	6.10	10.51	0.81	0.43	5.00	7.20	2.53	0.16	0.31	0.31
219	TYPE "J" INLET	R-3287-SB10	2.54	3.98	0.78	0.46	5.00	7.20	2.57	0.51	0.45	0.51
220	TYPE "A" INLET	R-3010	2.61	3.78	0.85	0.14	5.00	7.20	0.87	0.13	0.26	0.26
221	TYPE "C" MANHOLE	R-3010	4.10	5.54	0.85	0.15	5.00	7.20	0.93	0.15	0.27	0.27
222	TYPE "L" MANHOLE	R-3472	5.99	10.95	0.81	0.36	5.00	7.20	2.12	0.46	0.34	0.46
223	TYPE "L" MANHOLE	R-3455-C	6.18	11.14	0.81	0.41	5.00	7.20	2.43	0.15	0.30	0.30
224	TYPE "A" INLET	R-3010	2.70	3.86	0.85	0.12	5.00	7.20	0.73	0.09	0.23	0.23
225	TYPE "L" MANHOLE	R-3472	6.28	11.24	0.80	0.40	5.00	7.20	2.31	0.55	0.36	0.55
226	TYPE "L" MANHOLE	R-3010	6.31	11.27	0.85	0.14	5.00	7.20	0.83	0.12	0.25	0.25
227	TYPE "L" MANHOLE	R-3287-SB10	3.48	8.44	0.70	0.54	5.00	7.20	2.74	0.58	0.47	0.58
301	TYPE "J" MANHOLE	R-3287-15	2.51	3.95	0.83	0.60	5.00	7.20	3.57	0.22	0.46	0.46
302	TYPE "J" MANHOLE	R-3287-15	3.77	6.56	0.83	0.60	5.00	7.20	3.58	0.22	0.46	0.46
304	TYPE "J" MANHOLE	R-3287-15	2.52	3.96	0.75	0.65	5.00	7.20	3.54	0.21	0.46	0.46
305	TYPE "J" MANHOLE	R-3287-15	4.56	7.90	0.83	0.60	5.00	7.20	3.58	0.22	0.46	0.46
401	TYPE "B" INLET	R-3287-15	2.46	3.89	0.85	0.63	5.00	7.20	3.83	0.25	0.48	0.48
402	TYPE "C" MANHOLE	R-3287-SB10	2.62	4.33	0.85	0.31	5.00	7.20	1.90	0.28	0.38	0.38
403	TYPE "C" MANHOLE	R-3287-SB10	3.02	4.73	0.85	0.38	5.00	7.20	2.30	0.40	0.42	0.42
404	TYPE "C" MANHOLE	R-3287-SB10	3.22	5.47	0.85	0.38	5.00	7.20	2.30	0.40	0.42	0.42
405	TYPE "C" MANHOLE	R-3287-SB10	3.48	5.73	0.85	0.38	5.00	7.20	2.30	0.40	0.42	0.42
406	TYPE "C" MANHOLE	R-3287-SB10	3.84	6.09	0.85	0.38	5.00	7.20	2.30	0.40	0.42	0.42
407	TYPE "C" MANHOLE	R-3287-SB10	4.32	6.57	0.75	0.52	5.00	7.20	2.84	0.62	0.48	0.62
702	TYPE "J" MANHOLE	R-4342	4.76	8.10	0.30	0.51	5.00	7.20	1.11	0.05	0.25	0.25
703	TYPE "J" MANHOLE	R-4342	4.85	8.19	0.30	0.46	5.00	7.20	1.00	0.04	0.24	0.24
704	TYPE "J" MANHOLE	R-4342	8.28	11.62	0.30	0.22	5.00	7.20	0.47	0.01	0.15	0.15
705	TYPE "J" MANHOLE	R-1772	2.80	6.14	-	-	-	-	-	-	-	0.00
710	TYPE "E" INLET	R-4215-C	2.50	3.94	0.30	3.33	16.89	4.74	4.73	0.35	0.42	0.42

# **APPENDIX E**

## **PROPOSED CONDITIONS – WATER QUALITY**

**PROPOSED STORMWATER SYSTEM**  
**WATER QUALITY VOLUME CALCULATIONS**

**Job Information**

**Description:** I-65 Logistics Center  
**Reviewing Entity:** City of Franklin  
**Job Number:** 2019.02798  
**Date:** 03/19/21

**Detention Pond**

$$WQ_v = \frac{(P) * (R_v) * (A)}{12}$$

**P =** 1" rainfall

**R<sub>v</sub> =** 0.05 + 0.009(I) where I is the percent impervious cover

**A =** area in acres

**PARAMETERS**

**P =** 1.00 (in)  
**Pervious Area** 14.75  
**Impervious Area** 46.53  
**I =** 75.9% (%)  
**R<sub>v</sub> =** 0.73  
**A =** 61.27 (acres)

**CALCULATED WQ<sub>v</sub>**

$$WQ_v = \frac{3.74 \text{ (ac-ft)}}{163119.99 \text{ (ft}^3\text{)}}$$

	Pool			
	Stage	Area	Incremental Volume	Volume
	(ft)	(acre)	(acre-ft)	(acre-ft)
Below Normal Pool	700.00	4.53	0.00	0.00
	708.92	6.16	47.68	47.68
	709.92	6.79	6.48	54.16
	710.42	6.89	3.42	57.58
Total Volume				57.58

> 11.23