Malarkey IND
Stormwater Management

3540 Essex Drive
Franklin, Indiana

Drainage Memorandum

Prepared For:
Cooper & Associates
2200 Ellis Drive
New Lenox, IL 60451

Prepared By:
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Original: October 10th, 2024

Kimley»Horn

Kimley»Horn

Table of Contents

1.0. Project Summary

Project Name:	Malarkey IND – Final Buildout
Location:	3540 Essex Drive, Franklin, Johnson County, Indiana
Type:	Drainage Memorandum
Reviewing Agency:	City of Franklin & Johnson County
Storm Sewer Modeling:	Storm and Sanitary Analysis (SSA), Rational Method
Receiving Body:	Graham Arm

2.0. Introduction

Kimley-Horn and Associates, Inc. has been retained by Cooper & Associates LLC to prepare construction documents and provide civil engineering services for the proposed industrial development for Malarkey Roofing Products as the Owner and end user (Project). The Project includes the development of approximately 138 acres of agricultural land to the north and west of Essex Drive in Franklin, Indiana. The Project includes the planned construction of an approximately 357,600 SF industrial building with associated drives, parking, rail spur, and substantial outdoor product storage spaces. The Project also includes a 4,110 LF roadway extension of Essex Drive, connecting to Paul Hand Blvd. The extension will become the east frontage of the Malarkey site and will include sanitary sewer and water main extensions along with three entrances. A 90' right of way will be dedicated to the City for Essex Drive. Utility services will be brought from extended infrastructure off Essex Drive and Paul Hand Blvd where applicable. Stormwater detention and quality measures will be provided in the form of an interconnected wet & dry detention ponds at the east and south sides of the site. The Project will be broken down into two phases: the first being the mass grading and pond excavation, and the second being the final buildout and Essex Drive extension.

This Drainage Memorandum focuses on the final buildout condition by confirming assumptions made during the mass grading phase and presenting storm sizing based on the City of Franklin Stormwater Management Ordinance and Johnson County Stormwater Technical Standards Manual (Version 1.0 - 2023), whichever is more stringent.

3.0. Existing Conditions

The site is a combination of Basin 1, Basin 2 and Basin 3 as described by the master planned drainage report submitted concurrently with the mass grading phase. Per the drainage report, each basin was assumed to be a curve number (CN) of 95 and have a time of concentration (TC) of 10 minutes. In addition, there will be significant off-site drainage entering the site from the north through a 12" culvert under Paul Hand. The 12" culvert is also planned to be replaced with a 4'x3' box culvert which has already been factored in accordingly in terms of inline capacity. Several excerpts are included in **Appendix D**. The full Drainage Report can be found in **Appendix G**.

Aerial Photograph
An aerial photograph of the Project Site has been included in **Appendix A** for reference.

FEMA
The Project Site is located on the Flood Insurance Rate Map number 18081C0139E (dated 1/29/2021) and 18081C0137D (date 8/2/2007) concluded that the site lies in Zone X which is the area of minimal flood hazard and outside the 100-Yr Flood Hazard zones. See **Appendix B** for the FEMA FIRMette.

Soil Characteristics
The Natural Resources Conservation Service (NRCS) Web Soil Survey of Johnson County, Indiana, indicates Brookston silty clay loam and Crosby silt loam on site. A soil map can be found in **Appendix C.**

4.0. Proposed Conditions

Proposed Hydrology
The developed site will maintain the master planned drainage assumptions set forth in the master drainage report. Each on-site basin was assumed to have a curve number (CN) of 95 and a time of concentration (TC) of 10 minutes. As shown in the Proposed Curve Number Exhibit, the calculated composite CN of each basin, when factoring in the proposed impervious and pervious areas, is summarized in the table below. Note that some areas within the basins have been deferred to future developments however are assumed in full buildout condition in this report. Ultimately, this development meets the intention of the master plan, and no additional measures are required. See table below for a summary of calculated values. Refer to Appendix E for the Curve Number Exhibit and accompanying calculations.

	Acreage (AC)	Composite Curve Number (C)	Time of Concentration (TC) in minutes
Basin 1	47.48	95	10.7
Basin 2	11.23	87	10.4
Basin 3	74.10	93	10.4

Proposed Hydraulics
The proposed storm sewer conveyance system was designed to meet the City requirements using Storm and Sanitary Analysis (SSA), an extension of Civil 3D. The HGL of the 10-year storm was kept below the proposed rim elevations of each structure. Rainfall intensities and 'c' values are to be taken from the City of Franklin Stormwater Management Ordinance. The storm sewers are to be designed to maintain a minimum full flow velocity of 2.5 ft/s. See Appendix G for calculations.

Stormwater Quality
Stormwater quality treatment for the project site has already been accounted for as part of the interconnected detention pond design. See the drainage report in Appendix XX.

5.0 Appendices

Appendix A: Aerial Photograph


E 400 N
County Rd 400 N
Project Site
Bearing Dr
Graham Ditch
Sloan Dr
Bearing Dr
Essex Dr
E County Rd 300 N

Appendix B: FEMA Flood Insurance Rate Map

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) Report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS Report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study Report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study Report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Indiana State Plane East Zone (FIPS zone 1301). The **horizontal datum** was NAD 83, GRS 1980 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713- 3242**, or visit its website at http://www.ngs.noaa.gov.

Base map information shown on this FIRM was derived from the 2005 Indiana Orthophotography (IndianaMap Framework Data www.indianamap.org). This information was photogrammetrically compiled at a scale of 1:2400 from aerial photography dated spring 2005. Aerial Photography shown on the FIRM is from 2018 provided by Johnson County.

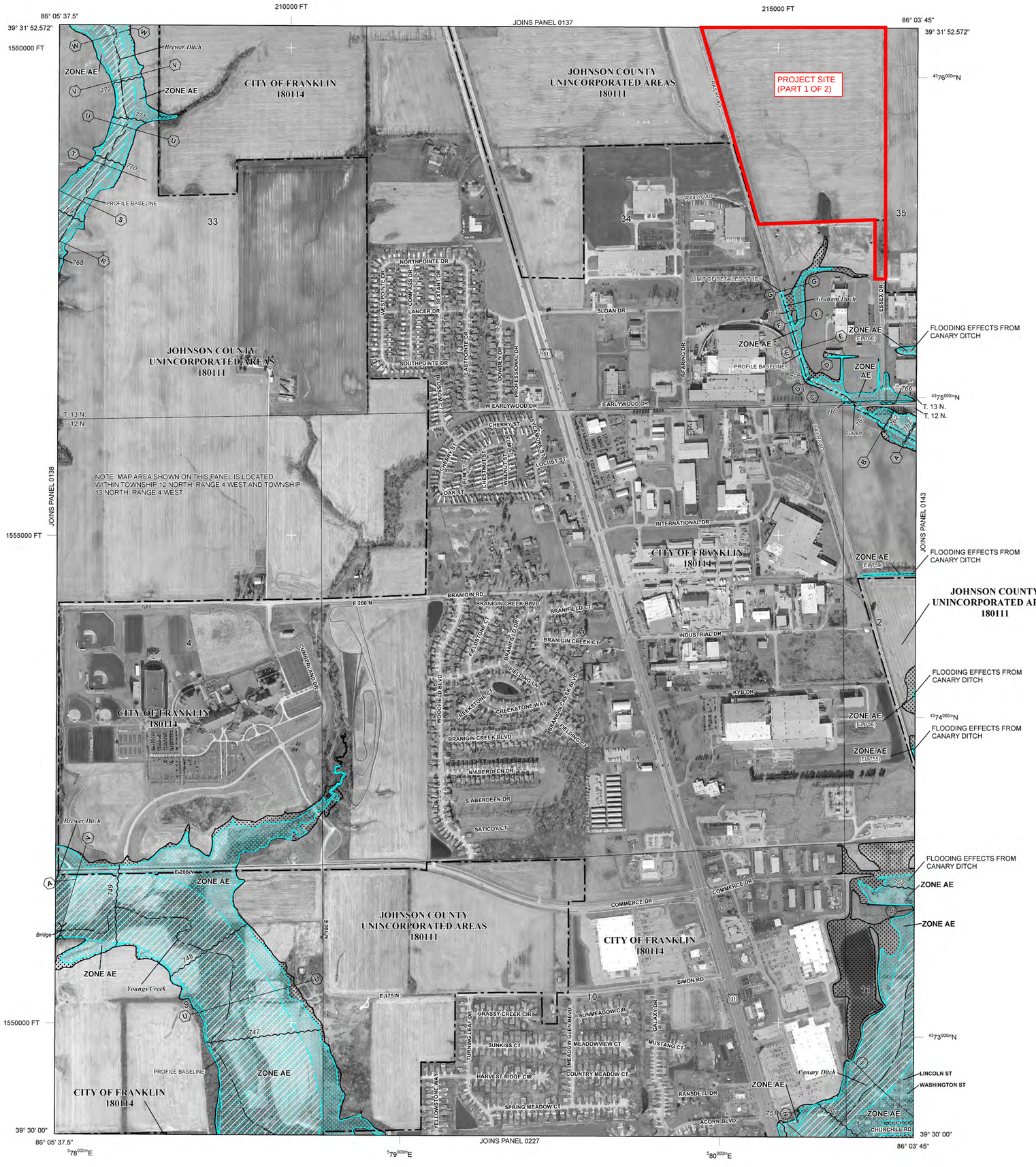
The **profile baselines** depicted on this map represent the hydraulic modeling baselines that match the flood profiles in the FIS report. As a result of improved topographic data, the **profile baseline**, in some cases, may deviate significantly from the channel centerline or appear outside the SFHA.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

For information on available products associated with this FIRM visit the **Map Service Center (MSC)** website at http://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the MSC website.

If you have **questions about this map,** how to order products, or the National Flood Insurance Program in general, please call the **FEMA Map Information eXchange (FMIX)** at **1-877-FEMA-MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/business/nfip.



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Areas formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- 1% Annual Chance Floodplain Boundary
- 0.2% Annual Chance Floodplain Boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths, or flood velocities.
- 513 — Base Flood Elevation line and value; elevation in feet*
- (EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

- A — A — Cross section line
- 23 — 23 — Transect line
- Culvert
- Bridge
- 45° 02' 08", 93° 02' 12" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83) Western Hemisphere
- 3100000 FT — 5000-foot ticks: Indiana State Plane East Zone (FIPS Zone 1301), Transverse Mercator projection
- 4389000mN — 1000-meter Universal Transverse Mercator grid values, zone 16
- DX5510 × — Bench mark (see explanation in Notes to Users section of this FIRM panel)
- M1.5 • — River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
August 2, 2007

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
January 29, 2021 - to increase Base Flood Elevations and to change Special Flood Hazard Areas.

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'
250 0 500 1000 FEET
150 0 150 300 METERS

NFIP NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0139E

FIRM

FLOOD INSURANCE RATE MAP

JOHNSON COUNTY, INDIANA AND INCORPORATED AREAS

PANEL 139 OF 352
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
FRANKLIN, CITY OF	180114	0139	E
JOHNSON COUNTY	180111	0139	E

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER 18081C0139E

MAP REVISED JANUARY 29, 2021

Federal Emergency Management Agency

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utiiized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Indiana State Plane East zone 3826 (FIPSZONE 1301). The **horizontal datum** was NAD83. Differences in datum, spheroid, projection or state plane zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov/ or contact the National Geodetic Survey at the following address:

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Base Map information shown on this FIRM was derived from the Johnson County Computer Services from photography dated 2001 and from USGS digital orthophoto quadrangles dated 1998 or later.

This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

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Contact the **FEMA Map Service Center** at 1-800-358-9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study report, and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1-800-358-9620 and its website at http://msc.fema.gov/.

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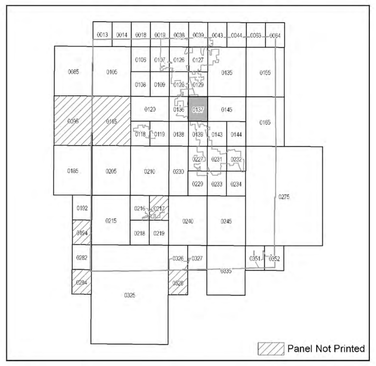
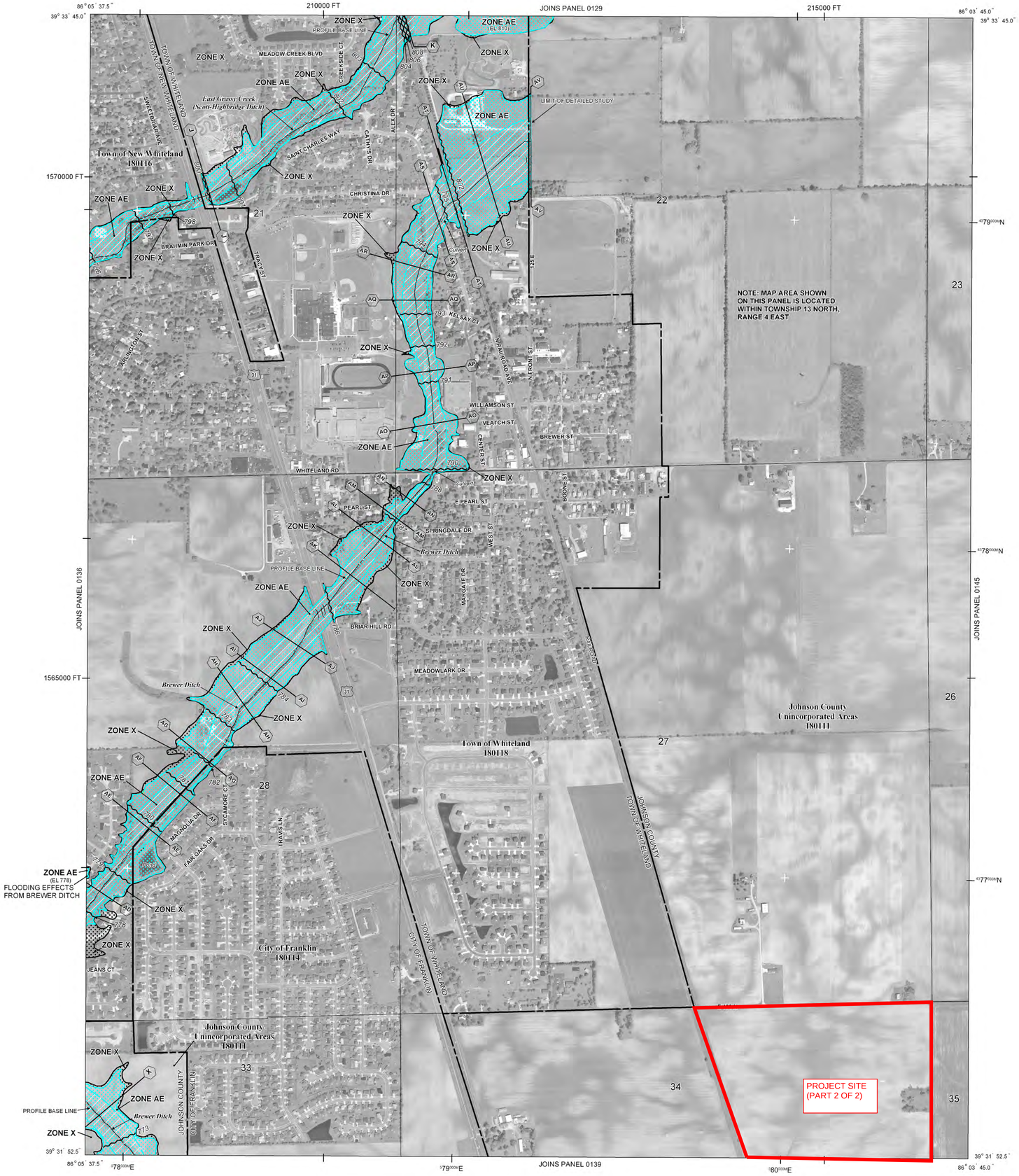
PANEL INDEX





LEGEND

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	0.2% annual chance floodplain boundary
	Floodway Boundary
	Zone D Boundary
	CBRS and OPA boundary
	Boundary Dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
513	Base Flood Elevation line and value; elevation in feet*
(EL 10)	Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

A — A	Cross section line
23 — 23	Transect line
85° 03' 45.0", 41° 24' 22.5"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
4587000 M	1000-meter Universal Transverse Mercator grid values, zone 16
2250000 FT	5000-foot grid ticks: Indiana State Plane East Coordinate System, 3826 zone (FIPSZONE 1301) Transverse Mercator
KA0015	Bench mark (see explanation in Notes to Users section of this FIRM panel)
M1.5	River Mile

MAP REPOSITORY
Refer to listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
August 2, 2007

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'
250 0 500 1000 FEET
150 0 150 300 METERS

NFIP

PANEL 0137D

FIRM

FLOOD INSURANCE RATE MAP

JOHNSON COUNTY, INDIANA

AND INCORPORATED AREAS

PANEL 137 OF 352
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
FRANKLIN, CITY OF	180114	0137	D
JOHNSON COUNTY	180111	0137	D
NEW WHITELAND, TOWN OF	180116	0137	D
WHITELAND, TOWN OF	180118	0137	D

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
18081C0137D
EFFECTIVE DATE
AUGUST 2, 2007

Federal Emergency Management Agency

NATIONAL FLOOD INSURANCE PROGRAM

Appendix C: Soil Map


86° 4' 41" W
86° 3' 33" W
39° 32' 29" N
39° 31' 20" N
579300
579500
579700
579900
580100
580300
580500
580700
4377200
4377000
4376800
4376600
4376400
4376200
4376000
4375800
4375600
4375400
4375200
CsB2
Br
MnB2
CrA
FxC2
E 400 N
Paul Hand Blvd
Sloan Dr
31
YclA
N
Map Scale: 1:10,400 if printed on A portrait (8.5" x 11") sheet.
Meters
0
150
300
600
900
Feet
0
500
1000
2000
3000
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 16N WGS84

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 31, Sep 1, 2023

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

Date(s) aerial images were photographed: Jun 15, 2022—Jun 21, 2022

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	99.8	38.5%
CrA	Crosby silt loam, fine-loamy subsoil, 0 to 2 percent slopes	C/D	110.0	42.5%
CsB2	Crosby-Miami silt loams, 2 to 4 percent slopes, eroded	C/D	11.7	4.5%
FxC2	Fox complex, 6 to 12 percent slopes, eroded	B	7.3	2.8%
MnB2	Miami silt loam, 2 to 6 percent slopes, eroded	C	22.3	8.6%
YclA	Crosby silt loam, fine-loamy subsoil-Urban land complex, 0 to 2 percent slopes	C/D	7.9	3.0%
Totals for Area of Interest			**259.0**	**100.0%**

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

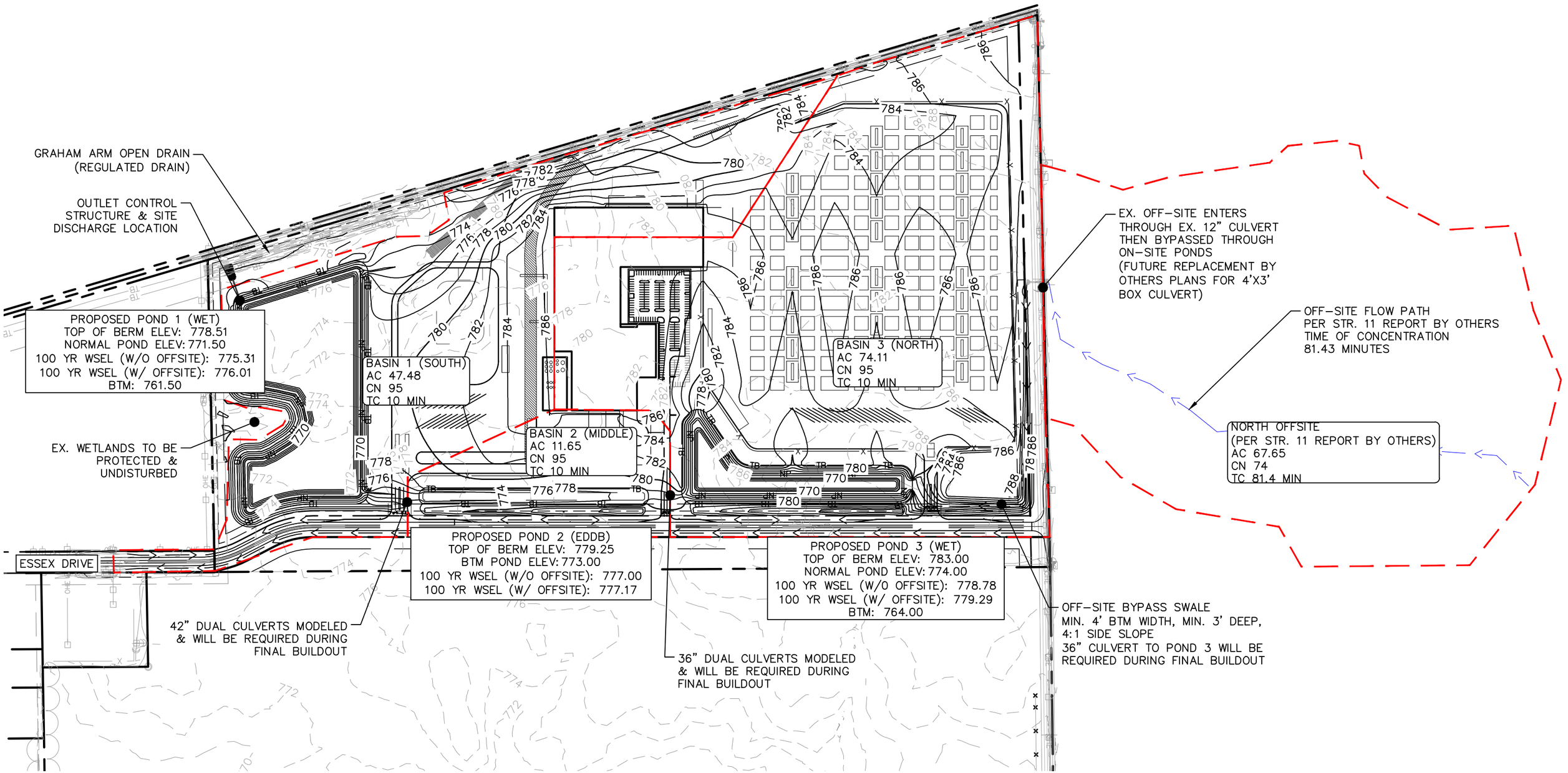
Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Appendix D: Master Plan Map

NOTES:
1. SCHEMATIC SITE LAYOUT IS SHOWN FOR DRAINAGE MASTER PLANNING PURPOSES ONLY. FINAL LAYOUT IS SUBJECT TO CHANGE.
2. PROPOSED GRADING CONTOURS SHOWN ARE FOR MASS GRADING PURPOSES. IT IS THE INTENTION TO REPLACE INTERIM SWALES CONNECTING PONDS WITH EQUALIZING CULVERTS PROPERLY SIZED TO CONVEY DRAINAGE AS PRESENT IN THIS DRAINAGE REPORT.
3. 2' & 10' CONTOUR INTERVALS SHOWN FOR CLARITY
4. OFF-SITE CONTOURS/ACREAGE ARE FROM LIDAR RECORDS



Kimley»Horn

MALARKEY IND

PROPOSED DRAINAGE AREA MAP
FRANKLIN, INDIANA
August 7, 2024

0' 200' 400'
SCALE: 1" = 400'
NORTH

Appendix E: Curve Number Exhibit

GRAHAM ARM OPEN DRAIN
(REGULATED DRAIN)

OUTLET CONTROL
STRUCTURE & SITE
DISCHARGE LOCATION

EX. WETLANDS TO BE
PROTECTED &
UNDISTURBED

ESSEX DRIVE

BASIN 1 (SOUTH)
AC 47.48
CN 95
TC 10.7 MIN

BASIN 2 (MIDDLE)
AC 11.23
CN 87
TC 10.4 MIN

BASIN 3 (NORTH)
AC 74.10
CN 93
TC 10.4 MIN

ON-SITE TC PATH
SEE CALCS

ON-SITE TC PATH
SEE CALCS

785.98

EX. OFF-SITE ENTERS
THROUGH EX. 12" CULVERT
THEN BYPASSED THROUGH
ON-SITE PONDS
(FUTURE REPLACEMENT BY
OTHERS PLANS FOR 4'X3'
BOX CULVERT)

OFF-SITE FLOW PATH
PER STR. 11 REPORT BY OTHERS
TIME OF CONCENTRATION
81.43 MINUTES

NORTH OFFSITE
(PER STR. 11 REPORT BY OTHERS)
AC 67.65
CN 74
TC 81.4 MIN

Kimley»Horn

MALARKEY IND - FINAL BUILDOUT

PROPOSED CURVE NUMBER EXHIBIT
FRANKLIN, INDIANA
October 4, 2024

0' 200' 400'
SCALE: 1" = 400'
NORTH

Kimley»Horn

PROJECT:	**Malarkey IND**
BY:	**AMM**
DATE:	**10-Oct-24**

Site Soil		
Hydrologic Group	%	
A	0.0%	0.0%
B	0.0%	11.2%
C	0.0%	30.7%
D	100.0%	58.1%
Total	100.0%	

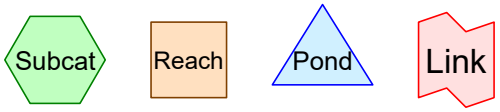
Cover	Type	Condition	Soil Group Weighted Runoff Coefficient	Soil Group Weighted CN	
			C	Actual Soil Group	Next Less Impervious Soil Group
Fully Developed	Impervious	Paved	0.85	98	98
Fully Developed	Impervious	Rooftop	0.90	98	98
Fully Developed	Open Space	Good Condition (>75% Cover)	0.30	80	80
Water	Pond or Lake	-	1.00	100	100

Basin	Area (ac)					Weighted C	Weighted CN	Weighted CN
	Impervious - Paved	Impervious - Rooftop	Open Space - Good Condition (>75% Cover)	Pond or Lake	Total		Actual Soil Group	Next Less Impervious Soil Group
Basin 1	23.9356	5.4952	8.7200	9.33	47.48	0.78	95	95
Basin 2	3.5838	0.1905	6.7400	0.72	11.23	0.53	87	87
Basin 3	48.3186	3.3720	19.8500	2.56	74.10	0.71	93	93

Basin 3 (North) - Buildout

Basin 2 (Middle) - Buildout

Basin 1 (South) - Buildout



Routing Diagram for Malarkey IND_Huff_R1
Prepared by Kimley-Horn & Associates, Printed 10/4/2024

Summary for Subcatchment 20S: Basin 3 (North) - Buildout

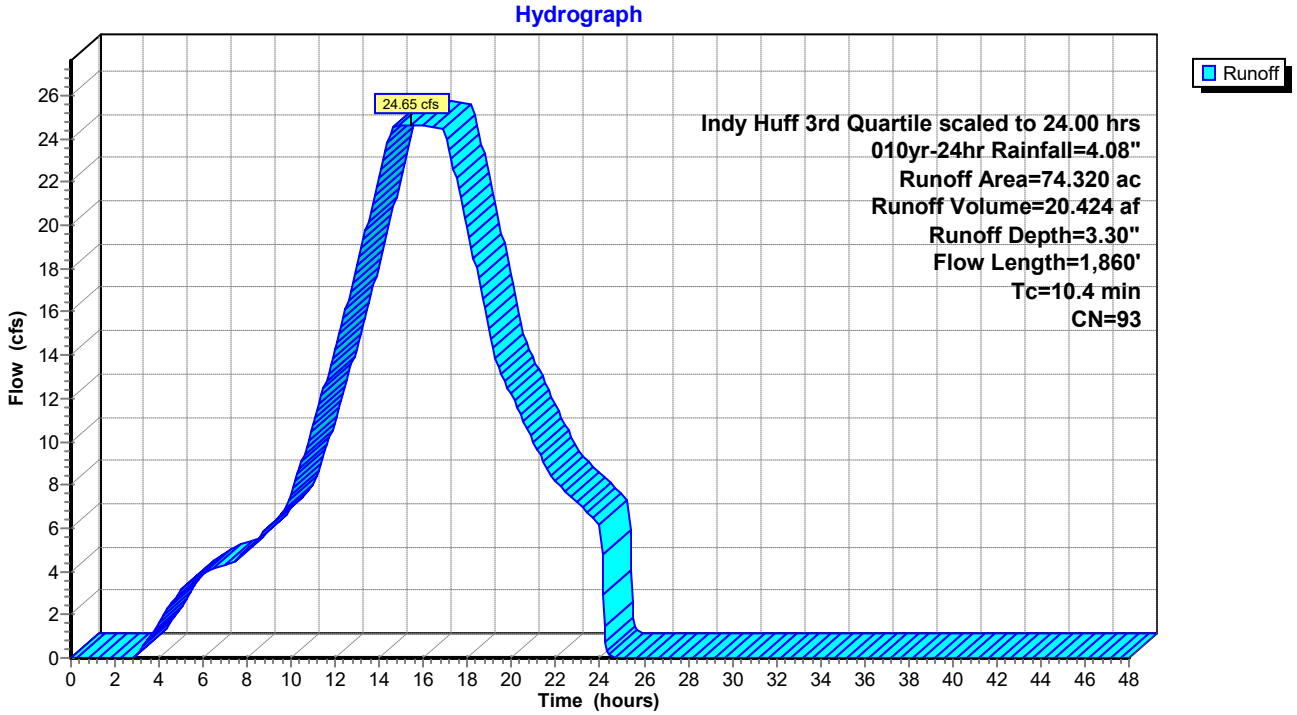
Runoff = 24.65 cfs @ 15.44 hrs, Volume= 20.424 af, Depth= 3.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Indy Huff 3rd Quartile scaled to 24.00 hrs 010yr-24hr Rainfall=4.08"

	Area (ac)	CN	Description
*	74.320	93	From Excel
	74.320		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.8	20	0.0200	0.12		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.93"
1.4	80	0.0100	0.95		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.93"
0.8	100	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
5.4	1,660	0.0030	5.17	36.53	**Pipe Channel, RCP_Round 36"** 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.013
10.4	1,860	Total			

Subcatchment 20S: Basin 3 (North) - Buildout



Summary for Subcatchment 21S: Basin 2 (Middle) - Buildout

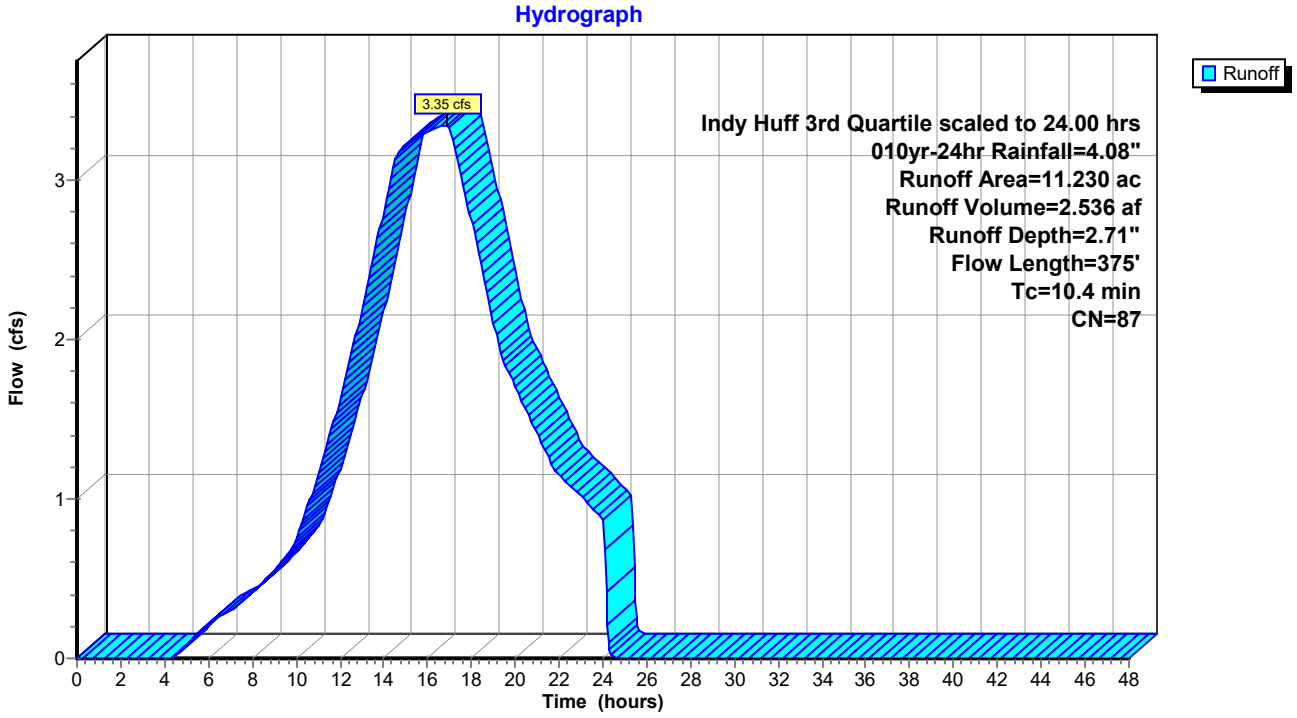
Runoff = 3.35 cfs @ 16.85 hrs, Volume= 2.536 af, Depth= 2.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Indy Huff 3rd Quartile scaled to 24.00 hrs 010yr-24hr Rainfall=4.08"

	Area (ac)	CN	Description
*	11.230	87	From Excel
	11.230		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.9	75	0.0300	0.18		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.93"
0.9	110	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
2.6	190	0.0300	1.21		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
10.4	375	Total			

Subcatchment 21S: Basin 2 (Middle) - Buildout



Summary for Subcatchment 22S: Basin 1 (South) - Buildout

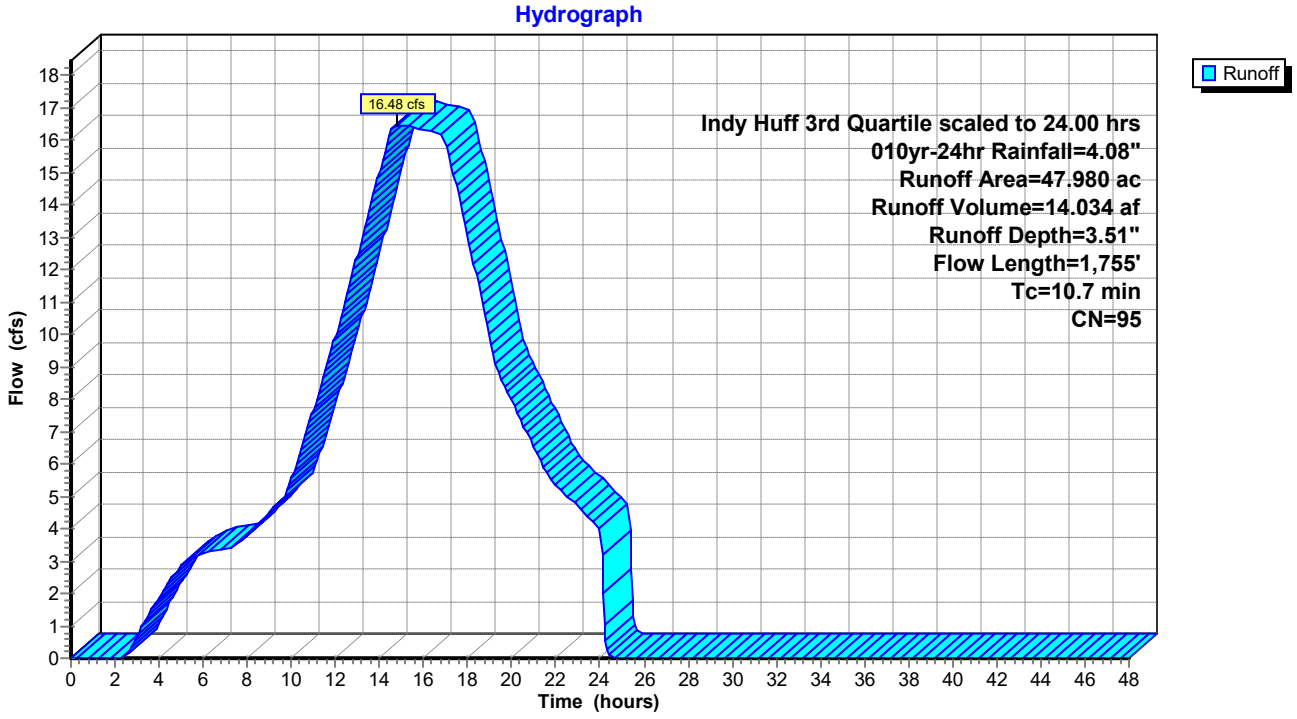
Runoff = 16.48 cfs @ 14.77 hrs, Volume= 14.034 af, Depth= 3.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Indy Huff 3rd Quartile scaled to 24.00 hrs 010yr-24hr Rainfall=4.08"

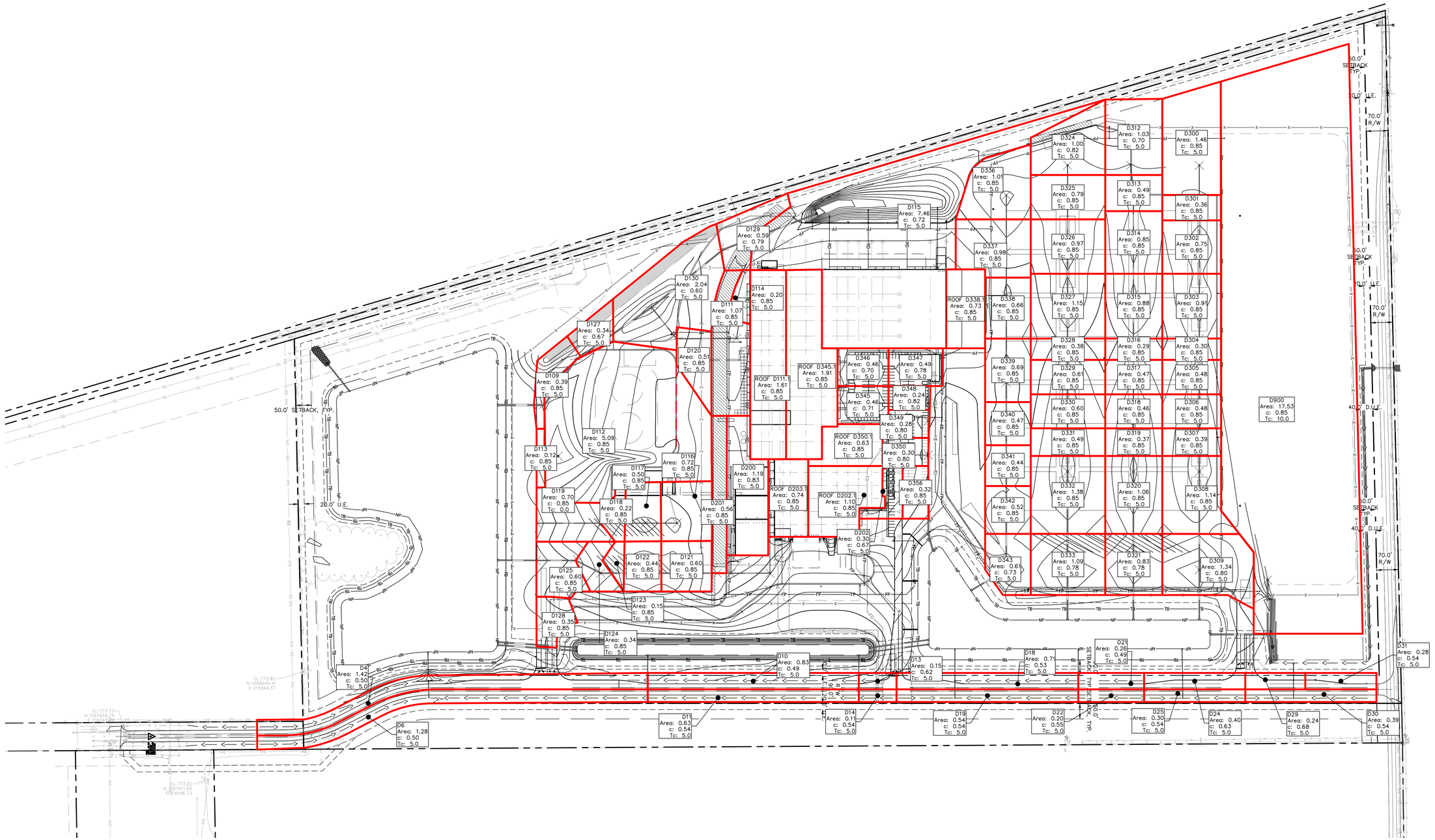
	Area (ac)	CN	Description
*	47.980	95	
	47.980		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.9	50	0.0200	0.14		**Sheet Flow, Rail Shoulder Area** Grass: Short n= 0.150 P2= 2.93"
0.4	55	0.1100	2.32		**Shallow Concentrated Flow, Swale Bank** Short Grass Pasture Kv= 7.0 fps
0.4	400	0.0100	17.92	6,022.73	**Trap/Vee/Rect Channel Flow, Btm Swale to D104** Bot.W=20.00' D=7.00' Z= 4.0 '/' Top.W=76.00' n= 0.022
4.0	1,250	0.0030	5.17	36.53	**Pipe Channel, D104 to Pond1** 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.013
10.7	1,755	Total			

Subcatchment 22S: Basin 1 (South) - Buildout



Appendix F: Storm Sewer Design Calculations



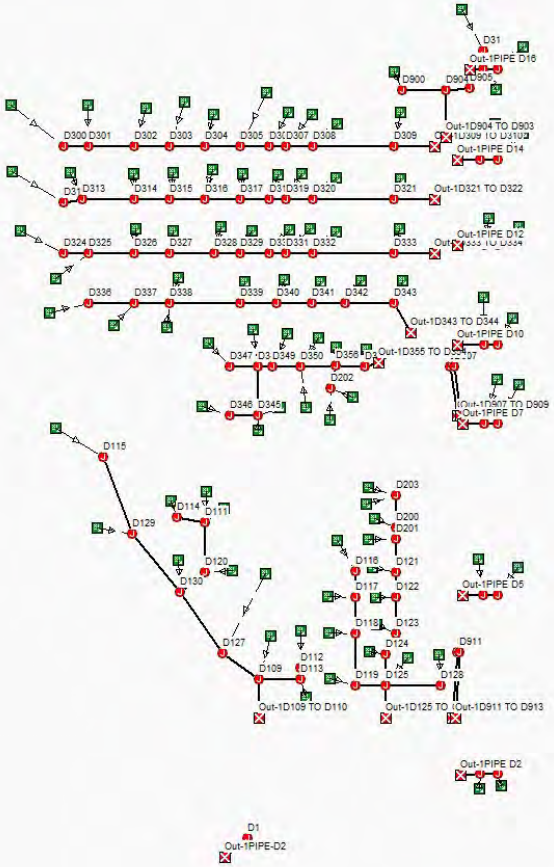
Kimley»Horn

MALARKEY IND

PROPOSED STORM SEWER CATCHMENT AREA
FRANKLIN, INDIANA
October 4, 2024

0' 75' 150' 300'
SCALE: 1" = 150'

NORTH


D31
Out-1PIPE D16
D900
D300 D301 D302 D303 D304 D305 D306 D307 D308 D309
Out-1D904 TO D903
Out-1PIPE D14
D313 D314 D315 D316 D317 D318 D319 D320 D321
Out-1D321 TO D322
D324 D325 D326 D327 D328 D329 D330 D331 D332 D333
Out-1PIPE D12
D336 D337 D338 D339 D340 D341 D342 D343
Out-1D343 TO D344
Out-1PIPE D10
D347 D348 D349 D350 D358 D359
Out-1D355 TO D356
D202
D346 D345
Out-1D907 TO D909
Out-1PIPE D7
D115
D203
D114
D111
D200
D201
D129
D120
D116
D121
D130
D117
D122
Out-1PIPE D5
D118
D123
D127
D124
D911
D112
D113
D109
D119
D125
D128
Out-1D109 TO D110
Out-1D125 TO
Out-1D911 TO D913
Out-1PIPE D2
D1
Out-1PIPE-D2

Malarkey IND - Franklin, IN
Storm Sewer Catchment Area Analysis

Catchment Area	Pervious (ac)	Impervious (ac)	Total (ac)	c	CN
D109	0.0000	0.39	0.39	0.85	98
D111	0.0000	1.07	1.07	0.85	98
D112	0.0000	5.09	5.09	0.85	98
D113	0.0000	0.12	0.12	0.85	98
D114	0.0000	0.20	0.20	0.85	98
D115	1.7486	5.71	7.46	0.72	92
D116	0.0000	0.72	0.72	0.85	98
D117	0.0000	0.50	0.50	0.85	98
D118	0.0000	0.22	0.22	0.85	98
D119	0.0000	0.70	0.70	0.85	98
D120	0.0000	0.51	0.51	0.85	98
D121	0.0000	0.60	0.60	0.85	98
D122	0.0000	0.44	0.44	0.85	98
D123	0.0000	0.15	0.15	0.85	98
D124	0.0000	0.34	0.34	0.85	98
D125	0.0000	0.60	0.60	0.85	98
D127	0.1100	0.23	0.34	0.67	90
D128	0.0000	0.35	0.35	0.85	98
D129	0.0680	0.52	0.59	0.79	95
D130	0.9251	1.11	2.04	0.60	87
D201	0.0000	0.56	0.56	0.85	98
D202	0.0985	0.20	0.30	0.67	90
D300	0.0000	1.46	1.46	0.85	98
D301	0.0000	0.36	0.36	0.85	98
D302	0.0000	0.75	0.75	0.85	98
D303	0.0000	0.91	0.91	0.85	98
D304	0.0000	0.30	0.30	0.85	98
D305	0.0000	0.48	0.48	0.85	98
D306	0.0000	0.48	0.48	0.85	98
D307	0.0000	0.39	0.39	0.85	98
D308	0.0000	1.14	1.14	0.85	98
D309	0.0000	1.34	1.34	0.85	98
D312	0.2883	0.74	1.03	0.70	91
D313	0.0000	0.49	0.49	0.85	98
D314	0.0000	0.85	0.85	0.85	98
D315	0.0000	0.88	0.88	0.85	98
D316	0.0000	0.29	0.29	0.85	98
D317	0.0000	0.47	0.47	0.85	98
D318	0.0000	0.46	0.46	0.85	98
D319	0.0000	0.37	0.37	0.85	98
D320	0.0000	1.06	1.06	0.85	98
D321	0.1032	0.73	0.83	0.78	95
D324	0.0589	0.94	1.00	0.82	97

D325	0.0000	0.79	0.79	0.85	98
D326	0.0000	0.97	0.97	0.85	98
D327	0.0000	1.15	1.15	0.85	98
D328	0.0000	0.38	0.38	0.85	98
D329	0.0000	0.61	0.61	0.85	98
D330	0.0000	0.60	0.60	0.85	98
D331	0.0000	0.49	0.49	0.85	98
D332	0.0000	1.38	1.38	0.85	98
D333	0.1350	0.96	1.09	0.78	95
D336	0.0000	1.01	1.01	0.85	98
D337	0.0000	0.98	0.98	0.85	98
D338	0.0000	0.66	0.66	0.85	98
D339	0.0000	0.69	0.69	0.85	98
D340	0.0000	0.47	0.47	0.85	98
D341	0.0000	0.44	0.44	0.85	98
D342	0.0000	0.52	0.52	0.85	98
D343	0.0000	0.61	0.61	0.85	98
D345	0.1193	0.34	0.46	0.71	92
D346	0.1290	0.33	0.46	0.70	91
D347	0.0600	0.43	0.49	0.78	95
D348	0.0135	0.23	0.24	0.82	97
D349	0.0255	0.25	0.28	0.80	96
D350	0.0375	0.26	0.30	0.78	95
D356	0.0000	0.32	0.32	0.85	98

	c' (RATIONAL)	CN (TR-55)
Pervious	0.3	74
Impervious	0.85	98

Kimley»Horn

INLET CALCULATION COMPUTATION

Date: 8-Oct-24
Designed By:
Project: Malarkey IND - Franklin

$$Q = CA\sqrt{2gh}$$

50 %Clogging Factor
3 Weir Coefficient

Weir Equation Per INDOT = $Q = CPd^{1.5}$

* 50% Clogging Factor Applied

Location: NOBLESVILLE, INDIANA Storm Event: 10 Year

Structure No.	Runoff Coefficient (C)	Rainfall Intensity (i)	*Clear Opening Area (A) (in^2)	Orifice Coefficient (C)	Drainage Area (ac)	Depth of Water over Grate (h) (in)	Gravity (g) (ft/s^2)	Q Allowable (cfs)		Q Calculated (cfs)	CASTING TYPE	PONDING DEPTH (WEIR) (d) (ft)	Notes
D109	0.85	7.16	144	0.67	0.39	7	32.2	4.11	>	2.37	R-4342	0.49	
D111	0.85	7.16	187.2	0.67	1.07	7	32.2	5.34	>	6.51	R-3455-C	0.96	Partial Perforated Underdrain
D112	0.85	7.16	144	0.67	5.09	7	32.2	4.11	>	30.98	R-4342	2.72	Stub for Future Expansion
D113	0.85	7.16	79.2	0.67	0.12	7	32.2	2.26	>	0.73	R-3010	0.22	
D114	0.85	7.16	93.6	0.67	0.20	7	32.2	2.67	>	1.22	R-3472	0.31	
D116	0.85	7.16	187.2	0.67	0.72	7	32.2	5.34	>	4.38	R-3455-C	0.74	
D117	0.85	7.16	187.2	0.67	0.50	7	32.2	5.34	>	3.04	R-3455-C	0.58	
D118	0.85	7.16	187.2	0.67	0.22	7	32.2	5.34	>	1.34	R-3455-C	0.34	
D119	0.85	7.16	151.2	0.67	0.70	7	32.2	4.31	>	4.26	R-3287-10V	0.73	
D120	0.85	7.16	187.2	0.67	0.51	7	32.2	5.34	>	3.10	R-3455-C	0.59	
D121	0.85	7.16	187.2	0.67	0.60	7	32.2	5.34	>	3.65	R-3455-C	0.65	
D122	0.85	7.16	187.2	0.67	0.44	7	32.2	5.34	>	2.68	R-3455-C	0.53	
D123	0.85	7.16	93.6	0.67	0.15	7	32.2	2.67	>	0.91	R-3472	0.26	
D124	0.85	7.16	93.6	0.67	0.34	7	32.2	2.67	>	2.07	R-3472	0.45	
D125	0.85	7.16	151.2	0.67	0.60	7	32.2	4.31	>	3.65	R-3287-10V	0.65	
D127	0.67	7.16	93.6	0.67	0.34	7	32.2	2.67	>	1.64	R-3472	0.38	
D128	0.85	7.16	79.2	0.67	0.35	7	32.2	2.26	>	2.13	R-3010	0.46	
D129	0.79	7.16	187.2	0.67	0.59	7	32.2	5.34	>	3.32	R-3455-C	0.61	
D130	0.60	7.16	144	0.67	2.04	36	32.2	9.31	>	8.77	R-4342	1.17	Depressed Yard
D201	0.85	7.16	93.6	0.67	0.56	7	32.2	2.67	>	3.41	R-3472	0.62	Perforated
D202	0.67	7.16	108	0.67	0.30	7	32.2	3.08	>	1.44	R-3287-SB10	0.35	
D300	0.85	7.16	187.2	0.67	1.46	7	32.2	5.34	>	8.89	R-3455-C	1.18	Stub for Future Expansion
D301	0.85	7.16	187.2	0.67	0.36	12	32.2	6.99	>	2.19	R-3455-C	0.47	
D302	0.85	7.16	187.2	0.67	0.75	12	32.2	6.99	>	4.56	R-3455-C	0.76	
D303	0.85	7.16	187.2	0.67	0.91	12	32.2	6.99	>	5.54	R-3455-C	0.86	
D304	0.85	7.16	187.2	0.67	0.30	12	32.2	6.99	>	1.83	R-3455-C	0.41	
D305	0.85	7.16	187.2	0.67	0.48	12	32.2	6.99	>	2.92	R-3455-C	0.56	
D306	0.85	7.16	187.2	0.67	0.48	12	32.2	6.99	>	2.92	R-3455-C	0.56	
D307	0.85	7.16	187.2	0.67	0.39	12	32.2	6.99	>	2.37	R-3455-C	0.49	
D308	0.85	7.16	187.2	0.67	1.14	12	32.2	6.99	>	6.94	R-3455-C	1.00	
D309	0.85	7.16	187.2	0.67	1.34	12	32.2	6.99	>	8.16	R-3455-C	1.12	Any Clogging Overflow over Curb will spill directly into Pond 2
D312	0.70	7.16	187.2	0.67	1.03	12	32.2	6.99	>	5.13	R-3455-C	0.82	

D313	0.85	7.16	187.2	0.67	0.49	12	32.2	6.99	>	2.98	R-3455-C	0.57	
D314	0.85	7.16	187.2	0.67	0.85	12	32.2	6.99	>	5.17	R-3455-C	0.83	
D315	0.85	7.16	187.2	0.67	0.88	12	32.2	6.99	>	5.36	R-3455-C	0.84	
D316	0.85	7.16	187.2	0.67	0.29	12	32.2	6.99	>	1.76	R-3455-C	0.40	
D317	0.85	7.16	187.2	0.67	0.47	12	32.2	6.99	>	2.86	R-3455-C	0.56	
D318	0.85	7.16	187.2	0.67	0.46	12	32.2	6.99	>	2.80	R-3455-C	0.55	
D319	0.85	7.16	187.2	0.67	0.37	12	32.2	6.99	>	2.25	R-3455-C	0.47	
D320	0.85	7.16	187.2	0.67	1.06	12	32.2	6.99	>	6.45	R-3455-C	0.96	
D321	0.78	7.16	187.2	0.67	0.83	12	32.2	6.99	>	4.64	R-3455-C	0.77	
D324	0.82	7.16	187.2	0.67	1.00	12	32.2	6.99	>	5.85	R-3455-C	0.90	
D325	0.85	7.16	187.2	0.67	0.79	12	32.2	6.99	>	4.81	R-3455-C	0.79	
D326	0.85	7.16	187.2	0.67	0.97	12	32.2	6.99	>	5.90	R-3455-C	0.90	
D327	0.85	7.16	187.2	0.67	1.15	12	32.2	6.99	>	7.00	R-3455-C	1.01	Doubled with D326
D328	0.85	7.16	187.2	0.67	0.38	12	32.2	6.99	>	2.31	R-3455-C	0.48	
D329	0.85	7.16	187.2	0.67	0.61	12	32.2	6.99	>	3.71	R-3455-C	0.66	
D330	0.85	7.16	187.2	0.67	0.60	12	32.2	6.99	>	3.65	R-3455-C	0.65	
D331	0.85	7.16	187.2	0.67	0.49	12	32.2	6.99	>	2.98	R-3455-C	0.57	
D332	0.85	7.16	187.2	0.67	1.38	12	32.2	6.99	>	8.40	R-3455-C	1.14	Doubled with D331
D333	0.78	7.16	187.2	0.67	1.09	12	32.2	6.99	>	6.10	R-3455-C	0.92	
D336	0.85	7.16	187.2	0.67	1.01	12	32.2	6.99	>	6.15	R-3455-C	0.93	
D337	0.85	7.16	187.2	0.67	0.98	12	32.2	6.99	>	5.96	R-3455-C	0.91	
D338	0.85	7.16	187.2	0.67	0.66	12	32.2	6.99	>	4.02	R-3455-C	0.70	
D339	0.85	7.16	187.2	0.67	0.69	12	32.2	6.99	>	4.20	R-3455-C	0.72	
D340	0.85	7.16	187.2	0.67	0.47	12	32.2	6.99	>	2.86	R-3455-C	0.56	
D341	0.85	7.16	187.2	0.67	0.44	12	32.2	6.99	>	2.68	R-3455-C	0.53	
D342	0.85	7.16	187.2	0.67	0.52	12	32.2	6.99	>	3.16	R-3455-C	0.59	
D343	0.85	7.16	187.2	0.67	0.61	12	32.2	6.99	>	3.71	R-3455-C	0.66	
D345	0.71	7.16	79.2	0.67	0.46	12	32.2	2.96	>	2.33	R-3010	0.48	
D346	0.70	7.16	79.2	0.67	0.46	12	32.2	2.96	>	2.29	R-3010	0.48	
D347	0.78	7.16	79.2	0.67	0.49	12	32.2	2.96	>	2.75	R-3010	0.54	
D348	0.82	7.16	79.2	0.67	0.24	12	32.2	2.96	>	1.41	R-3010	0.35	
D349	0.80	7.16	144	0.67	0.28	12	32.2	5.38	>	1.60	R-4342	0.38	
D350	0.78	7.16	144	0.67	0.30	12	32.2	5.38	>	1.68	R-4342	0.39	
D356	0.85	7.16	144	0.67	0.32	12	32.2	5.38	>	1.95	R-4342	0.43	

Project Description

File Name	MalarkeyIND_StormSewerSizing_10-3-24.SPF

Project Options

Flow Units	CFS
Elevation Type	Elevation
Hydrology Method	Rational
Time of Concentration (TOC) Method	User-Defined
Link Routing Method	Kinematic Wave
Enable Overflow Ponding at Nodes	YES
Skip Steady State Analysis Time Periods	NO

Analysis Options

Start Analysis On	00:00:00	0:00:00
End Analysis On	00:00:00	0:00:00
Start Reporting On	00:00:00	0:00:00
Antecedent Dry Days	0	days
Runoff (Dry Weather) Time Step	0 01:00:00	days hh:mm:ss
Runoff (Wet Weather) Time Step	0 00:05:00	days hh:mm:ss
Reporting Time Step	0 00:05:00	days hh:mm:ss
Routing Time Step	30	seconds

Number of Elements

	Qty
Rain Gages	0
Subbasins	92
Nodes	113
Junctions	93
Outfalls	20
Flow Diversions	0
Inlets	0
Storage Nodes	0
Links	93
Channels	0
Pipes	93
Pumps	0
Orifices	0
Weirs	0
Outlets	0
Pollutants	0
Land Uses	0

Rainfall Details

Return Period	10 year(s)

Subbasin Summary

SN	Subbasin ID	Area (ac)	Weighted Runoff Coefficient	Total Rainfall (in)	Total Runoff (in)	Total Runoff Volume (ac-in)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
1	Sub-D10	0.83	0.4900	0.60	0.29	0.24	2.93	0 00:05:00
2	Sub-D109	0.39	0.8500	0.60	0.51	0.20	2.41	0 00:05:00
3	Sub-D11	0.63	0.5400	0.60	0.32	0.20	2.46	0 00:05:00
4	Sub-D111	1.07	0.8500	0.60	0.51	0.55	6.56	0 00:05:00
5	Sub-D111.1	1.61	0.8500	0.60	0.51	0.82	9.87	0 00:05:00
6	Sub-D112	5.09	0.8500	0.60	0.51	2.60	31.21	0 00:05:00
7	Sub-D113	0.12	0.8500	0.60	0.51	0.06	0.73	0 00:05:00
8	Sub-D114	0.20	0.8500	0.60	0.51	0.10	1.23	0 00:05:00
9	Sub-D115	7.46	0.7200	0.60	0.43	3.23	38.73	0 00:05:00
10	Sub-D116	0.72	0.8500	0.60	0.51	0.37	4.42	0 00:05:00
11	Sub-D117	0.50	0.8500	0.60	0.51	0.26	3.08	0 00:05:00
12	Sub-D118	0.22	0.8500	0.60	0.51	0.11	1.34	0 00:05:00
13	Sub-D119	0.70	0.8500	0.60	0.51	0.36	4.30	0 00:05:00
14	Sub-D120	0.51	0.8500	0.60	0.51	0.26	3.10	0 00:05:00
15	Sub-D121	0.60	0.8500	0.60	0.51	0.31	3.70	0 00:05:00
16	Sub-D122	0.44	0.8500	0.60	0.51	0.23	2.72	0 00:05:00
17	Sub-D123	0.15	0.8500	0.60	0.51	0.08	0.92	0 00:05:00
18	Sub-D124	0.34	0.8500	0.60	0.51	0.17	2.09	0 00:05:00
19	Sub-D125	0.60	0.8500	0.60	0.51	0.31	3.66	0 00:05:00
20	Sub-D127	0.34	0.6700	0.60	0.40	0.14	1.64	0 00:05:00
21	Sub-D128	0.35	0.8500	0.60	0.51	0.18	2.16	0 00:05:00
22	Sub-D129	0.33	0.7900	0.60	0.48	0.16	1.87	0 00:05:00
23	Sub-D13	0.15	0.6200	0.60	0.37	0.06	0.66	0 00:05:00
24	Sub-D130	2.04	0.6000	0.60	0.36	0.73	8.83	0 00:05:00
25	Sub-D14	0.11	0.5400	0.60	0.32	0.04	0.44	0 00:05:00
26	Sub-D18	0.71	0.5300	0.60	0.32	0.23	2.72	0 00:05:00
27	Sub-D19	0.54	0.5400	0.60	0.32	0.18	2.11	0 00:05:00
28	Sub-D200	1.19	0.8300	0.60	0.50	0.59	7.12	0 00:05:00
29	Sub-D201	0.56	0.8500	0.60	0.51	0.29	3.45	0 00:05:00
30	Sub-D202	0.30	0.6700	0.60	0.40	0.12	1.45	0 00:05:00
31	Sub-D202.1	1.10	0.8500	0.60	0.51	0.56	6.74	0 00:05:00
32	Sub-D203	0.74	0.8500	0.60	0.51	0.38	4.52	0 00:05:00
33	Sub-D203.1	0.74	0.8500	0.60	0.51	0.38	4.54	0 00:05:00
34	Sub-D21	0.26	0.4900	0.60	0.29	0.08	0.91	0 00:05:00
35	Sub-D22	0.20	0.5500	0.60	0.33	0.06	0.78	0 00:05:00
36	Sub-D24	0.40	0.6300	0.60	0.38	0.15	1.80	0 00:05:00
37	Sub-D25	0.30	0.5400	0.60	0.32	0.10	1.18	0 00:05:00
38	Sub-D29	0.24	0.6800	0.60	0.41	0.10	1.16	0 00:05:00
39	Sub-D30	0.39	0.5400	0.60	0.32	0.13	1.53	0 00:05:00
40	Sub-D300	1.46	0.8500	0.60	0.51	0.75	8.96	0 00:05:00
41	Sub-D301	0.36	0.8500	0.60	0.51	0.18	2.18	0 00:05:00
42	Sub-D302	0.75	0.8500	0.60	0.51	0.38	4.58	0 00:05:00
43	Sub-D303	0.91	0.8500	0.60	0.51	0.46	5.56	0 00:05:00
44	Sub-D304	0.30	0.8500	0.60	0.51	0.15	1.83	0 00:05:00
45	Sub-D305	0.48	0.8500	0.60	0.51	0.25	2.96	0 00:05:00
46	Sub-D306	0.48	0.8500	0.60	0.51	0.24	2.92	0 00:05:00
47	Sub-D307	0.39	0.8500	0.60	0.51	0.20	2.37	0 00:05:00
48	Sub-D308	1.14	0.8500	0.60	0.51	0.58	7.00	0 00:05:00
49	Sub-D309	1.34	0.8000	0.60	0.48	0.64	7.73	0 00:05:00
50	Sub-D31	0.28	0.5400	0.60	0.32	0.09	1.09	0 00:05:00
51	Sub-D312	1.03	0.7000	0.60	0.42	0.43	5.19	0 00:05:00
52	Sub-D313	0.49	0.8500	0.60	0.51	0.25	3.00	0 00:05:00
53	Sub-D314	0.85	0.8500	0.60	0.51	0.43	5.21	0 00:05:00
54	Sub-D315	0.88	0.8500	0.60	0.51	0.45	5.38	0 00:05:00
55	Sub-D316	0.29	0.8500	0.60	0.51	0.15	1.78	0 00:05:00
56	Sub-D317	0.47	0.8500	0.60	0.51	0.24	2.87	0 00:05:00
57	Sub-D318	0.46	0.8500	0.60	0.51	0.24	2.83	0 00:05:00
58	Sub-D319	0.37	0.8500	0.60	0.51	0.19	2.30	0 00:05:00
59	Sub-D320	1.06	0.8500	0.60	0.51	0.54	6.48	0 00:05:00
60	Sub-D321	0.83	0.7800	0.60	0.47	0.39	4.67	0 00:05:00
61	Sub-D324	1.00	0.8200	0.60	0.49	0.49	5.92	0 00:05:00
62	Sub-D325	0.79	0.8500	0.60	0.51	0.40	4.82	0 00:05:00
63	Sub-D326	0.97	0.8500	0.60	0.51	0.49	5.92	0 00:05:00
64	Sub-D327	1.15	0.8500	0.60	0.51	0.59	7.04	0 00:05:00
65	Sub-D328	0.38	0.8500	0.60	0.51	0.19	2.32	0 00:05:00

Subbasin Summary

SN	Subbasin ID	Area (ac)	Weighted Runoff Coefficient	Total Rainfall (in)	Total Runoff (in)	Total Runoff Volume (ac-in)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
66	Sub-D329	0.61	0.8500	0.60	0.51	0.31	3.75	0 00:05:00
67	Sub-D330	0.60	0.8500	0.60	0.51	0.31	3.70	0 00:05:00
68	Sub-D331	0.49	0.8500	0.60	0.51	0.25	3.00	0 00:05:00
69	Sub-D332	1.38	0.8500	0.60	0.51	0.71	8.47	0 00:05:00
70	Sub-D333	1.09	0.7800	0.60	0.47	0.51	6.11	0 00:05:00
71	Sub-D336	1.01	0.8500	0.60	0.51	0.52	6.20	0 00:05:00
72	Sub-D337	0.98	0.8500	0.60	0.51	0.50	6.02	0 00:05:00
73	Sub-D338	0.73	0.8500	0.60	0.51	0.37	4.47	0 00:05:00
74	Sub-D338.1	0.73	0.8500	0.60	0.51	0.37	4.47	0 00:05:00
75	Sub-D339	0.69	0.8500	0.60	0.51	0.35	4.22	0 00:05:00
76	Sub-D340	0.47	0.8500	0.60	0.51	0.24	2.86	0 00:05:00
77	Sub-D341	0.44	0.8500	0.60	0.51	0.23	2.71	0 00:05:00
78	Sub-D342	0.52	0.8500	0.60	0.51	0.26	3.18	0 00:05:00
79	Sub-D343	0.61	0.7300	0.60	0.44	0.27	3.21	0 00:05:00
80	Sub-D345	0.46	0.7100	0.60	0.43	0.20	2.36	0 00:05:00
81	Sub-D345.1	1.91	0.8500	0.60	0.51	0.98	11.71	0 00:05:00
82	Sub-D346	0.46	0.7000	0.60	0.42	0.19	2.31	0 00:05:00
83	Sub-D347	0.49	0.7800	0.60	0.47	0.23	2.75	0 00:05:00
84	Sub-D348	0.24	0.8200	0.60	0.49	0.12	1.42	0 00:05:00
85	Sub-D349	0.28	0.8000	0.60	0.48	0.13	1.62	0 00:05:00
86	Sub-D350	0.30	0.8000	0.60	0.48	0.14	1.73	0 00:05:00
87	Sub-D350.1	0.63	0.8500	0.60	0.51	0.32	3.86	0 00:05:00
88	Sub-D355	0.69	0.4700	0.60	0.28	0.19	2.34	0 00:05:00
89	Sub-D356	0.32	0.8500	0.60	0.51	0.16	1.96	0 00:05:00
90	Sub-D4	1.42	0.5000	0.60	0.30	0.43	5.12	0 00:05:00
91	Sub-D6	1.28	0.5000	0.60	0.30	0.38	4.61	0 00:05:00
92	Sub-D900	17.53	0.8500	0.90	0.77	13.43	80.60	0 00:10:00

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Surcharge Elevation (ft)	Ponded Area (ft^2)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	D1	Junction	770.95	774.78	770.95	774.78	0.00	0.00	770.95	0.00	3.83	0 00:00	0.00	0.00
2	D10	Junction	773.41	776.76	773.41	776.76	0.00	5.28	774.34	0.00	2.42	0 00:00	0.00	0.00
3	D109	Junction	771.46	779.12	771.46	779.12	0.00	89.05	774.57	0.00	4.54	0 00:00	0.00	0.00
4	D11	Junction	773.69	776.39	773.69	776.39	0.00	2.46	774.49	0.00	1.90	0 00:00	0.00	0.00
5	D111	Junction	777.10	786.60	777.10	786.60	0.00	17.55	778.88	0.00	7.72	0 00:00	0.00	0.00
6	D112	Junction	772.70	777.00	772.70	777.00	0.00	31.21	774.48	0.00	2.52	0 00:00	0.00	0.00
7	D113	Junction	772.38	778.29	772.38	778.29	0.00	31.70	774.25	0.00	4.04	0 00:00	0.00	0.00
8	D114	Junction	779.59	786.43	779.59	786.43	0.00	1.23	780.00	0.00	6.44	0 00:00	0.00	0.00
9	D115	Junction	774.75	778.17	774.75	778.17	0.00	38.73	776.91	0.00	1.34	0 00:00	0.00	0.00
10	D116	Junction	778.80	783.61	778.80	783.61	0.00	4.41	779.56	0.00	4.05	0 00:00	0.00	0.00
11	D117	Junction	777.54	783.61	777.54	783.61	0.00	7.33	778.54	0.00	5.07	0 00:00	0.00	0.00
12	D118	Junction	776.10	783.03	776.10	783.03	0.00	8.48	777.12	0.00	5.91	0 00:00	0.00	0.00
13	D119	Junction	774.03	778.45	774.03	778.45	0.00	12.13	775.04	0.00	3.41	0 00:00	0.00	0.00
14	D120	Junction	775.18	784.31	775.18	784.31	0.00	20.12	776.65	0.00	7.66	0 00:00	0.00	0.00
15	D121	Junction	775.48	783.69	775.48	783.69	0.00	22.30	777.16	0.00	6.53	0 00:00	0.00	0.00
16	D122	Junction	774.64	783.58	774.64	783.58	0.00	24.67	776.18	0.00	7.40	0 00:00	0.00	0.00
17	D123	Junction	773.46	782.80	773.46	782.80	0.00	25.35	775.09	0.00	7.71	0 00:00	0.00	0.00
18	D124	Junction	772.68	780.83	772.68	780.83	0.00	27.02	774.34	0.00	6.49	0 00:00	0.00	0.00
19	D125	Junction	771.63	778.45	771.63	778.45	0.00	43.77	773.92	0.00	4.53	0 00:00	0.00	0.00
20	D127	Junction	771.99	781.48	771.99	781.48	0.00	63.47	774.71	0.00	6.76	0 00:00	0.00	0.00
21	D128	Junction	774.27	778.24	774.27	778.24	0.00	2.16	774.89	0.00	3.36	0 00:00	0.00	0.00
22	D129	Junction	773.77	786.06	773.77	786.06	0.00	38.33	775.92	0.00	10.14	0 00:00	0.00	0.00
23	D13	Junction	774.66	780.46	774.66	780.46	0.00	1.08	776.29	0.00	4.18	0 00:00	0.00	0.00
24	D130	Junction	772.88	780.33	772.88	780.33	0.00	63.06	775.59	0.00	4.74	0 00:00	0.00	0.00
25	D14	Junction	776.29	779.98	776.29	779.98	0.00	0.44	776.57	0.00	3.41	0 00:00	0.00	0.00
26	D18	Junction	775.55	781.61	775.55	781.61	0.00	4.78	776.50	0.00	5.11	0 00:00	0.00	0.00
27	D19	Junction	776.51	780.29	776.51	780.29	0.00	2.11	777.07	0.00	3.22	0 00:00	0.00	0.00
28	D200	Junction	777.00	786.35	777.00	786.35	0.00	15.74	778.36	0.00	7.99	0 00:00	0.00	0.00
29	D201	Junction	776.57	786.77	776.57	786.77	0.00	19.04	778.16	0.00	8.61	0 00:00	0.00	0.00
30	D202	Junction	777.30	786.22	777.30	786.22	0.00	8.19	778.09	0.00	8.13	0 00:00	0.00	0.00
31	D203	Junction	778.04	783.88	778.04	783.88	0.00	9.06	779.26	0.00	4.61	0 00:00	0.00	0.00
32	D21	Junction	775.55	783.72	775.55	783.72	0.00	1.66	779.96	0.00	3.76	0 00:00	0.00	0.00
33	D22	Junction	780.20	783.72	780.20	783.72	0.00	0.78	780.52	0.00	3.20	0 00:00	0.00	0.00
34	D24	Junction	776.28	784.17	776.28	784.17	0.00	2.91	781.19	0.00	2.98	0 00:00	0.00	0.00
35	D25	Junction	781.06	784.47	781.06	784.47	0.00	1.18	781.54	0.00	2.92	0 00:00	0.00	0.00
36	D29	Junction	777.47	786.63	777.47	786.63	0.00	3.68	782.02	0.00	4.61	0 00:00	0.00	0.00
37	D30	Junction	781.74	784.81	781.74	784.81	0.00	1.53	782.31	0.00	2.50	0 00:00	0.00	0.00
38	D300	Junction	778.58	784.16	778.58	784.16	0.00	8.96	779.65	0.00	4.51	0 00:00	0.00	0.00
39	D301	Junction	777.60	782.42	777.60	782.42	0.00	10.96	779.07	0.00	3.36	0 00:00	0.00	0.00
40	D302	Junction	777.06	782.16	777.06	782.16	0.00	14.76	778.54	0.00	3.62	0 00:00	0.00	0.00
41	D303	Junction	776.64	782.16	776.64	782.16	0.00	19.36	778.43	0.00	3.74	0 00:00	0.00	0.00
42	D304	Junction	776.22	783.56	776.22	783.56	0.00	20.74	778.11	0.00	5.44	0 00:00	0.00	0.00
43	D305	Junction	775.80	782.16	775.80	782.16	0.00	22.84	777.69	0.00	4.48	0 00:00	0.00	0.00
44	D306	Junction	775.45	781.71	775.45	781.71	0.00	24.86	777.27	0.00	4.44	0 00:00	0.00	0.00
45	D307	Junction	775.26	781.71	775.26	781.71	0.00	26.49	777.15	0.00	4.56	0 00:00	0.00	0.00
46	D308	Junction	774.93	781.17	774.93	781.17	0.00	31.20	777.07	0.00	4.10	0 00:00	0.00	0.00
47	D309	Junction	773.99	780.25	773.99	780.25	0.00	35.55	776.38	0.00	3.87	0 00:00	0.00	0.00
48	D31	Junction	782.21	783.88	782.21	783.88	0.00	1.09	782.59	0.00	1.29	0 00:00	0.00	0.00
49	D312	Junction	777.89	783.92	777.89	783.92	0.00	5.19	779.01	0.00	4.91	0 00:00	0.00	0.00
50	D313	Junction	777.67	782.83	777.67	782.83	0.00	7.99	778.84	0.00	3.99	0 00:00	0.00	0.00
51	D314	Junction	777.06	781.63	777.06	781.63	0.00	12.33	778.69	0.00	2.94	0 00:00	0.00	0.00
52	D315	Junction	776.64	781.64	776.64	781.64	0.00	16.76	778.25	0.00	3.39	0 00:00	0.00	0.00
53	D316	Junction	776.22	784.29	776.22	784.29	0.00	18.13	777.92	0.00	6.37	0 00:00	0.00	0.00
54	D317	Junction	775.80	782.89	775.80	782.89	0.00	20.23	777.65	0.00	5.24	0 00:00	0.00	0.00
55	D318	Junction	775.45	781.74	775.45	781.74	0.00	22.22	777.48	0.00	4.27	0 00:00	0.00	0.00
56	D319	Junction	775.26	781.60	775.26	781.60	0.00	23.81	777.28	0.00	4.32	0 00:00	0.00	0.00
57	D320	Junction	774.93	780.62	774.93	780.62	0.00	28.30	776.92	0.00	3.70	0 00:00	0.00	0.00
58	D321	Junction	773.99	780.50	773.99	780.50	0.00	30.81	776.10	0.00	4.40	0 00:00	0.00	0.00
59	D324	Junction	778.58	783.17	778.58	783.17	0.00	5.92	779.60	0.00	3.58	0 00:00	0.00	0.00
60	D325	Junction	777.60	782.70	777.60	782.70	0.00	10.48	779.10	0.00	3.59	0 00:00	0.00	0.00
61	D326	Junction	777.06	782.42	777.06	782.42	0.00	15.55	778.59	0.00	3.83	0 00:00	0.00	0.00
62	D327	Junction	776.64	782.41	776.64	782.41	0.00	21.51	778.60	0.00	3.82	0 00:00	0.00	0.00
63	D328	Junction	776.11	784.01	776.11	784.01	0.00	23.23	778.06	0.00	5.95	0 00:00	0.00	0.00
64	D329	Junction	775.80	782.41	775.80	782.41	0.00	26.06	777.67	0.00	4.74	0 00:00	0.00	0.00

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Surcharge Elevation (ft)	Ponded Area (ft^2)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
65	D330	Junction	775.45	781.96	775.45	781.96	0.00	28.74	777.46	0.00	4.51	0 00:00	0.00	0.00
66	D331	Junction	775.26	781.96	775.26	781.96	0.00	30.90	777.37	0.00	4.59	0 00:00	0.00	0.00
67	D332	Junction	774.93	781.43	774.93	781.43	0.00	36.90	777.05	0.00	4.38	0 00:00	0.00	0.00
68	D333	Junction	773.99	781.05	773.99	781.05	0.00	40.47	776.22	0.00	4.83	0 00:00	0.00	0.00
69	D336	Junction	777.88	782.65	777.88	782.65	0.00	6.20	778.93	0.00	3.72	0 00:00	0.00	0.00
70	D337	Junction	776.97	784.46	776.97	784.46	0.00	11.67	778.51	0.00	5.95	0 00:00	0.00	0.00
71	D338	Junction	776.55	784.81	776.55	784.81	0.00	19.63	778.36	0.00	6.46	0 00:00	0.00	0.00
72	D339	Junction	775.71	784.10	775.71	784.10	0.00	22.65	777.49	0.00	6.61	0 00:00	0.00	0.00
73	D340	Junction	775.29	783.75	775.29	783.75	0.00	24.73	777.10	0.00	6.65	0 00:00	0.00	0.00
74	D341	Junction	774.87	783.40	774.87	783.40	0.00	26.55	776.77	0.00	6.64	0 00:00	0.00	0.00
75	D342	Junction	774.47	782.75	774.47	782.75	0.00	28.51	776.46	0.00	6.29	0 00:00	0.00	0.00
76	D343	Junction	773.90	782.05	773.90	782.05	0.00	30.27	775.98	0.00	6.07	0 00:00	0.00	0.00
77	D345	Junction	779.73	785.41	779.73	785.41	0.00	16.22	780.89	0.00	4.52	0 00:00	0.00	0.00
78	D346	Junction	781.32	784.99	781.32	784.99	0.00	2.31	781.91	0.00	3.07	0 00:00	0.00	0.00
79	D347	Junction	780.29	784.75	780.29	784.75	0.00	2.75	780.95	0.00	3.80	0 00:00	0.00	0.00
80	D348	Junction	777.69	784.87	777.69	784.87	0.00	19.80	779.84	0.00	5.03	0 00:00	0.00	0.00
81	D349	Junction	777.23	785.46	777.23	785.46	0.00	21.27	778.60	0.00	6.86	0 00:00	0.00	0.00
82	D350	Junction	775.85	784.95	775.85	784.95	0.00	26.16	777.72	0.00	7.23	0 00:00	0.00	0.00
83	D355	Junction	773.78	782.92	773.78	782.92	0.00	37.04	775.58	0.00	7.34	0 00:00	0.00	0.00
84	D356	Junction	774.46	784.16	774.46	784.16	0.00	35.13	776.41	0.00	7.76	0 00:00	0.00	0.00
85	D4	Junction	771.38	772.90	771.38	772.90	0.00	9.64	772.50	0.00	0.88	0 00:00	0.00	0.00
86	D6	Junction	772.21	773.46	772.21	773.46	0.00	4.61	772.90	0.00	0.56	0 00:00	0.00	0.00
87	D900	Junction	774.94	782.05	774.94	782.05	0.00	80.60	777.88	0.00	4.17	0 00:00	0.00	0.00
88	D904	Junction	774.24	786.22	774.24	786.22	0.00	79.78	777.15	0.00	9.07	0 00:00	0.00	0.00
89	D905	Junction	775.94	779.36	775.94	779.36	0.00	0.00	775.94	0.00	3.42	0 00:00	0.00	0.00
90	D906	Junction	773.50	776.92	773.50	776.92	0.00	0.00	773.50	0.00	3.42	0 00:00	0.00	0.00
91	D907	Junction	773.50	776.92	773.50	776.92	0.00	0.00	773.50	0.00	3.42	0 00:00	0.00	0.00
92	D910	Junction	772.52	776.48	772.52	776.48	0.00	0.00	772.52	0.00	3.96	0 00:00	0.00	0.00
93	D911	Junction	772.50	776.46	772.50	776.46	0.00	0.00	772.50	0.00	3.96	0 00:00	0.00	0.00
94	Out-1D109 TO D110	Outfall	771.00					88.84	774.11					
95	Out-1D125 TO D126	Outfall	771.00					43.70	773.28					
96	Out-1D309 TO D310	Outfall	773.50					35.47	775.89					
97	Out-1D321 TO D322	Outfall	773.50					30.74	775.61					
98	Out-1D333 TO D334	Outfall	773.50					40.38	775.73					
99	Out-1D343 TO D344	Outfall	773.50					30.22	775.58					
100	Out-1D355 TO D354	Outfall	773.50					37.01	775.29					
101	Out-1D904 TO D903	Outfall	773.50					79.32	776.40					
102	Out-1D906 TO D908	Outfall	772.83					0.00	772.83					
103	Out-1D907 TO D909	Outfall	772.83					0.00	772.83					
104	Out-1D910 TO D912	Outfall	771.00					0.00	771.00					
105	Out-1D911 TO D913	Outfall	771.00					0.00	771.00					
106	Out-1PIPE D10	Outfall	774.00					4.74	774.70					
107	Out-1PIPE D12	Outfall	774.00					1.65	774.39					
108	Out-1PIPE D14	Outfall	774.50					2.89	775.04					
109	Out-1PIPE D16	Outfall	776.90					3.67	777.57					
110	Out-1PIPE D2	Outfall	771.00					9.54	772.11					
111	Out-1PIPE D5	Outfall	773.00					5.24	773.93					
112	Out-1PIPE D7	Outfall	773.00					1.07	773.29					
113	Out-1PIPE-D2	Outfall	770.39					0.00	770.39					

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length (ft)	Inlet Invert Elevation (ft)	Outlet Invert Elevation (ft)	Average Slope (%)	Diameter or Height (in)	Manning's Roughness	Peak Flow (cfs)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)	Peak Flow Depth (ft)	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged (min)	Reported Condition
1	D109 TO D110	Pipe	D109	Out-1D109 TO D110	151.50	771.46	771.00	0.3000	54.000	0.0130	88.84	107.84	0.82	7.66	3.11	0.69	0.00	Calculated
2	D111 TO D120	Pipe	D111	D120	192.94	777.10	775.18	1.0000	24.000	0.0130	17.17	22.62	0.76	8.22	1.30	0.65	0.00	Calculated
3	D112 TO D113	Pipe	D112	D113	44.54	772.70	772.48	0.5000	36.000	0.0130	30.98	47.16	0.66	8.09	1.77	0.59	0.00	Calculated
4	D113 TO D109	Pipe	D113	D109	164.47	772.38	771.56	0.5000	36.000	0.0130	31.13	47.16	0.66	7.24	1.77	0.59	0.00	Calculated
5	D114 TO D111	Pipe	D114	D111	110.87	779.59	778.48	1.0000	12.000	0.0130	1.19	3.56	0.33	6.35	0.40	0.40	0.00	Calculated
6	D115 TO D129	Pipe	D115	D129	326.39	774.75	773.77	0.3000	42.000	0.0130	36.66	55.18	0.66	11.14	2.07	0.59	0.00	Calculated
7	D116 TO D117	Pipe	D116	D117	101.09	778.80	777.79	1.0000	15.000	0.0130	4.34	6.46	0.67	8.07	0.75	0.60	0.00	Calculated
8	D117 TO D118	Pipe	D117	D118	144.27	777.54	776.10	1.0000	18.000	0.0130	7.24	10.50	0.69	6.51	0.91	0.61	0.00	Calculated
9	D118 TO D119	Pipe	D118	D119	206.59	776.10	774.03	1.0000	18.000	0.0130	8.39	10.50	0.80	6.77	1.01	0.67	0.00	Calculated
10	D119 TO D125	Pipe	D119	D125	120.00	773.53	772.33	1.0000	24.000	0.0130	12.12	26.93	0.45	8.39	0.94	0.47	0.00	Calculated
11	D120 TO D130	Pipe	D120	D130	129.36	775.18	773.88	1.0000	24.000	0.0130	20.00	22.62	0.88	8.24	1.46	0.73	0.00	Calculated
12	D121 TO D122	Pipe	D121	D122	98.40	775.48	774.74	0.7500	30.000	0.0130	22.25	35.52	0.63	7.68	1.43	0.57	0.00	Calculated
13	D122 TO D123	Pipe	D122	D123	144.30	774.64	773.56	0.7500	30.000	0.0130	24.57	35.52	0.69	7.89	1.53	0.61	0.00	Calculated
14	D123 TO D124	Pipe	D123	D124	90.01	773.46	772.78	0.7500	30.000	0.0130	25.30	35.52	0.71	7.90	1.56	0.62	0.00	Calculated
15	D124 TO D125	Pipe	D124	D125	126.67	772.68	771.73	0.7500	30.000	0.0130	26.97	35.52	0.76	8.04	1.63	0.65	0.00	Calculated
16	D125 TO D126	Pipe	D125	Out-1D125 TO D126	126.50	771.63	771.00	0.5000	36.000	0.0130	43.70	47.16	0.93	7.69	2.28	0.76	0.00	Calculated
17	D127 TO D109	Pipe	D127	D109	178.44	771.99	771.46	0.3000	48.000	0.0130	63.22	78.78	0.80	7.07	2.71	0.68	0.00	Calculated
18	D128 TO D125	Pipe	D128	D125	217.34	774.27	772.64	0.7500	12.000	0.0130	2.04	3.09	0.66	7.56	0.59	0.59	0.00	Calculated
19	D129 TO D130	Pipe	D129	D130	294.71	773.77	772.88	0.3000	42.000	0.0130	37.36	55.18	0.68	6.35	2.10	0.60	0.00	Calculated
20	D130 TO D127	Pipe	D130	D127	295.68	772.88	771.99	0.3000	48.000	0.0130	62.28	78.78	0.79	7.17	2.67	0.67	0.00	Calculated
21	D200 TO D201	Pipe	D200	D201	43.89	777.00	776.67	0.7500	24.000	0.0130	15.72	19.59	0.80	6.95	1.36	0.68	0.00	Calculated
22	D201 TO D121	Pipe	D201	D121	132.26	776.57	775.58	0.7500	24.000	0.0130	18.90	19.59	0.96	7.24	1.57	0.79	0.00	Calculated
23	D202 TO D356	Pipe	D202	D356	84.01	777.30	775.62	2.0000	18.000	0.0130	8.11	14.86	0.55	10.73	0.79	0.53	0.00	Calculated
24	D203 TO D200	Pipe	D203	D200	125.48	778.04	777.10	0.7500	18.000	0.0130	8.86	9.10	0.97	8.98	1.19	0.79	0.00	Calculated
25	D300 TO D301	Pipe	D300	D301	96.10	778.58	777.62	1.0000	18.000	0.0130	8.84	10.50	0.84	9.24	1.05	0.70	0.00	Calculated
26	D301 TO D302	Pipe	D301	D302	182.50	777.60	777.06	0.3000	24.000	0.0130	10.67	12.39	0.86	4.71	1.42	0.71	0.00	Calculated
27	D302 TO D303	Pipe	D302	D303	140.00	777.06	776.64	0.3000	30.000	0.0130	14.64	22.47	0.65	4.96	1.47	0.59	0.00	Calculated
28	D303 TO D304	Pipe	D303	D304	140.00	776.64	776.22	0.3000	30.000	0.0130	19.28	22.47	0.86	5.26	1.78	0.71	0.00	Calculated
29	D304 TO D305	Pipe	D304	D305	140.00	776.22	775.80	0.3000	30.000	0.0130	20.65	22.47	0.92	5.32	1.88	0.75	0.00	Calculated
30	D305 TO D306	Pipe	D305	D306	115.00	775.80	775.45	0.3000	36.000	0.0130	22.79	36.53	0.62	5.50	1.72	0.57	0.00	Calculated
31	D306 TO D307	Pipe	D306	D307	65.00	775.45	775.26	0.3000	36.000	0.0130	24.84	36.53	0.68	5.57	1.81	0.60	0.00	Calculated
32	D307 TO D308	Pipe	D307	D308	107.50	775.26	774.93	0.3000	36.000	0.0130	26.45	36.53	0.72	5.68	1.89	0.63	0.00	Calculated
33	D308 TO D309	Pipe	D308	D309	316.00	774.93	773.99	0.3000	36.000	0.0130	31.01	36.53	0.85	6.11	2.11	0.70	0.00	Calculated
34	D309 TO D310	Pipe	D309	Out-1D309 TO D310	162.16	773.99	773.50	0.3000	36.000	0.0130	35.47	36.53	0.97	6.05	2.38	0.79	0.00	Calculated
35	D312 TO D313	Pipe	D312	D313	75.35	777.89	777.67	0.3000	18.000	0.0130	5.09	5.75	0.88	5.51	1.09	0.73	0.00	Calculated
36	D313 TO D314	Pipe	D313	D314	203.79	777.67	777.06	0.3000	24.000	0.0130	7.73	12.39	0.62	4.32	1.14	0.57	0.00	Calculated
37	D314 TO D315	Pipe	D314	D315	140.00	777.06	776.64	0.3000	24.000	0.0130	12.23	12.39	0.99	4.66	1.61	0.80	0.00	Calculated
38	D315 TO D316	Pipe	D315	D316	140.00	776.64	776.22	0.3000	30.000	0.0130	16.71	22.47	0.74	5.09	1.60	0.64	0.00	Calculated
39	D316 TO D317	Pipe	D316	D317	140.00	776.22	775.80	0.3000	30.000	0.0130	18.08	22.47	0.80	5.19	1.70	0.68	0.00	Calculated
40	D317 TO D318	Pipe	D317	D318	115.00	775.80	775.45	0.3000	30.000	0.0130	20.20	22.47	0.90	5.26	1.85	0.74	0.00	Calculated
41	D318 TO D319	Pipe	D318	D319	65.00	775.45	775.26	0.3000	30.000	0.0130	22.20	22.47	0.99	5.27	2.02	0.81	0.00	Calculated
42	D319 TO D320	Pipe	D319	D320	107.50	775.26	774.93	0.3000	36.000	0.0130	23.79	36.53	0.65	5.54	1.76	0.59	0.00	Calculated
43	D320 TO D321	Pipe	D320	D321	316.00	774.93	773.99	0.3000	36.000	0.0130	28.03	36.53	0.77	5.96	1.96	0.65	0.00	Calculated
44	D321 TO D322	Pipe	D321	Out-1D321 TO D322	162.16	773.99	773.50	0.3000	36.000	0.0130	30.74	36.53	0.84	5.89	2.11	0.70	0.00	Calculated
45	D324 TO D325	Pipe	D324	D325	96.10	778.58	778.10	0.5000	18.000	0.0130	5.81	7.43	0.78	6.91	0.99	0.66	0.00	Calculated
46	D325 TO D326	Pipe	D325	D326	182.50	777.60	777.06	0.3000	24.000	0.0130	10.23	12.39	0.83	4.57	1.38	0.69	0.00	Calculated

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length (ft)	Inlet Invert Elevation (ft)	Outlet Invert Elevation (ft)	Average Slope (%)	Diameter or Height (in)	Manning's Roughness	Peak Flow (cfs)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)	Peak Flow Depth (ft)	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged (min)	Reported Condition
47	D326 TO D327	Pipe	D326	D327	140.00	777.06	776.64	0.3000	30.000	0.0130	15.43	22.47	0.69	5.01	1.52	0.61	0.00	Calculated
48	D327 TO D328	Pipe	D327	D328	175.00	776.64	776.11	0.3000	30.000	0.0130	21.38	22.47	0.95	5.39	1.94	0.78	0.00	Calculated
49	D328 TO D329	Pipe	D328	D329	105.00	776.11	775.80	0.3000	36.000	0.0130	23.19	36.53	0.63	5.51	1.73	0.58	0.00	Calculated
50	D329 TO D330	Pipe	D329	D330	115.00	775.80	775.45	0.3000	36.000	0.0130	26.01	36.53	0.71	5.67	1.87	0.62	0.00	Calculated
51	D330 TO D331	Pipe	D330	D331	65.00	775.45	775.26	0.3000	36.000	0.0130	28.72	36.53	0.79	5.75	2.00	0.67	0.00	Calculated
52	D331 TO D332	Pipe	D331	D332	107.50	775.26	774.93	0.3000	36.000	0.0130	30.86	36.53	0.84	5.86	2.11	0.70	0.00	Calculated
53	D332 TO D333	Pipe	D332	D333	316.00	774.93	773.99	0.3000	42.000	0.0130	36.63	55.11	0.66	6.35	2.08	0.59	0.00	Calculated
54	D333 TO D334	Pipe	D333	Out-1D333 TO D334	162.16	773.99	773.50	0.3000	42.000	0.0130	40.38	55.11	0.73	6.34	2.22	0.64	0.00	Calculated
55	D336 TO D337	Pipe	D336	D337	182.82	777.88	776.97	0.5000	18.000	0.0130	5.98	7.43	0.81	7.99	1.01	0.68	0.00	Calculated
56	D337 TO D338	Pipe	D337	D338	140.00	776.97	776.55	0.3000	24.000	0.0130	11.52	12.39	0.93	4.61	1.52	0.76	0.00	Calculated
57	D338 TO D339	Pipe	D338	D339	280.00	776.55	775.71	0.3000	30.000	0.0130	19.25	22.47	0.86	5.40	1.77	0.71	0.00	Calculated
58	D339 TO D340	Pipe	D339	D340	140.00	775.71	775.29	0.3000	36.000	0.0130	22.56	36.53	0.62	5.50	1.70	0.57	0.00	Calculated
59	D340 TO D341	Pipe	D340	D341	140.00	775.29	774.87	0.3000	36.000	0.0130	24.63	36.53	0.67	5.62	1.80	0.60	0.00	Calculated
60	D341 TO D342	Pipe	D341	D342	132.50	774.87	774.47	0.3000	36.000	0.0130	26.43	36.53	0.72	5.70	1.89	0.63	0.00	Calculated
61	D342 TO D343	Pipe	D342	D343	191.00	774.47	773.90	0.3000	36.000	0.0130	28.39	36.53	0.78	5.84	1.98	0.66	0.00	Calculated
62	D343 TO D344	Pipe	D343	Out-1D343 TO D344	132.49	773.90	773.50	0.3000	36.000	0.0130	30.22	36.53	0.83	5.86	2.08	0.69	0.00	Calculated
63	D345 TO D348	Pipe	D345	D348	192.00	779.73	778.19	0.8000	30.000	0.0130	15.79	36.69	0.43	7.31	1.14	0.46	0.00	Calculated
64	D346 TO D345	Pipe	D346	D345	110.00	781.32	780.22	1.0000	12.000	0.0130	2.26	3.56	0.63	7.22	0.58	0.58	0.00	Calculated
65	D347 TO D348	Pipe	D347	D348	109.94	780.29	779.19	1.0000	12.000	0.0130	2.69	3.56	0.75	7.53	0.65	0.65	0.00	Calculated
66	D348 TO D349	Pipe	D348	D349	57.06	777.69	777.23	0.8000	30.000	0.0130	19.78	36.69	0.54	7.63	1.31	0.52	0.00	Calculated
67	D349 TO D350	Pipe	D349	D350	110.00	777.23	776.35	0.8000	30.000	0.0130	21.17	36.69	0.58	7.80	1.36	0.54	0.00	Calculated
68	D350 TO D356	Pipe	D350	D356	120.00	775.85	774.89	0.8000	36.000	0.0130	26.08	59.66	0.44	8.22	1.39	0.46	0.00	Calculated
69	D355 TO D354	Pipe	D355	Out-1D355 TO D354	56.70	773.78	773.50	0.5000	42.000	0.0130	37.01	71.14	0.52	7.48	1.79	0.51	0.00	Calculated
70	D356 TO D355	Pipe	D356	D355	134.48	774.46	773.78	0.5000	42.000	0.0130	35.06	71.14	0.49	7.44	1.73	0.50	0.00	Calculated
71	D900 TO D904	Pipe	D900	D904	175.29	774.94	774.24	0.4000	48.000	0.0130	79.78	90.85	0.88	10.64	2.90	0.73	0.00	Calculated
72	D904 TO D903	Pipe	D904	Out-1D904 TO D903	185.55	774.24	773.50	0.4000	48.000	0.0130	79.32	90.85	0.87	8.22	2.89	0.72	0.00	Calculated
73	D905 TO D904	Pipe	D905	D904	92.59	775.94	775.02	1.0000	36.000	0.0130	0.00	66.70	0.00	0.00	0.00	0.00	0.00	Calculated
74	D906 TO D908	Pipe	D906	Out-1D906 TO D908	195.02	773.50	772.83	0.3400	36.000	0.0130	0.00	39.09	0.00	0.00	0.00	0.00	0.00	Calculated
75	D907 TO D909	Pipe	D907	Out-1D907 TO D909	194.94	773.50	772.83	0.3400	36.000	0.0130	0.00	39.10	0.00	0.00	0.00	0.00	0.00	Calculated
76	D910 TO D912	Pipe	D910	Out-1D910 TO D912	258.62	772.52	771.00	0.5900	42.000	0.0130	0.00	77.13	0.00	0.00	0.00	0.00	0.00	Calculated
77	D911 TO D913	Pipe	D911	Out-1D911 TO D913	258.78	772.50	771.00	0.5800	42.000	0.0130	0.00	76.60	0.00	0.00	0.00	0.00	0.00	Calculated
78	PIPE D10	Pipe	D18	Out-1PIPE D10	103.09	775.55	774.00	1.5000	15.000	0.0130	4.74	7.91	0.60	6.80	0.70	0.56	0.00	Calculated
79	PIPE D11	Pipe	D19	D18	55.92	776.51	775.95	1.0000	12.000	0.0130	2.09	3.56	0.59	6.09	0.55	0.55	0.00	Calculated
80	PIPE D12	Pipe	D21	Out-1PIPE D12	103.17	775.55	774.00	1.5000	15.000	0.0130	1.65	7.91	0.21	5.14	0.39	0.31	0.00	Calculated
81	PIPE D13	Pipe	D22	D21	55.93	780.20	779.64	1.0000	12.000	0.0130	0.77	3.56	0.22	4.96	0.31	0.31	0.00	Calculated
82	PIPE D14	Pipe	D24	Out-1PIPE D14	88.78	776.28	774.50	2.0000	12.000	0.0130	2.89	5.04	0.57	6.68	0.54	0.54	0.00	Calculated
83	PIPE D15	Pipe	D25	D24	70.43	781.06	780.71	0.5000	12.000	0.0130	1.15	2.52	0.46	4.66	0.47	0.47	0.00	Calculated
84	PIPE D16	Pipe	D29	Out-1PIPE D16	55.01	777.47	776.90	1.0400	15.000	0.0130	3.67	6.59	0.56	5.54	0.67	0.53	0.00	Calculated
85	PIPE D17	Pipe	D30	D29	58.24	781.74	781.46	0.4800	12.000	0.0130	1.50	2.47	0.61	4.71	0.56	0.56	0.00	Calculated
86	PIPE D2	Pipe	D4	Out-1PIPE D2	76.01	771.38	771.00	0.5000	24.000	0.0130	9.54	16.00	0.60	5.36	1.11	0.56	0.00	Calculated
87	PIPE D3	Pipe	D6	D4	55.52	772.21	771.38	1.4900	15.000	0.0130	4.57	7.90	0.58	7.98	0.68	0.55	0.00	Calculated
88	PIPE D5	Pipe	D10	Out-1PIPE D5	81.00	773.41	773.00	0.5000	18.000	0.0130	5.24	7.43	0.70	4.60	0.93	0.62	0.00	Calculated
89	PIPE D6	Pipe	D11	D10	57.80	773.69	773.41	0.5000	12.000	0.0130	2.42	2.52	0.96	5.26	0.78	0.78	0.00	Calculated
90	PIPE D7	Pipe	D13	Out-1PIPE D7	83.06	774.66	773.00	2.0000	15.000	0.0130	1.07	9.14	0.12	5.01	0.29	0.23	0.00	Calculated
91	PIPE D8	Pipe	D14	D13	55.87	776.29	776.01	0.5000	12.000	0.0130	0.43	2.52	0.17	3.61	0.28	0.28	0.00	Calculated
92	PIPE-33	Pipe	D31	D29	71.16	782.21	781.50	1.0000	12.000	0.0130	1.06	3.56	0.30	5.60	0.37	0.37	0.00	Calculated

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length (ft)	Inlet Invert Elevation (ft)	Outlet Invert Elevation (ft)	Average Slope (%)	Diameter or Height (in)	Manning's Roughness	Peak Flow (cfs)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)	Peak Flow Depth (ft)	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged (min)	Reported Condition
93	PIPE-D2	Pipe	D1	Out-1PIPE-D2	116.38	770.95	770.39	0.4800	36.000	0.0130	0.00	46.34	0.00	0.00	0.00	0.00	0.00	Calculated

Junction Input

SN	Element ID	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Ground/Rim (Max) Offset (ft)	Initial Water Elevation (ft)	Initial Water Depth (ft)	Surcharge Elevation (ft)	Surcharge Depth (ft)	Ponded Area (ft^2)	Minimum Pipe Cover (in)
1	D1	770.95	774.78	3.83	770.95	0.00	774.78	0.00	0.00	10.00
2	D10	773.41	776.76	3.36	773.41	0.00	776.76	0.00	0.00	22.28
3	D109	771.46	779.12	7.66	771.46	0.00	779.12	0.00	0.00	37.94
4	D11	773.69	776.39	2.69	773.69	0.00	776.39	0.00	0.00	20.34
5	D111	777.10	786.60	9.50	777.10	0.00	786.60	0.00	0.00	85.42
6	D112	772.70	777.00	4.30	772.70	0.00	777.00	0.00	0.00	15.59
7	D113	772.38	778.29	5.92	772.38	0.00	778.29	0.00	0.00	33.80
8	D114	779.59	786.43	6.84	779.59	0.00	786.43	0.00	0.00	70.10
9	D115	774.75	778.17	3.42	774.75	0.00	778.17	0.00	0.00	0.00
10	D116	778.80	783.61	4.81	778.80	0.00	783.61	0.00	0.00	42.69
11	D117	777.54	783.61	6.07	777.54	0.00	783.61	0.00	0.00	54.83
12	D118	776.10	783.03	6.93	776.10	0.00	783.03	0.00	0.00	65.20
13	D119	774.03	778.45	4.42	774.03	0.00	778.45	0.00	0.00	35.05
14	D120	775.18	784.31	9.13	775.18	0.00	784.31	0.00	0.00	85.58
15	D121	775.48	783.69	8.21	775.48	0.00	783.69	0.00	0.00	68.55
16	D122	774.64	783.58	8.94	774.64	0.00	783.58	0.00	0.00	76.04
17	D123	773.46	782.80	9.34	773.46	0.00	782.80	0.00	0.00	80.85
18	D124	772.68	780.83	8.15	772.68	0.00	780.83	0.00	0.00	66.57
19	D125	771.63	778.45	6.82	771.63	0.00	778.45	0.00	0.00	45.82
20	D127	771.99	781.48	9.48	771.99	0.00	781.48	0.00	0.00	65.81
21	D128	774.27	778.24	3.97	774.27	0.00	778.24	0.00	0.00	35.70
22	D129	773.77	786.06	12.29	773.77	0.00	786.06	0.00	0.00	105.51
23	D13	774.66	780.46	5.80	774.66	0.00	780.46	0.00	0.00	41.46
24	D130	772.88	780.33	7.45	772.88	0.00	780.33	0.00	0.00	41.42
25	D14	776.29	779.98	3.69	776.29	0.00	779.98	0.00	0.00	32.30
26	D18	775.55	781.61	6.07	775.55	0.00	781.61	0.00	0.00	55.95
27	D19	776.51	780.29	3.78	776.51	0.00	780.29	0.00	0.00	33.34
28	D200	777.00	786.35	9.35	777.00	0.00	786.35	0.00	0.00	88.23
29	D201	776.57	786.77	10.20	776.57	0.00	786.77	0.00	0.00	97.19
30	D202	777.30	786.22	8.92	777.30	0.00	786.22	0.00	0.00	89.08
31	D203	778.04	783.88	5.84	778.04	0.00	783.88	0.00	0.00	52.04
32	D21	775.55	783.72	8.17	775.55	0.00	783.72	0.00	0.00	36.93
33	D22	780.20	783.72	3.52	780.20	0.00	783.72	0.00	0.00	30.22
34	D24	776.28	784.17	7.89	776.28	0.00	784.17	0.00	0.00	29.47
35	D25	781.06	784.47	3.40	781.06	0.00	784.47	0.00	0.00	28.85
36	D29	777.47	786.63	9.15	777.47	0.00	786.63	0.00	0.00	49.51
37	D30	781.74	784.81	3.07	781.74	0.00	784.81	0.00	0.00	24.83
38	D300	778.58	784.16	5.58	778.58	0.00	784.16	0.00	0.00	48.96
39	D301	777.60	782.42	4.82	777.60	0.00	782.42	0.00	0.00	33.85
40	D302	777.06	782.16	5.10	777.06	0.00	782.16	0.00	0.00	31.24
41	D303	776.64	782.16	5.53	776.64	0.00	782.16	0.00	0.00	36.32
42	D304	776.22	783.56	7.34	776.22	0.00	783.56	0.00	0.00	58.07
43	D305	775.80	782.16	6.37	775.80	0.00	782.16	0.00	0.00	40.38
44	D306	775.45	781.71	6.26	775.45	0.00	781.71	0.00	0.00	39.10
45	D307	775.26	781.71	6.45	775.26	0.00	781.71	0.00	0.00	41.39
46	D308	774.93	781.17	6.23	774.93	0.00	781.17	0.00	0.00	38.80
47	D309	773.99	780.25	6.26	773.99	0.00	780.25	0.00	0.00	39.16
48	D31	782.21	783.88	1.67	782.21	0.00	783.88	0.00	0.00	8.00
49	D312	777.89	783.92	6.02	777.89	0.00	783.92	0.00	0.00	54.28
50	D313	777.67	782.83	5.16	777.67	0.00	782.83	0.00	0.00	37.92
51	D314	777.06	781.63	4.57	777.06	0.00	781.63	0.00	0.00	30.82
52	D315	776.64	781.64	5.01	776.64	0.00	781.64	0.00	0.00	30.07
53	D316	776.22	784.29	8.08	776.22	0.00	784.29	0.00	0.00	66.91
54	D317	775.80	782.89	7.10	775.80	0.00	782.89	0.00	0.00	55.15
55	D318	775.45	781.74	6.29	775.45	0.00	781.74	0.00	0.00	45.48
56	D319	775.26	781.60	6.35	775.26	0.00	781.60	0.00	0.00	40.15
57	D320	774.93	780.62	5.68	774.93	0.00	780.62	0.00	0.00	32.18
58	D321	773.99	780.50	6.51	773.99	0.00	780.50	0.00	0.00	42.16
59	D324	778.58	783.17	4.59	778.58	0.00	783.17	0.00	0.00	37.05
60	D325	777.60	782.70	5.09	777.60	0.00	782.70	0.00	0.00	37.09
61	D326	777.06	782.42	5.36	777.06	0.00	782.42	0.00	0.00	34.36
62	D327	776.64	782.41	5.78	776.64	0.00	782.41	0.00	0.00	39.33
63	D328	776.11	784.01	7.90	776.11	0.00	784.01	0.00	0.00	58.83
64	D329	775.80	782.41	6.62	775.80	0.00	782.41	0.00	0.00	43.41
65	D330	775.45	781.96	6.51	775.45	0.00	781.96	0.00	0.00	42.15

Junction Input

SN	Element ID	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Ground/Rim (Max) Offset (ft)	Initial Water Elevation (ft)	Initial Water Depth (ft)	Surcharge Elevation (ft)	Surcharge Depth (ft)	Ponded Area (ft^2)	Minimum Pipe Cover (in)
66	D331	775.26	781.96	6.71	775.26	0.00	781.96	0.00	0.00	44.49
67	D332	774.93	781.43	6.49	774.93	0.00	781.43	0.00	0.00	35.91
68	D333	773.99	781.05	7.06	773.99	0.00	781.05	0.00	0.00	42.76
69	D336	777.88	782.65	4.77	777.88	0.00	782.65	0.00	0.00	39.20
70	D337	776.97	784.46	7.50	776.97	0.00	784.46	0.00	0.00	65.96
71	D338	776.55	784.81	8.27	776.55	0.00	784.81	0.00	0.00	69.20
72	D339	775.71	784.10	8.39	775.71	0.00	784.10	0.00	0.00	64.74
73	D340	775.29	783.75	8.46	775.29	0.00	783.75	0.00	0.00	65.56
74	D341	774.87	783.40	8.53	774.87	0.00	783.40	0.00	0.00	66.40
75	D342	774.47	782.75	8.28	774.47	0.00	782.75	0.00	0.00	63.35
76	D343	773.90	782.05	8.15	773.90	0.00	782.05	0.00	0.00	61.83
77	D345	779.73	785.41	5.68	779.73	0.00	785.41	0.00	0.00	38.22
78	D346	781.32	784.99	3.66	781.32	0.00	784.99	0.00	0.00	31.93
79	D347	780.29	784.75	4.46	780.29	0.00	784.75	0.00	0.00	41.48
80	D348	777.69	784.87	7.18	777.69	0.00	784.87	0.00	0.00	50.13
81	D349	777.23	785.46	8.22	777.23	0.00	785.46	0.00	0.00	68.69
82	D350	775.85	784.95	9.10	775.85	0.00	784.95	0.00	0.00	73.15
83	D355	773.78	782.92	9.14	773.78	0.00	782.92	0.00	0.00	67.63
84	D356	774.46	784.16	9.71	774.46	0.00	784.16	0.00	0.00	74.48
85	D4	771.38	772.90	1.52	771.38	0.00	772.90	0.00	0.00	0.00
86	D6	772.21	773.46	1.25	772.21	0.00	773.46	0.00	0.00	0.00
87	D900	774.94	782.05	7.10	774.94	0.00	782.05	0.00	0.00	37.23
88	D904	774.24	786.22	11.98	774.24	0.00	786.22	0.00	0.00	95.75
89	D905	775.94	779.36	3.42	775.94	0.00	779.36	0.00	0.00	5.00
90	D906	773.50	776.92	3.42	773.50	0.00	776.92	0.00	0.00	5.00
91	D907	773.50	776.92	3.42	773.50	0.00	776.92	0.00	0.00	5.00
92	D910	772.52	776.48	3.96	772.52	0.00	776.48	0.00	0.00	5.50
93	D911	772.50	776.46	3.96	772.50	0.00	776.46	0.00	0.00	5.50

Junction Results

SN	Element ID	Peak Inflow (cfs)	Peak Lateral Inflow (cfs)	Max HGL Elevation Attained (ft)	Max HGL Depth Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Average HGL Elevation Attained (ft)	Average HGL Depth Attained (ft)	Time of Max HGL Occurrence (days hh:mm)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	D1	0.00	0.00	770.95	0.00	0.00	3.83	770.95	0.00	0 00:00	0 00:00	0.00	0.00
2	D10	5.28	2.93	774.34	0.93	0.00	2.42	773.41	0.00	0 00:05	0 00:00	0.00	0.00
3	D109	89.05	2.41	774.57	3.11	0.00	4.54	771.57	0.11	0 00:06	0 00:00	0.00	0.00
4	D11	2.46	2.46	774.49	0.80	0.00	1.90	773.70	0.01	0 00:05	0 00:00	0.00	0.00
5	D111	17.55	16.42	778.88	1.78	0.00	7.72	778.48	1.38	0 00:05	0 00:00	0.00	0.00
6	D112	31.21	31.21	774.48	1.78	0.00	2.52	772.71	0.01	0 00:05	0 00:00	0.00	0.00
7	D113	31.70	0.73	774.25	1.87	0.00	4.04	772.49	0.11	0 00:05	0 00:00	0.00	0.00
8	D114	1.23	1.23	780.00	0.41	0.00	6.44	779.59	0.00	0 00:05	0 00:00	0.00	0.00
9	D115	38.73	38.73	776.91	2.16	0.00	1.34	774.76	0.01	0 00:05	0 00:00	0.00	0.00
10	D116	4.41	4.41	779.56	0.76	0.00	4.05	778.80	0.00	0 00:05	0 00:00	0.00	0.00
11	D117	7.33	3.08	778.54	1.00	0.00	5.07	777.79	0.25	0 00:05	0 00:00	0.00	0.00
12	D118	8.48	1.34	777.12	1.02	0.00	5.91	776.10	0.00	0 00:05	0 00:00	0.00	0.00
13	D119	12.13	4.30	775.04	1.01	0.00	3.41	774.04	0.01	0 00:05	0 00:00	0.00	0.00
14	D120	20.12	3.10	776.65	1.47	0.00	7.66	775.18	0.00	0 00:05	0 00:00	0.00	0.00
15	D121	22.30	3.70	777.16	1.68	0.00	6.53	775.59	0.11	0 00:05	0 00:00	0.00	0.00
16	D122	24.67	2.71	776.18	1.54	0.00	7.40	774.75	0.11	0 00:05	0 00:00	0.00	0.00
17	D123	25.35	0.91	775.09	1.63	0.00	7.71	773.57	0.11	0 00:05	0 00:00	0.00	0.00
18	D124	27.02	2.09	774.34	1.66	0.00	6.49	772.79	0.11	0 00:06	0 00:00	0.00	0.00
19	D125	43.77	3.66	773.92	2.29	0.00	4.53	772.64	1.01	0 00:06	0 00:00	0.00	0.00
20	D127	63.47	1.64	774.71	2.72	0.00	6.76	772.01	0.02	0 00:06	0 00:00	0.00	0.00
21	D128	2.16	2.16	774.89	0.62	0.00	3.36	774.27	0.00	0 00:05	0 00:00	0.00	0.00
22	D129	38.33	1.87	775.92	2.15	0.00	10.14	773.78	0.01	0 00:05	0 00:00	0.00	0.00
23	D13	1.08	0.66	776.29	1.63	0.00	4.18	776.01	1.35	0 00:05	0 00:00	0.00	0.00
24	D130	63.06	8.83	775.59	2.71	0.00	4.74	773.89	1.01	0 00:05	0 00:00	0.00	0.00
25	D14	0.44	0.44	776.57	0.28	0.00	3.41	776.29	0.00	0 00:05	0 00:00	0.00	0.00
26	D18	4.78	2.72	776.50	0.95	0.00	5.11	775.95	0.40	0 00:05	0 00:00	0.00	0.00
27	D19	2.11	2.11	777.07	0.56	0.00	3.22	776.51	0.00	0 00:05	0 00:00	0.00	0.00
28	D200	15.74	7.12	778.36	1.36	0.00	7.99	777.11	0.11	0 00:05	0 00:00	0.00	0.00
29	D201	19.04	3.45	778.16	1.59	0.00	8.61	776.68	0.11	0 00:05	0 00:00	0.00	0.00
30	D202	8.19	8.19	778.09	0.79	0.00	8.13	777.30	0.00	0 00:05	0 00:00	0.00	0.00
31	D203	9.06	9.06	779.26	1.22	0.00	4.61	778.05	0.01	0 00:05	0 00:00	0.00	0.00
32	D21	1.66	0.91	779.96	4.41	0.00	3.76	779.64	4.09	0 00:05	0 00:00	0.00	0.00
33	D22	0.78	0.78	780.52	0.32	0.00	3.20	780.20	0.00	0 00:05	0 00:00	0.00	0.00
34	D24	2.91	1.80	781.19	4.91	0.00	2.98	780.71	4.43	0 00:05	0 00:00	0.00	0.00
35	D25	1.18	1.18	781.54	0.48	0.00	2.92	781.07	0.01	0 00:05	0 00:00	0.00	0.00
36	D29	3.68	1.15	782.02	4.55	0.00	4.61	781.50	4.03	0 00:05	0 00:00	0.00	0.00
37	D30	1.53	1.53	782.31	0.57	0.00	2.50	781.74	0.00	0 00:05	0 00:00	0.00	0.00
38	D300	8.96	8.96	779.65	1.07	0.00	4.51	778.59	0.01	0 00:05	0 00:00	0.00	0.00
39	D301	10.96	2.18	779.07	1.47	0.00	3.36	777.63	0.03	0 00:05	0 00:00	0.00	0.00
40	D302	14.76	4.58	778.54	1.48	0.00	3.62	777.06	0.00	0 00:05	0 00:00	0.00	0.00
41	D303	19.36	5.56	778.43	1.79	0.00	3.74	776.65	0.01	0 00:05	0 00:00	0.00	0.00
42	D304	20.74	1.83	778.11	1.89	0.00	5.44	776.23	0.01	0 00:06	0 00:00	0.00	0.00
43	D305	22.84	2.96	777.69	1.89	0.00	4.48	775.81	0.01	0 00:06	0 00:00	0.00	0.00
44	D306	24.86	2.92	777.27	1.82	0.00	4.44	775.46	0.01	0 00:06	0 00:00	0.00	0.00
45	D307	26.49	2.37	777.15	1.89	0.00	4.56	775.27	0.01	0 00:06	0 00:00	0.00	0.00
46	D308	31.20	6.99	777.07	2.14	0.00	4.10	774.95	0.02	0 00:06	0 00:00	0.00	0.00
47	D309	35.55	7.73	776.38	2.39	0.00	3.87	774.00	0.01	0 00:07	0 00:00	0.00	0.00
48	D31	1.09	1.09	782.59	0.38	0.00	1.29	782.21	0.00	0 00:05	0 00:00	0.00	0.00
49	D312	5.19	5.19	779.01	1.12	0.00	4.91	777.90	0.01	0 00:05	0 00:00	0.00	0.00
50	D313	7.99	3.00	778.84	1.17	0.00	3.99	777.67	0.00	0 00:05	0 00:00	0.00	0.00
51	D314	12.33	5.21	778.69	1.63	0.00	2.94	777.06	0.00	0 00:05	0 00:00	0.00	0.00
52	D315	16.76	5.38	778.25	1.61	0.00	3.39	776.65	0.01	0 00:06	0 00:00	0.00	0.00
53	D316	18.13	1.78	777.92	1.70	0.00	6.37	776.23	0.01	0 00:06	0 00:00	0.00	0.00
54	D317	20.23	2.87	777.65	1.85	0.00	5.24	775.81	0.01	0 00:06	0 00:00	0.00	0.00
55	D318	22.22	2.83	777.48	2.03	0.00	4.27	775.46	0.01	0 00:06	0 00:00	0.00	0.00
56	D319	23.81	2.29	777.28	2.02	0.00	4.32	775.27	0.01	0 00:06	0 00:00	0.00	0.00
57	D320	28.30	6.48	776.92	1.99	0.00	3.70	774.95	0.02	0 00:06	0 00:00	0.00	0.00
58	D321	30.81	4.67	776.10	2.11	0.00	4.40	774.00	0.01	0 00:07	0 00:00	0.00	0.00
59	D324	5.92	5.92	779.60	1.02	0.00	3.58	778.59	0.01	0 00:05	0 00:00	0.00	0.00
60	D325	10.48	4.82	779.10	1.50	0.00	3.59	778.11	0.51	0 00:05	0 00:00	0.00	0.00
61	D326	15.55	5.92	778.59	1.53	0.00	3.83	777.06	0.00	0 00:05	0 00:00	0.00	0.00
62	D327	21.51	7.04	778.60	1.96	0.00	3.82	776.65	0.01	0 00:05	0 00:00	0.00	0.00
63	D328	23.23	2.32	778.06	1.95	0.00	5.95	776.12	0.01	0 00:06	0 00:00	0.00	0.00
64	D329	26.06	3.75	777.67	1.87	0.00	4.74	775.81	0.01	0 00:06	0 00:00	0.00	0.00

Junction Results

SN	Element ID	Peak Inflow (cfs)	Peak Lateral Inflow (cfs)	Max HGL Elevation Attained (ft)	Max HGL Depth Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Average HGL Elevation Attained (ft)	Average HGL Depth Attained (ft)	Time of Max HGL Occurrence (days hh:mm)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
65	D330	28.74	3.70	777.46	2.01	0.00	4.51	775.46	0.01	0 00:06	0 00:00	0.00	0.00
66	D331	30.90	3.00	777.37	2.11	0.00	4.59	775.27	0.01	0 00:06	0 00:00	0.00	0.00
67	D332	36.90	8.47	777.05	2.12	0.00	4.38	774.95	0.02	0 00:06	0 00:00	0.00	0.00
68	D333	40.47	6.11	776.22	2.23	0.00	4.83	774.00	0.01	0 00:06	0 00:00	0.00	0.00
69	D336	6.20	6.20	778.93	1.05	0.00	3.72	777.89	0.01	0 00:05	0 00:00	0.00	0.00
70	D337	11.67	6.02	778.51	1.54	0.00	5.95	776.98	0.01	0 00:05	0 00:00	0.00	0.00
71	D338	19.63	8.94	778.36	1.81	0.00	6.46	776.56	0.01	0 00:05	0 00:00	0.00	0.00
72	D339	22.65	4.22	777.49	1.78	0.00	6.61	775.72	0.01	0 00:06	0 00:00	0.00	0.00
73	D340	24.73	2.86	777.10	1.81	0.00	6.65	775.30	0.01	0 00:06	0 00:00	0.00	0.00
74	D341	26.55	2.71	776.77	1.90	0.00	6.64	774.88	0.01	0 00:06	0 00:00	0.00	0.00
75	D342	28.51	3.18	776.46	1.99	0.00	6.29	774.48	0.01	0 00:06	0 00:00	0.00	0.00
76	D343	30.27	3.21	775.98	2.08	0.00	6.07	773.91	0.01	0 00:07	0 00:00	0.00	0.00
77	D345	16.22	14.06	780.89	1.16	0.00	4.52	780.23	0.50	0 00:05	0 00:00	0.00	0.00
78	D346	2.31	2.31	781.91	0.59	0.00	3.07	781.33	0.01	0 00:05	0 00:00	0.00	0.00
79	D347	2.75	2.75	780.95	0.66	0.00	3.80	780.29	0.00	0 00:05	0 00:00	0.00	0.00
80	D348	19.80	1.42	779.84	2.15	0.00	5.03	779.19	1.50	0 00:05	0 00:00	0.00	0.00
81	D349	21.27	1.62	778.60	1.37	0.00	6.86	777.24	0.01	0 00:05	0 00:00	0.00	0.00
82	D350	26.16	5.59	777.72	1.87	0.00	7.23	776.36	0.51	0 00:05	0 00:00	0.00	0.00
83	D355	37.04	2.34	775.58	1.80	0.00	7.34	773.79	0.01	0 00:05	0 00:00	0.00	0.00
84	D356	35.13	1.96	776.41	1.95	0.00	7.76	775.62	1.16	0 00:05	0 00:00	0.00	0.00
85	D4	9.64	5.12	772.50	1.12	0.00	0.88	771.39	0.01	0 00:05	0 00:00	0.00	0.00
86	D6	4.61	4.61	772.90	0.69	0.00	0.56	772.21	0.00	0 00:05	0 00:00	0.00	0.00
87	D900	80.60	80.60	777.88	2.94	0.00	4.17	774.97	0.03	0 00:10	0 00:00	0.00	0.00
88	D904	79.78	0.00	777.15	2.91	0.00	9.07	775.03	0.79	0 00:10	0 00:00	0.00	0.00
89	D905	0.00	0.00	775.94	0.00	0.00	3.42	775.94	0.00	0 00:00	0 00:00	0.00	0.00
90	D906	0.00	0.00	773.50	0.00	0.00	3.42	773.50	0.00	0 00:00	0 00:00	0.00	0.00
91	D907	0.00	0.00	773.50	0.00	0.00	3.42	773.50	0.00	0 00:00	0 00:00	0.00	0.00
92	D910	0.00	0.00	772.52	0.00	0.00	3.96	772.52	0.00	0 00:00	0 00:00	0.00	0.00
93	D911	0.00	0.00	772.50	0.00	0.00	3.96	772.50	0.00	0 00:00	0 00:00	0.00	0.00

Pipe Input

SN	Element ID	Length (ft)	Inlet Invert Elevation (ft)	Inlet Invert Offset (ft)	Outlet Invert Elevation (ft)	Outlet Invert Offset (ft)	Total Drop (ft)	Average Slope (%)	Pipe Shape	Pipe Diameter or Height (in)	Pipe Width (in)	Manning's Roughness	Entrance Losses	Exit/Bend Losses	Additional Losses	Initial Flow (cfs)	Flap Gate	No. of Barrels
1	D109 TO D110	151.50	771.46	0.00	771.00	0.00	0.46	0.3000	CIRCULAR	54.000	54.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
2	D111 TO D120	192.94	777.10	0.00	775.18	0.00	1.93	1.0000	CIRCULAR	24.000	24.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
3	D112 TO D113	44.54	772.70	0.00	772.48	0.10	0.22	0.5000	CIRCULAR	36.000	36.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
4	D113 TO D109	164.47	772.38	0.00	771.56	0.10	0.82	0.5000	CIRCULAR	36.000	36.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
5	D114 TO D111	110.87	779.59	0.00	778.48	1.38	1.11	1.0000	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
6	D115 TO D129	326.39	774.75	0.00	773.77	0.00	0.98	0.3000	CIRCULAR	42.000	42.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
7	D116 TO D117	101.09	778.80	0.00	777.79	0.25	1.01	1.0000	CIRCULAR	15.000	15.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
8	D117 TO D118	144.27	777.54	0.00	776.10	0.00	1.44	1.0000	CIRCULAR	18.000	18.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
9	D118 TO D119	206.59	776.10	0.00	774.03	0.00	2.07	1.0000	CIRCULAR	18.000	18.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
10	D119 TO D125	120.00	773.53	-0.50	772.33	0.70	1.20	1.0000	CIRCULAR	24.000	24.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
11	D120 TO D130	129.36	775.18	0.00	773.88	1.00	1.29	1.0000	CIRCULAR	24.000	24.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
12	D121 TO D122	98.40	775.48	0.00	774.74	0.10	0.74	0.7500	CIRCULAR	30.000	30.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
13	D122 TO D123	144.30	774.64	0.00	773.56	0.10	1.08	0.7500	CIRCULAR	30.000	30.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
14	D123 TO D124	90.01	773.46	0.00	772.78	0.10	0.68	0.7500	CIRCULAR	30.000	30.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
15	D124 TO D125	126.67	772.68	0.00	771.73	0.10	0.95	0.7500	CIRCULAR	30.000	30.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
16	D125 TO D126	126.50	771.63	0.00	771.00	0.00	0.63	0.5000	CIRCULAR	36.000	36.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
17	D127 TO D109	178.44	771.99	0.00	771.46	0.00	0.54	0.3000	CIRCULAR	48.000	48.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
18	D128 TO D125	217.34	774.27	0.00	772.64	1.01	1.63	0.7500	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
19	D129 TO D130	294.71	773.77	0.00	772.88	0.00	0.89	0.3000	CIRCULAR	42.000	42.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
20	D130 TO D127	295.68	772.88	0.00	771.99	0.00	0.89	0.3000	CIRCULAR	48.000	48.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
21	D200 TO D201	43.89	777.00	0.00	776.67	0.10	0.33	0.7500	CIRCULAR	24.000	24.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
22	D201 TO D121	132.26	776.57	0.00	775.58	0.10	0.99	0.7500	CIRCULAR	24.000	24.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
23	D202 TO D356	84.01	777.30	0.00	775.62	1.16	1.68	2.0000	CIRCULAR	18.000	18.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
24	D203 TO D200	125.48	778.04	0.00	777.10	0.10	0.94	0.7500	CIRCULAR	18.000	18.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
25	D300 TO D301	96.10	778.58	0.00	777.62	0.02	0.96	1.0000	CIRCULAR	18.000	18.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
26	D301 TO D302	182.50	777.60	0.00	777.06	0.00	0.55	0.3000	CIRCULAR	24.000	24.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
27	D302 TO D303	140.00	777.06	0.00	776.64	0.00	0.42	0.3000	CIRCULAR	30.000	30.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
28	D303 TO D304	140.00	776.64	0.00	776.22	0.00	0.42	0.3000	CIRCULAR	30.000	30.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
29	D304 TO D305	140.00	776.22	0.00	775.80	0.00	0.42	0.3000	CIRCULAR	30.000	30.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
30	D305 TO D306	115.00	775.80	0.00	775.45	0.00	0.35	0.3000	CIRCULAR	36.000	36.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
31	D306 TO D307	65.00	775.45	0.00	775.26	0.00	0.20	0.3000	CIRCULAR	36.000	36.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
32	D307 TO D308	107.50	775.26	0.00	774.93	0.00	0.32	0.3000	CIRCULAR	36.000	36.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
33	D308 TO D309	316.00	774.93	0.00	773.99	0.00	0.95	0.3000	CIRCULAR	36.000	36.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
34	D309 TO D310	162.16	773.99	0.00	773.50	0.00	0.49	0.3000	CIRCULAR	36.000	36.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
35	D312 TO D313	75.35	777.89	0.00	777.67	0.00	0.23	0.3000	CIRCULAR	18.000	18.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
36	D313 TO D314	203.79	777.67	0.00	777.06	0.00	0.61	0.3000	CIRCULAR	24.000	24.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
37	D314 TO D315	140.00	777.06	0.00	776.64	0.00	0.42	0.3000	CIRCULAR	24.000	24.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
38	D315 TO D316	140.00	776.64	0.00	776.22	0.00	0.42	0.3000	CIRCULAR	30.000	30.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
39	D316 TO D317	140.00	776.22	0.00	775.80	0.00	0.42	0.3000	CIRCULAR	30.000	30.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
40	D317 TO D318	115.00	775.80	0.00	775.45	0.00	0.35	0.3000	CIRCULAR	30.000	30.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
41	D318 TO D319	65.00	775.45	0.00	775.26	0.00	0.20	0.3000	CIRCULAR	30.000	30.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
42	D319 TO D320	107.50	775.26	0.00	774.93	0.00	0.32	0.3000	CIRCULAR	36.000	36.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
43	D320 TO D321	316.00	774.93	0.00	773.99	0.00	0.95	0.3000	CIRCULAR	36.000	36.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
44	D321 TO D322	162.16	773.99	0.00	773.50	0.00	0.49	0.3000	CIRCULAR	36.000	36.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
45	D324 TO D325	96.10	778.58	0.00	778.10	0.50	0.48	0.5000	CIRCULAR	18.000	18.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
46	D325 TO D326	182.50	777.60	0.00	777.06	0.00	0.55	0.3000	CIRCULAR	24.000	24.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
47	D326 TO D327	140.00	777.06	0.00	776.64	0.00	0.42	0.3000	CIRCULAR	30.000	30.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
48	D327 TO D328	175.00	776.64	0.00	776.11	0.00	0.52	0.3000	CIRCULAR	30.000	30.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
49	D328 TO D329	105.00	776.11	0.00	775.80	0.00	0.31	0.3000	CIRCULAR	36.000	36.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
50	D329 TO D330	115.00	775.80	0.00	775.45	0.00	0.35	0.3000	CIRCULAR	36.000	36.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
51	D330 TO D331	65.00	775.45	0.00	775.26	0.00	0.20	0.3000	CIRCULAR	36.000	36.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
52	D331 TO D332	107.50	775.26	0.00	774.93	0.00	0.32	0.3000	CIRCULAR	36.000	36.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
53	D332 TO D333	316.00	774.93	0.00	773.99	0.00	0.95	0.3000	CIRCULAR	42.000	42.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
54	D333 TO D334	162.16	773.99	0.00	773.50	0.00	0.49	0.3000	CIRCULAR	42.000	42.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
55	D336 TO D337	182.82	777.88	0.00	776.97	0.00	0.91	0.5000	CIRCULAR	18.000	18.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
56	D337 TO D338	140.00	776.97	0.00	776.55	0.00	0.42	0.3000	CIRCULAR	24.000	24.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
57	D338 TO D339	280.00	776.55	0.00	775.71	0.00	0.84	0.3000	CIRCULAR	30.000	30.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
58	D339 TO D340	140.00	775.71	0.00	775.29	0.00	0.42	0.3000	CIRCULAR	36.000	36.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
59	D340 TO D341	140.00	775.29	0.00	774.87	0.00	0.42	0.3000	CIRCULAR	36.000	36.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
60	D341 TO D342	132.50	774.87	0.00	774.47	0.00	0.40	0.3000	CIRCULAR	36.000	36.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
61	D342 TO D343	191.00	774.47	0.00	773.90	0.00	0.57	0.3000	CIRCULAR	36.000	36.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
62	D343 TO D344	132.49	773.90	0.00	773.50	0.00	0.40	0.3000	CIRCULAR	36.000	36.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
63	D345 TO D348	192.00	779.73	0.00	778.19	0.50	1.54	0.8000	CIRCULAR	30.000	30.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
64	D346 TO D345	110.00	781.32	0.00	780.22	0.50	1.10	1.0000	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
65	D347 TO D348	109.94	780.29	0.00	779.19	1.50	1.10	1.0000	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1

Pipe Input

SN	Element ID	Length (ft)	Inlet Invert Elevation (ft)	Inlet Invert Offset (ft)	Outlet Invert Elevation (ft)	Outlet Invert Offset (ft)	Total Drop (ft)	Average Slope (%)	Pipe Shape	Pipe Diameter or Height (in)	Pipe Width (in)	Manning's Roughness	Entrance Losses	Exit/Bend Losses	Additional Losses	Initial Flow (cfs)	Flap Gate	No. of Barrels
66	D348 TO D349	57.06	777.69	0.00	777.23	0.00	0.46	0.8000	CIRCULAR	30.000	30.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
67	D349 TO D350	110.00	777.23	0.00	776.35	0.50	0.88	0.8000	CIRCULAR	30.000	30.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
68	D350 TO D356	120.00	775.85	0.00	774.89	0.44	0.96	0.8000	CIRCULAR	36.000	36.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
69	D355 TO D354	56.70	773.78	0.00	773.50	0.00	0.28	0.5000	CIRCULAR	42.000	42.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
70	D356 TO D355	134.48	774.46	0.00	773.78	0.00	0.67	0.5000	CIRCULAR	42.000	42.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
71	D900 TO D904	175.29	774.94	0.00	774.24	0.00	0.70	0.4000	CIRCULAR	48.000	48.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
72	D904 TO D903	185.55	774.24	0.00	773.50	0.00	0.74	0.4000	CIRCULAR	48.000	48.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
73	D905 TO D904	92.59	775.94	0.00	775.02	0.78	0.93	1.0000	CIRCULAR	36.000	36.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
74	D906 TO D908	195.02	773.50	0.00	772.83	0.00	0.67	0.3400	CIRCULAR	36.000	36.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
75	D907 TO D909	194.94	773.50	0.00	772.83	0.00	0.67	0.3400	CIRCULAR	36.000	36.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
76	D910 TO D912	258.62	772.52	0.00	771.00	0.00	1.52	0.5900	CIRCULAR	42.000	42.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
77	D911 TO D913	258.78	772.50	0.00	771.00	0.00	1.50	0.5800	CIRCULAR	42.000	42.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
78	PIPE D10	103.09	775.55	0.00	774.00	0.00	1.55	1.5000	CIRCULAR	15.000	15.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
79	PIPE D11	55.92	776.51	0.00	775.95	0.41	0.56	1.0000	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
80	PIPE D12	103.17	775.55	0.00	774.00	0.00	1.55	1.5000	CIRCULAR	15.000	15.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
81	PIPE D13	55.93	780.20	0.00	779.64	4.10	0.56	1.0000	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
82	PIPE D14	88.78	776.28	0.00	774.50	0.00	1.78	2.0000	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
83	PIPE D15	70.43	781.06	0.00	780.71	4.44	0.35	0.5000	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
84	PIPE D16	55.01	777.47	0.00	776.90	0.00	0.57	1.0400	CIRCULAR	15.000	15.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
85	PIPE D17	58.24	781.74	0.00	781.46	3.98	0.28	0.4800	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
86	PIPE D2	76.01	771.38	0.00	771.00	0.00	0.38	0.5000	CIRCULAR	24.000	24.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
87	PIPE D3	55.52	772.21	0.00	771.38	0.00	0.83	1.4900	CIRCULAR	15.000	15.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
88	PIPE D5	81.00	773.41	0.00	773.00	0.00	0.41	0.5000	CIRCULAR	18.000	18.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
89	PIPE D6	57.80	773.69	0.00	773.41	0.00	0.29	0.5000	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
90	PIPE D7	83.06	774.66	0.00	773.00	0.00	1.66	2.0000	CIRCULAR	15.000	15.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
91	PIPE D8	55.87	776.29	0.00	776.01	1.35	0.28	0.5000	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
92	PIPE-33	71.16	782.21	0.00	781.50	4.03	0.71	1.0000	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
93	PIPE-D2	116.38	770.95	0.00	770.39	0.00	0.56	0.4800	CIRCULAR	36.000	36.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1

Pipe Results

SN	Element ID	Peak Flow (cfs)	Time of Peak Flow Occurrence (days hh:mm)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)	Travel Time (min)	Peak Flow Depth (ft)	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged (min)	Froude Number	Reported Condition
1	D109 TO D110	88.84	0 00:06	107.84	0.82	7.66	0.33	3.11	0.69	0.00		Calculated
2	D111 TO D120	17.17	0 00:05	22.62	0.76	8.22	0.39	1.30	0.65	0.00		Calculated
3	D112 TO D113	30.98	0 00:05	47.16	0.66	8.09	0.09	1.77	0.59	0.00		Calculated
4	D113 TO D109	31.13	0 00:05	47.16	0.66	7.24	0.38	1.77	0.59	0.00		Calculated
5	D114 TO D111	1.19	0 00:05	3.56	0.33	6.35	0.29	0.40	0.40	0.00		Calculated
6	D115 TO D129	36.66	0 00:05	55.18	0.66	11.14	0.49	2.07	0.59	0.00		Calculated
7	D116 TO D117	4.34	0 00:05	6.46	0.67	8.07	0.21	0.75	0.60	0.00		Calculated
8	D117 TO D118	7.24	0 00:05	10.50	0.69	6.51	0.37	0.91	0.61	0.00		Calculated
9	D118 TO D119	8.39	0 00:05	10.50	0.80	6.77	0.51	1.01	0.67	0.00		Calculated
10	D119 TO D125	12.12	0 00:05	26.93	0.45	8.39	0.24	0.94	0.47	0.00		Calculated
11	D120 TO D130	20.00	0 00:05	22.62	0.88	8.24	0.26	1.46	0.73	0.00		Calculated
12	D121 TO D122	22.25	0 00:05	35.52	0.63	7.68	0.21	1.43	0.57	0.00		Calculated
13	D122 TO D123	24.57	0 00:05	35.52	0.69	7.89	0.30	1.53	0.61	0.00		Calculated
14	D123 TO D124	25.30	0 00:06	35.52	0.71	7.90	0.19	1.56	0.62	0.00		Calculated
15	D124 TO D125	26.97	0 00:06	35.52	0.76	8.04	0.26	1.63	0.65	0.00		Calculated
16	D125 TO D126	43.70	0 00:06	47.16	0.93	7.69	0.27	2.28	0.76	0.00		Calculated
17	D127 TO D109	63.22	0 00:06	78.78	0.80	7.07	0.42	2.71	0.68	0.00		Calculated
18	D128 TO D125	2.04	0 00:05	3.09	0.66	7.56	0.48	0.59	0.59	0.00		Calculated
19	D129 TO D130	37.36	0 00:06	55.18	0.68	6.35	0.77	2.10	0.60	0.00		Calculated
20	D130 TO D127	62.28	0 00:06	78.78	0.79	7.17	0.69	2.67	0.67	0.00		Calculated
21	D200 TO D201	15.72	0 00:05	19.59	0.80	6.95	0.11	1.36	0.68	0.00		Calculated
22	D201 TO D121	18.90	0 00:05	19.59	0.96	7.24	0.30	1.57	0.79	0.00		Calculated
23	D202 TO D356	8.11	0 00:05	14.86	0.55	10.73	0.13	0.79	0.53	0.00		Calculated
24	D203 TO D200	8.86	0 00:05	9.10	0.97	8.98	0.23	1.19	0.79	0.00		Calculated
25	D300 TO D301	8.84	0 00:05	10.50	0.84	9.24	0.17	1.05	0.70	0.00		Calculated
26	D301 TO D302	10.67	0 00:05	12.39	0.86	4.71	0.65	1.42	0.71	0.00		Calculated
27	D302 TO D303	14.64	0 00:06	22.47	0.65	4.96	0.47	1.47	0.59	0.00		Calculated
28	D303 TO D304	19.28	0 00:06	22.47	0.86	5.26	0.44	1.78	0.71	0.00		Calculated
29	D304 TO D305	20.65	0 00:06	22.47	0.92	5.32	0.44	1.88	0.75	0.00		Calculated
30	D305 TO D306	22.79	0 00:06	36.53	0.62	5.50	0.35	1.72	0.57	0.00		Calculated
31	D306 TO D307	24.84	0 00:06	36.53	0.68	5.57	0.19	1.81	0.60	0.00		Calculated
32	D307 TO D308	26.45	0 00:06	36.53	0.72	5.68	0.32	1.89	0.63	0.00		Calculated
33	D308 TO D309	31.01	0 00:07	36.53	0.85	6.11	0.86	2.11	0.70	0.00		Calculated
34	D309 TO D310	35.47	0 00:07	36.53	0.97	6.05	0.45	2.38	0.79	0.00		Calculated
35	D312 TO D313	5.09	0 00:05	5.75	0.88	5.51	0.23	1.09	0.73	0.00		Calculated
36	D313 TO D314	7.73	0 00:05	12.39	0.62	4.32	0.79	1.14	0.57	0.00		Calculated
37	D314 TO D315	12.23	0 00:06	12.39	0.99	4.66	0.50	1.61	0.80	0.00		Calculated
38	D315 TO D316	16.71	0 00:06	22.47	0.74	5.09	0.46	1.60	0.64	0.00		Calculated
39	D316 TO D317	18.08	0 00:06	22.47	0.80	5.19	0.45	1.70	0.68	0.00		Calculated
40	D317 TO D318	20.20	0 00:06	22.47	0.90	5.26	0.36	1.85	0.74	0.00		Calculated
41	D318 TO D319	22.20	0 00:06	22.47	0.99	5.27	0.21	2.02	0.81	0.00		Calculated
42	D319 TO D320	23.79	0 00:06	36.53	0.65	5.54	0.32	1.76	0.59	0.00		Calculated
43	D320 TO D321	28.03	0 00:07	36.53	0.77	5.96	0.88	1.96	0.65	0.00		Calculated
44	D321 TO D322	30.74	0 00:07	36.53	0.84	5.89	0.46	2.11	0.70	0.00		Calculated
45	D324 TO D325	5.81	0 00:05	7.43	0.78	6.91	0.23	0.99	0.66	0.00		Calculated
46	D325 TO D326	10.23	0 00:05	12.39	0.83	4.57	0.67	1.38	0.69	0.00		Calculated
47	D326 TO D327	15.43	0 00:05	22.47	0.69	5.01	0.47	1.52	0.61	0.00		Calculated
48	D327 TO D328	21.38	0 00:06	22.47	0.95	5.39	0.54	1.94	0.78	0.00		Calculated
49	D328 TO D329	23.19	0 00:06	36.53	0.63	5.51	0.32	1.73	0.58	0.00		Calculated
50	D329 TO D330	26.01	0 00:06	36.53	0.71	5.67	0.34	1.87	0.62	0.00		Calculated
51	D330 TO D331	28.72	0 00:06	36.53	0.79	5.75	0.19	2.00	0.67	0.00		Calculated
52	D331 TO D332	30.86	0 00:06	36.53	0.84	5.86	0.31	2.11	0.70	0.00		Calculated
53	D332 TO D333	36.63	0 00:07	55.11	0.66	6.35	0.83	2.08	0.59	0.00		Calculated
54	D333 TO D334	40.38	0 00:07	55.11	0.73	6.34	0.43	2.22	0.64	0.00		Calculated
55	D336 TO D337	5.98	0 00:05	7.43	0.81	7.99	0.38	1.01	0.68	0.00		Calculated
56	D337 TO D338	11.52	0 00:05	12.39	0.93	4.61	0.51	1.52	0.76	0.00		Calculated
57	D338 TO D339	19.25	0 00:06	22.47	0.86	5.40	0.86	1.77	0.71	0.00		Calculated
58	D339 TO D340	22.56	0 00:06	36.53	0.62	5.50	0.42	1.70	0.57	0.00		Calculated
59	D340 TO D341	24.63	0 00:06	36.53	0.67	5.62	0.42	1.80	0.60	0.00		Calculated
60	D341 TO D342	26.43	0 00:06	36.53	0.72	5.70	0.39	1.89	0.63	0.00		Calculated
61	D342 TO D343	28.39	0 00:07	36.53	0.78	5.84	0.55	1.98	0.66	0.00		Calculated
62	D343 TO D344	30.22	0 00:07	36.53	0.83	5.86	0.38	2.08	0.69	0.00		Calculated
63	D345 TO D348	15.79	0 00:05	36.69	0.43	7.31	0.44	1.14	0.46	0.00		Calculated
64	D346 TO D345	2.26	0 00:05	3.56	0.63	7.22	0.25	0.58	0.58	0.00		Calculated

Pipe Results

SN	Element ID	Peak Flow (cfs)	Time of Peak Flow Occurrence (days hh:mm)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)	Travel Time (min)	Peak Flow Depth (ft)	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged (min)	Froude Number	Reported Condition
65	D347 TO D348	2.69	0 00:05	3.56	0.75	7.53	0.24	0.65	0.65	0.00		Calculated
66	D348 TO D349	19.78	0 00:05	36.69	0.54	7.63	0.12	1.31	0.52	0.00		Calculated
67	D349 TO D350	21.17	0 00:05	36.69	0.58	7.80	0.24	1.36	0.54	0.00		Calculated
68	D350 TO D356	26.08	0 00:05	59.66	0.44	8.22	0.24	1.39	0.46	0.00		Calculated
69	D355 TO D354	37.01	0 00:06	71.14	0.52	7.48	0.13	1.79	0.51	0.00		Calculated
70	D356 TO D355	35.06	0 00:05	71.14	0.49	7.44	0.30	1.73	0.50	0.00		Calculated
71	D900 TO D904	79.78	0 00:10	90.85	0.88	10.64	0.27	2.90	0.73	0.00		Calculated
72	D904 TO D903	79.32	0 00:10	90.85	0.87	8.22	0.38	2.89	0.72	0.00		Calculated
73	D905 TO D904	0.00	0 00:00	66.70	0.00	0.00		0.00	0.00	0.00		Calculated
74	D906 TO D908	0.00	0 00:00	39.09	0.00	0.00		0.00	0.00	0.00		Calculated
75	D907 TO D909	0.00	0 00:00	39.10	0.00	0.00		0.00	0.00	0.00		Calculated
76	D910 TO D912	0.00	0 00:00	77.13	0.00	0.00		0.00	0.00	0.00		Calculated
77	D911 TO D913	0.00	0 00:00	76.60	0.00	0.00		0.00	0.00	0.00		Calculated
78	PIPE D10	4.74	0 00:05	7.91	0.60	6.80	0.25	0.70	0.56	0.00		Calculated
79	PIPE D11	2.09	0 00:05	3.56	0.59	6.09	0.15	0.55	0.55	0.00		Calculated
80	PIPE D12	1.65	0 00:05	7.91	0.21	5.14	0.33	0.39	0.31	0.00		Calculated
81	PIPE D13	0.77	0 00:05	3.56	0.22	4.96	0.19	0.31	0.31	0.00		Calculated
82	PIPE D14	2.89	0 00:05	5.04	0.57	6.68	0.22	0.54	0.54	0.00		Calculated
83	PIPE D15	1.15	0 00:05	2.52	0.46	4.66	0.25	0.47	0.47	0.00		Calculated
84	PIPE D16	3.67	0 00:05	6.59	0.56	5.54	0.17	0.67	0.53	0.00		Calculated
85	PIPE D17	1.50	0 00:05	2.47	0.61	4.71	0.21	0.56	0.56	0.00		Calculated
86	PIPE D2	9.54	0 00:05	16.00	0.60	5.36	0.24	1.11	0.56	0.00		Calculated
87	PIPE D3	4.57	0 00:05	7.90	0.58	7.98	0.12	0.68	0.55	0.00		Calculated
88	PIPE D5	5.24	0 00:05	7.43	0.70	4.60	0.29	0.93	0.62	0.00		Calculated
89	PIPE D6	2.42	0 00:05	2.52	0.96	5.26	0.18	0.78	0.78	0.00		Calculated
90	PIPE D7	1.07	0 00:05	9.14	0.12	5.01	0.28	0.29	0.23	0.00		Calculated
91	PIPE D8	0.43	0 00:05	2.52	0.17	3.61	0.26	0.28	0.28	0.00		Calculated
92	PIPE-33	1.06	0 00:05	3.56	0.30	5.60	0.21	0.37	0.37	0.00		Calculated
93	PIPE-D2	0.00	0 00:00	46.34	0.00	0.00		0.00	0.00	0.00		Calculated

Appendix G: Complete Master Plan Drainage Report

Malarkey IND
Stormwater Management

3540 Essex Drive
Franklin, Indiana

Drainage Report

Prepared For:
Cooper & Associates
2200 Ellis Drive
New Lenox, IL 60451

Prepared By:
Kimley-Horn and Associates, Inc.
500 East 96th Street, Suite 300
Indianapolis, IN 46240
Phone: (317) 218-9560

Original: July 11th, 2024
Revised: August 9th, 2024

Kimley»Horn

Kimley»Horn

Table of Contents

1.0. Project Summary

Project Name:	Malarkey IND
Location:	3540 Essex Drive, Franklin, Johnson County, Indiana
Type:	Drainage Report
Reviewing Agency:	City of Franklin & Johnson County
Detention Policy:	City of Franklin & Johnson County
Water Quality:	City of Franklin & Johnson County
Water Quantity Modeling:	HydroCAD with SCS Type II & Indianapolis Huff Distribution
Storm Sewer Modeling:	N/A (Future)

Design:

Water Quantity:	Wet Detention Basin
Water Quality:	Wet Detention Basin
Receiving Body:	Graham Arm

2.0. Introduction

Kimley-Horn and Associates, Inc. has been retained by Cooper & Associates LLC to prepare construction documents and provide civil engineering services for the proposed industrial development for Malarkey Roofing Product as the Owner and end user (Project). The Project includes the development of approximately 138 acres of agricultural land to the north and west of Essex Drive in Franklin, Indiana. The project includes the planned construction of an approximately 353,300 SF industrial building with associated drives, parking, rail spur and substantial outdoor product storing spaces. The project also includes a 4,110 LF roadway extension of Essex Drive, connecting to Paul Hand Blvd. The extension will become the east frontage of the Malarkey site and will include sanitary sewer and water main extensions along with three entrances. It is anticipated that this private road will ultimately be shared as the lot(s) to the east develop on its own. 90' right of way will be dedicated to the City for Essex Drive. Utility services will be brought from extended infrastructure off Essex Drive and Paul Hand Blvd where applicable. Stormwater detention and quality measures will be provided in the form of a wet detention pond at the south of the site. The project will be broken down into two phases. The first being the mass grading and pond excavation. The second being the final buildout and Essex Drive extension.

This Drainage Report focuses on the mass grading phase while master planning for the fully developed condition. The design will incorporate the existing and planned proposed conditions onsite and offsite and provide supporting calculations for storm sewer, detention basin, and stormwater quality best management practice (BMP) sizing based on the *City of Franklin Stormwater Management Ordinance* and *Johnson County Stormwater Technical Standards Manual (Version 1.0 - 2023)* whichever is more stringent.

3.0. Existing Conditions

The existing site is currently undeveloped and is used for agricultural purposes. The adjacent property to the north, east and west are similar in nature. The property to the south is an existing industrial complex. The 138-acre tract of property is generally divided into three different drainage directions although all ultimately end into the same receiving body of water, Graham Arm. The main portion (114.95 acres) drains toward an on-site ephemeral drainage feature up the middle going N-S toward the existing patch of trees that have been partially classified as isolated wetlands. The second basin is a small portion (5.64 acres) at the northwest corner of the parcel that drains directly into Graham Arm regulated drain via an existing 24" culvert under the railroad tracks. The remaining portion (13.66 acres) along the east of the site drain east into Canary Ditch. In addition, there is a substantial offsite area (67.65 acres) entering the site from the north via a 12" CMP culvert under Paul Hand Blvd. Refer to **Appendix D** for the Existing Drainage Map.

Aerial Photograph

An aerial photograph of the Project Site has been included in **Appendix A** for reference.

FEMA

The Project Site is located on the Flood Insurance Rate Map number 18081C0139E (dated 1/29/2021)and 18081C0137D (date 8/2/2007) concluded that the site lies in Zone X which is the area of minimal flood hazard and outside the 100-Yr Flood Hazard zones. See **Appendix B** for the FEMA FIRMette.

Soil Characteristics

The Natural Resources Conservation Service (NRCS) Web Soil Survey of Johnson County, Indiana, indicates Brookston silty clay loam and Crosby silt loam on site. A soil map can be found in **Appendix C.**

4.0. Proposed Conditions

General Storm Routing & Provided Detention

During final buildout, it is anticipated that the proposed building, associated pavement areas, rail spurs, and Essex Drive extension will be constructed on the 138 AC+/- site. A part of the paved area will be deferred for future construction/expansion. However, the entire site in fully developed condition will be assumed for the stormwater management design. A set of interconnected wet and extended dry detention ponds will be designed to provide adequate detention for the developed site including Essex Drive to its full buildout condition while also adequately conveying off-site drainage from the north. For the mass grading phase, the proposed ponds will be located to the east of the proposed site, excavated in their entirety. An exception to this is the ponds will be connected via interim swales to eventually be filled in and replaced with culverts during final buildout. The outfall point for the pond will be located to the southwest of the south wet pond. The outfall will route detained discharge from the pond to the existing Graham Arm along the west property line, east of the rail right of way. In the interim condition, the site will overland drain via sheet flow to the closest available pond. During final buildout, proposed storm sewers will be designed to collect surface and roof runoff and route it to the said pond. Said design

will be presented with the drainage memorandum to be developed along with final calculations of the basins to confirm master planned assumptions. Refer to **Appendix E** for the Proposed Drainage Map.

Proposed Hydrology

HydroCAD was utilized to size the detention ponds. HydroCAD utilizes areas, runoff curve numbers, times of concentration and rainfall data to calculate runoff hydrographs utilizing the NRCS TR-20 methodology. There are two applicable stormwater ordinances to design to, therefore presented respectively.

Per the *City of Franklin Stormwater Management Ordinance*, utilizing the Huff distribution, the storm water detention design shall outlet storm water at a 2-year pre-development rainfall event rate for a 10-year post-development storm and shall outlet at a 10-year pre-development rainfall event rate for a 100-year post-development storm. Utilizing the 114.95 acres onsite contributing basin, curve number CN of 74 (Pasture/Grassland/Range, Good condition) and calculated time concentration (Tc) of 141.1 minutes. The allowable release rates are 12.28 cfs and 25.42 cfs for the 10-year and 100-year storms respectively.

Per Johnson County's *Stormwater Technical Standards Manual*, utilizing the SCS Type II rainfall distribution, the storm water detention designs shall outlet storm water at 0.1 and 0.3 cfs per acre of development area for 10-year and 100-year post-development rainfall respectively. At 114.95 acres, the allowable release rates set by the County are 11.49 cfs and 34.48 cfs as the allowable release rates.

As presented above in addition to the use of SCS Type II vs Huff rainfall distribution, this concludes that both set of ordinances are more stringent than each other in certain ways therefore the need to present both results. Since the south pond will outfall directly into the existing ditch at or less than the current condition, there will be no downstream restrictions to consider, therefore the allowable release rates will not be reduced.

The interconnected proposed detention ponds for this project have been sized to provide rate control for the entire 138-acre developments of the project site including Essex Drive. In addition, the ponds have been oversized to accommodate 67.65 AC of offsite runoff in current condition from the north to bypass through the pond until that area is developed and assumingly their own detention pond is provided. A composite curve number of 95 was assumed for all of the on-site basins, 92 for the ROW area and 74 for the undeveloped off-site drainage area.

The normal pools of each pond were set to ensure positive drainage to their respective outfall. The south pond was set to ensure positive drainage to be at or above Graham Arm's active channel by having the outgoing pipe's crown at or above the existing shelf. The ultimate release rate from the south pond will be controlled by two orifices. The invert of the first, 17" diameter, orifice will be set at the normal pool elevation of 771.50. The invert of the second orifice, one 40"Wx24H" rectangular, will be set the elevation of 774.25. The table below summarizes the water surface elevations and release rates for the pond. Refer to **Appendix F** for detailed HydroCAD calculations.

Summary of Wet Pond 1 (South) Performance without Off-site Bypass

Wet Pond 1 (South)	Peak 10-YR Release Rate (cfs)	Peak 10-YR Water Surface Elevation	Peak 100-YR Release Rate (cfs)	Peak 100-YR Water Surface Elevation	T/Berm
Allowable (City)	12.28	N/A	25.42	N/A	2' Freeboard
Allowable (County)	11.49	N/A	34.48	N/A	1' Freeboard
SCS Type 2 Distribution	10.98	774.28	**25.10**	**775.31**	778.51
Huff Distribution (Highest of 24Hr, 1Q, 2Q, 3Q)	**10.99**	**774.28**	24.05	775.26	778.51

Summary of Wet Pond 1 (South) Performance with Off-site Bypass

Wet Pond 1 (South)	Peak 10-YR Release Rate (cfs)	Peak 10-YR Water Surface Elevation	Peak 100-YR Release Rate (cfs)	Peak 100-YR Water Surface Elevation	T/Berm
SCS Type 2 Distribution	16.14	774.77	**39.70**	**776.01**	778.51
Huff Distribution (Highest of 24Hr, 1Q, 2Q, 3Q)	**16.66**	**774.81**	37.62	775.92	778.51

The emergency overflow weir was designed using 1.25 times the maximum flow into the pond. As seen in **Appendix F** of this report, the highest peak 100-Yr flow with offsite into the pond is 418 CFS resulting in the design flow rate for the overflow weir to be 522.5 cfs. A 335-ft wide trapezoidal weir and 6" height was modeled with a 3:1 side slope on both sides to the west, toward Graham Arm. The spillway is designed to be set at 776.01. The resulting maximum overflow elevation is 776.51. The top of bank is set at 778.51 in order to provide the minimum required two feet of freeboard above the top of spillway elevation. The top casting of the outlet control structure will also be set at 776.01 in order to act in clogging situations. All building foundations are set to a minimum 2.0-ft above the overflow elevation. Weir calculations can be found shown in **Appendix F.**

Proposed Hydraulics

The drainage report of the final buildout will present the hydraulic calculations for all on-site storm sewer It will be required that all the HGL of the 10-yr storm be kept below the proposed rim elevations of each structure. Rainfall intensities and 'c' values to be taken from the *City of Franklin Stormwater Management Ordinance*. The storm sewers are to be designed to maintain a minimum full flow velocity of 2.5 ft/s. The outfall pipe was sized to the highest resulting peak release rate out of the south pond which is 39.70 with offsite. See **Appendix G** for calculations.

Stormwater Quality

Stormwater quality treatment for the project site will be accomplished by routing onsite flow through the proposed detention pond. According to the City of Franklin Subdivisions Standards, "The developer shall be required to provide a water quality detention system that is designed to detain, for over 24 hours after peak run-off from a 24-hour storm, at least 20% of the run-off from either a 1-1/4 inch storm or ½ inch of direct runoff, whichever is greater." With this condition, it is required that the pond have a water quality design volume of 57,896 cubic-feet. It was determined that the available stormwater quality volume is 2,583,071 cubic-feet. See below for detailed calculations and **Appendix H** for HydroCAD outputs.

Scenario 1: South Pond area = 492,794 SF x ½" / 12"/Ft = 20,533 CF
Scenario 2: Highest WQV event per HydroCAD = 289,482 CF (0.17 Hr) x 0.20 = **57,896 CF**

Total Detention Volume = 2,872,553 CF

2,872,553 CF – 289,482 CF = 2,583,071 CF available.

5.0 Appendices

Appendix A: Aerial Photograph


E 400 N
County Rd 400 N
Project Site
Bearing Dr
Graham Ditch
Sloan Dr
Bearing Dr
Essex Dr
E County Rd 300 N

Appendix B: FEMA Flood Insurance Rate Map

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) Report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS Report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study Report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study Report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Indiana State Plane East Zone (FIPS zone 1301). The **horizontal datum** was NAD 83, GRS 1980 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713- 3242**, or visit its website at http://www.ngs.noaa.gov.

Base map information shown on this FIRM was derived from the 2005 Indiana Orthophotography (IndianaMap Framework Data www.indianamap.org). This information was photogrammetrically compiled at a scale of 1:2400 from aerial photography dated spring 2005. Aerial Photography shown on the FIRM is from 2018 provided by Johnson County.

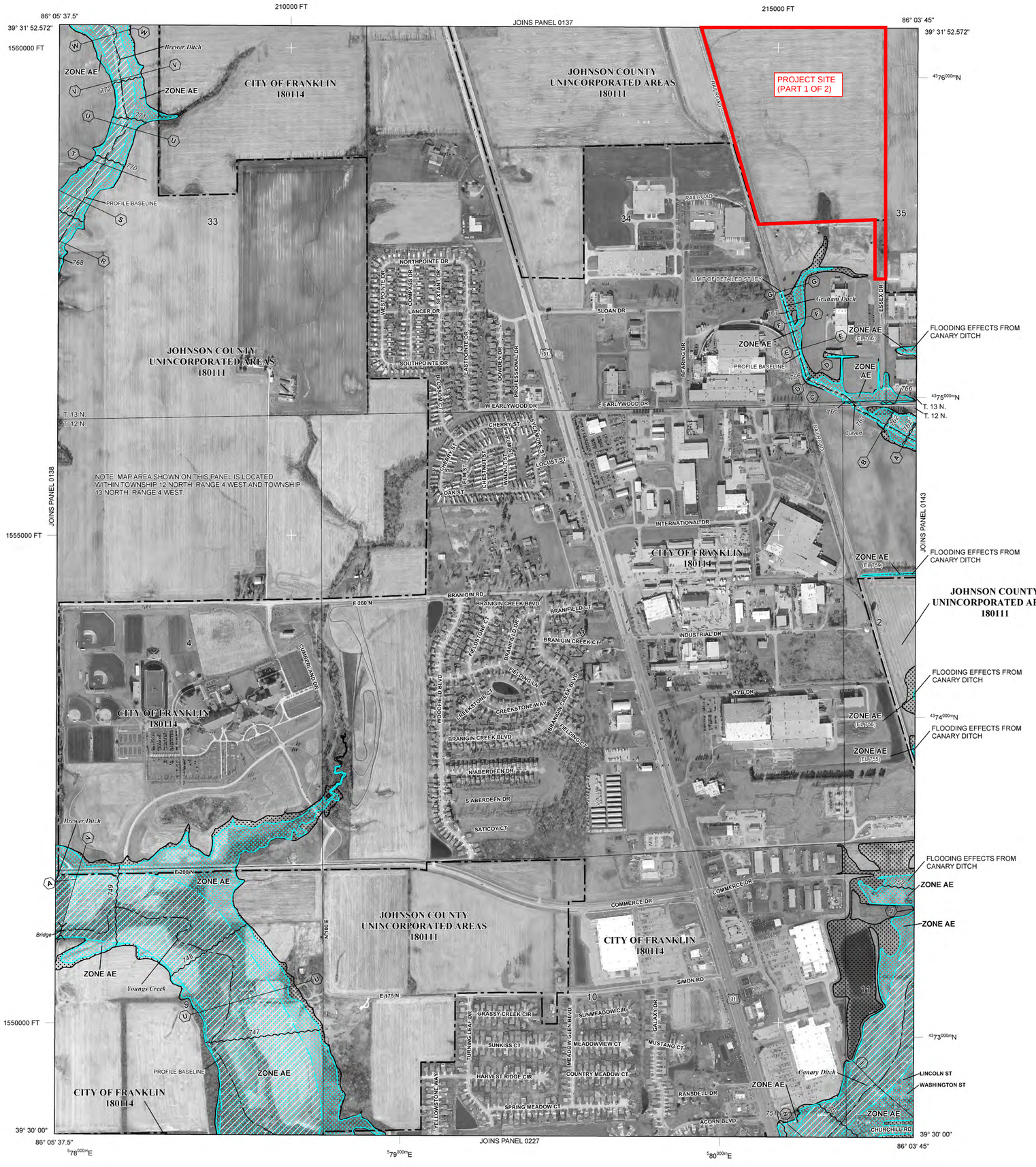
The **profile baselines** depicted on this map represent the hydraulic modeling baselines that match the flood profiles in the FIS report. As a result of improved topographic data, the **profile baseline**, in some cases, may deviate significantly from the channel centerline or appear outside the SFHA.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

For information on available products associated with this FIRM visit the **Map Service Center (MSC)** website at http://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the MSC website.

If you have **questions about this map,** how to order products, or the National Flood Insurance Program in general, please call the **FEMA Map Information eXchange (FMIX)** at **1-877-FEMA-MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/business/nfip.



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Areas formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- 1% Annual Chance Floodplain Boundary
- 0.2% Annual Chance Floodplain Boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths, or flood velocities.
- 513 — Base Flood Elevation line and value; elevation in feet*
- (EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

- A — A — Cross section line
- 23 — 23 — Transect line
- Culvert
- Bridge
- 45° 02' 08", 93° 02' 12" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83) Western Hemisphere
- 3100000 FT — 5000-foot ticks: Indiana State Plane East Zone (FIPS Zone 1301), Transverse Mercator projection
- 4389000mN — 1000-meter Universal Transverse Mercator grid values, zone 16
- DX5510 × — Bench mark (see explanation in Notes to Users section of this FIRM panel)
- M1.5 • — River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
August 2, 2007

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
January 29, 2021 - to increase Base Flood Elevations and to change Special Flood Hazard Areas.

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'
250 0 500 1000 FEET
150 0 150 300 METERS

NFIP NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0139E

FIRM

FLOOD INSURANCE RATE MAP

JOHNSON COUNTY, INDIANA AND INCORPORATED AREAS

PANEL 139 OF 352
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
FRANKLIN, CITY OF	180114	0139	E
JOHNSON COUNTY	180111	0139	E

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER 18081C0139E

MAP REVISED JANUARY 29, 2021

Federal Emergency Management Agency

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utiiized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Indiana State Plane East zone 3826 (FIPSZONE 1301). The **horizontal datum** was NAD83. Differences in datum, spheroid, projection or state plane zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

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NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
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Base Map information shown on this FIRM was derived from the Johnson County Computer Services from photography dated 2001 and from USGS digital orthophoto quadrangles dated 1998 or later.

This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

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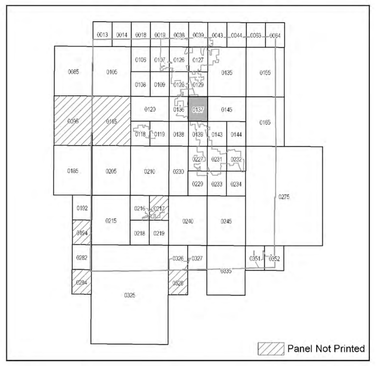
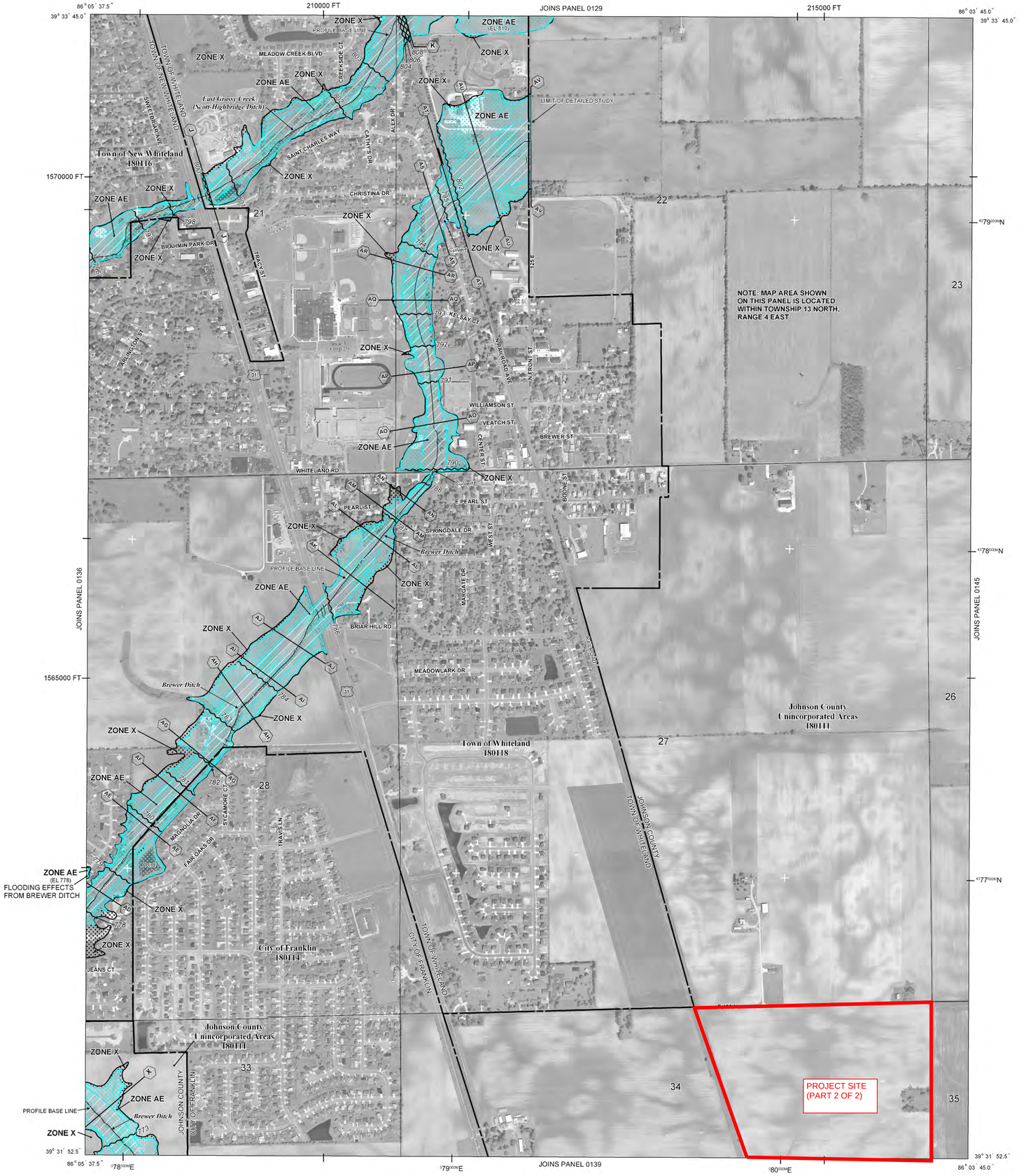
PANEL INDEX





LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

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The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

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	Zone D Boundary
	CBRS and OPA boundary
	Boundary Dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
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(EL 10)	Base Flood Elevation value where uniform within zone; elevation in feet*

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A — A	Cross section line
23 — 23	Transect line
85° 03' 45.0", 41° 24' 22.5"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
4587000 M	1000-meter Universal Transverse Mercator grid values, zone 16
2250000 FT	5000-foot grid ticks: Indiana State Plane East Coordinate System, 3826 zone (FIPSZONE 1301) Transverse Mercator
KA0015	Bench mark (see explanation in Notes to Users section of this FIRM panel)
M1.5	River Mile

MAP REPOSITORY
Refer to listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
August 2, 2007

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'
250 0 500 1000 FEET
150 0 150 300 METERS

NFIP

PANEL 0137D

FIRM

FLOOD INSURANCE RATE MAP

JOHNSON COUNTY, INDIANA

AND INCORPORATED AREAS

PANEL 137 OF 352
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
FRANKLIN, CITY OF	180114	0137	D
JOHNSON COUNTY	180111	0137	D
NEW WHITELAND, TOWN OF	180116	0137	D
WHITELAND, TOWN OF	180118	0137	D

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
18081C0137D
EFFECTIVE DATE
AUGUST 2, 2007

Federal Emergency Management Agency

NATIONAL FLOOD INSURANCE PROGRAM

Appendix C: Soil Map


86° 4' 41" W
86° 3' 33" W
39° 32' 29" N
39° 31' 20" N
579300
579500
579700
579900
580100
580300
580500
580700
4377200
4377000
4376800
4376600
4376400
4376200
4376000
4375800
4375600
4375400
4375200
CsB2
Br
MnB2
CrA
FxC2
E 400 N
Paul Hand Blvd
Sloan Dr
31
YclA
N
Map Scale: 1:10,400 if printed on A portrait (8.5" x 11") sheet.
Meters
0
150
300
600
900
Feet
0
500
1000
2000
3000
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 16N WGS84

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 31, Sep 1, 2023

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

Date(s) aerial images were photographed: Jun 15, 2022—Jun 21, 2022

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	99.8	38.5%
CrA	Crosby silt loam, fine-loamy subsoil, 0 to 2 percent slopes	C/D	110.0	42.5%
CsB2	Crosby-Miami silt loams, 2 to 4 percent slopes, eroded	C/D	11.7	4.5%
FxC2	Fox complex, 6 to 12 percent slopes, eroded	B	7.3	2.8%
MnB2	Miami silt loam, 2 to 6 percent slopes, eroded	C	22.3	8.6%
YclA	Crosby silt loam, fine-loamy subsoil-Urban land complex, 0 to 2 percent slopes	C/D	7.9	3.0%
Totals for Area of Interest			**259.0**	**100.0%**

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

Appendix D: Existing Conditions Map

NOTES:
1. 2' & 10' CONTOUR INTERVALS SHOWN FOR CLARITY
2. OFF-SITE CONTOURS/ACREAGE ARE FROM LIDAR RECORDS

EX RAILROAD R/W

EX. OFF-SITE ENTRY (THROUGH EX. 12" CULVERT & OUT EX. 24" CULVERT UNDER RAILROAD)

ON-SITE FLOW PATH 5,240 LF
TIME OF CONCENTRATION
141.1 MINUTES

EX BASIN (OFF-SITE-TO 24" CMP)
5.64 AC

GRAHAM ARM OPEN DRAIN
(REGULATED DRAIN)

EX. OFF-SITE ENTRY (THROUGH EX. 12" CULVERT)

OFF-SITE FLOW PATH
PER STR. 11 REPORT BY OTHERS
TIME OF CONCENTRATION
81.43 MINUTES

EX BASIN (ON-SITE)
114.95 AC
CN 74

EX BASIN (OFF-SITE UPSTREAM)
(PER STR. 11 REPORT BY OTHERS)
AC: 67.65

EX BASIN (OFFSITE TO CANARY DITCH)
13.67 AC

ESSEX DRIVE

PAUL HAND BLVD / 400 N

EX. ON-SITE DISCHARGE POINT
(DOWNSTREAM THROUGH WETLANDS/UNNAMED OFF-SITE TRIBUTARY, ULTIMATELY TO GRAHAM ARM)

Kimley»Horn

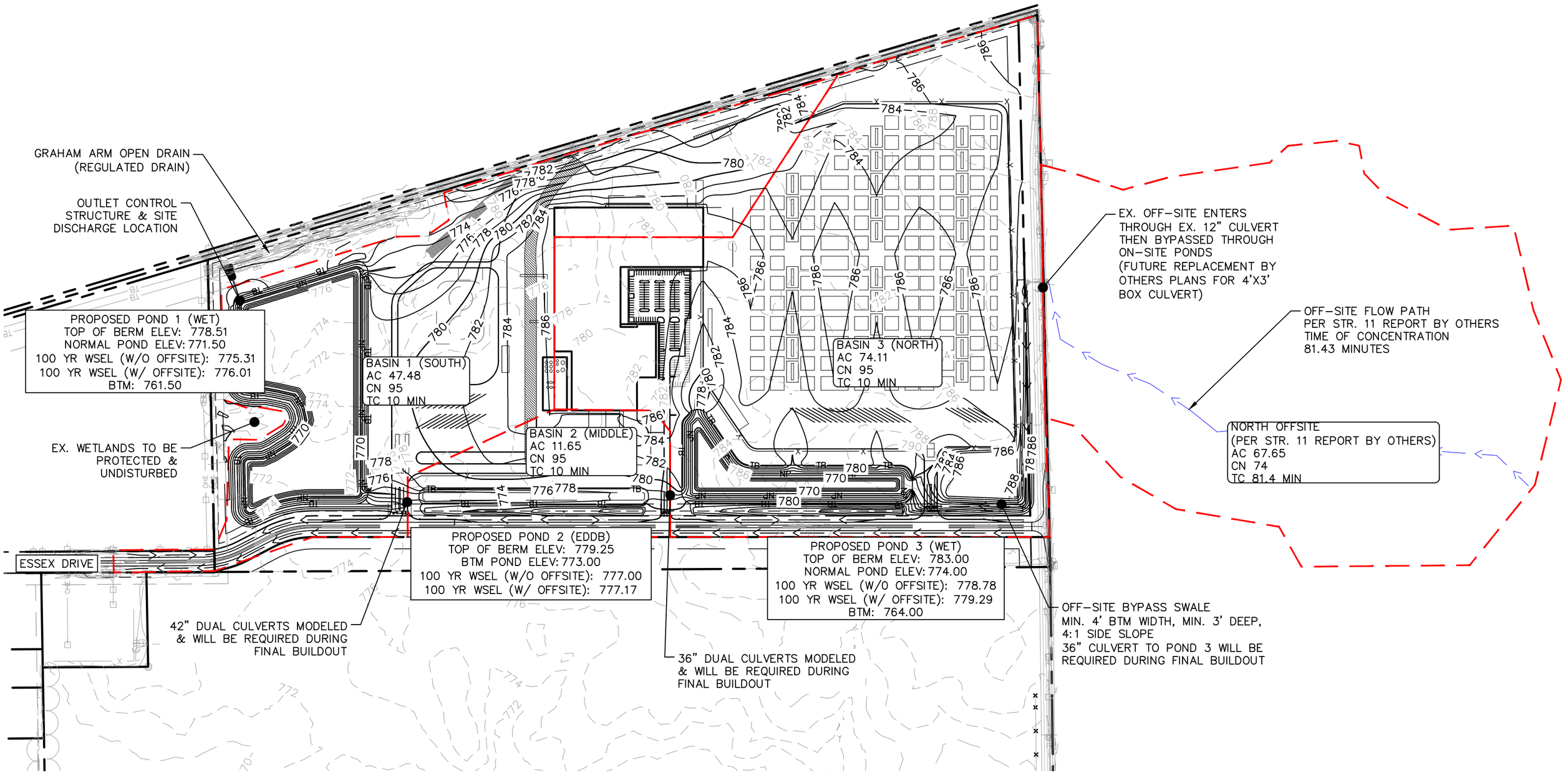
MALARKEY IND

EXISTING DRAINAGE AREA MAP
FRANKLIN, INDIANA
August 7, 2024

0' 200' 400'
SCALE: 1" = 400'
NORTH

Appendix E: Proposed Drainage Map

NOTES:
1. SCHEMATIC SITE LAYOUT IS SHOWN FOR DRAINAGE MASTER PLANNING PURPOSES ONLY. FINAL LAYOUT IS SUBJECT TO CHANGE.
2. PROPOSED GRADING CONTOURS SHOWN ARE FOR MASS GRADING PURPOSES. IT IS THE INTENTION TO REPLACE INTERIM SWALES CONNECTING PONDS WITH EQUALIZING CULVERTS PROPERLY SIZED TO CONVEY DRAINAGE AS PRESENT IN THIS DRAINAGE REPORT.
3. 2' & 10' CONTOUR INTERVALS SHOWN FOR CLARITY
4. OFF-SITE CONTOURS/ACREAGE ARE FROM LIDAR RECORDS



Kimley»Horn

MALARKEY IND

PROPOSED DRAINAGE AREA MAP
FRANKLIN, INDIANA
August 7, 2024

0' 200' 400'
SCALE: 1" = 400'
NORTH

Appendix F: Detention Basin Calculations

Table 2-2a Runoff curve numbers for urban areas [1/]

Cover description: Cover type and hydrologic condition	Average percent impervious area [2/]	Curve numbers for hydrologic soil group: A	B	C	D
Fully developed urban areas (vegetation established)					
Open space (lawns, parks, golf courses, cemeteries, etc.) [3/]:					
Poor condition (grass cover < 50%)		68	79	86	89
Fair condition (grass cover 50% to 75%)		49	69	79	84
Good condition (grass cover > 75%)		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and roads:					
Paved; curbs and storm sewers (excluding right-of-way)		98	98	98	98
Paved; open ditches (including right-of-way)		83	89	92	93
Gravel (including right-of-way)		76	85	89	91
Dirt (including right-of-way)		72	82	87	89
Western desert urban areas:					
Natural desert landscaping (pervious areas only) [4/]		63	77	85	88
Artificial desert landscaping (impervious weed barrier, desert shrub with 1- to 2-inch sand or gravel mulch and basin borders)		96	96	96	96
Urban districts:					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential districts by average lot size:					
1/8 acre or less (town houses)	65	77	85	90	92
1/4 acre	38	61	75	83	87
1/3 acre	30	57	72	[illegible]	[illegible]
1/2 acre	25	54	70		
1 acre	20	51	68		
2 acres	12	46	65		
Developing urban areas					
Newly graded areas (pervious areas only, no vegetation) [5/]		77	86	91	94
Idle lands (CN's are determined using cover types similar to those in table 2-2c).					

Use 95 for master planning purpose

[1] Average runoff condition, and $I_a = 0.2S$.

[2] The average percent impervious area shown was used to develop the composite CN's. Other assumptions are as follows: impervious areas are directly connected to the drainage system, impervious areas have a CN of 98, and pervious areas are considered equivalent to open space in good hydrologic condition. CN's for other combinations of conditions may be computed using figure 2-3 or 2-4.

[3] CN's shown are equivalent to those of pasture. Composite CN's may be computed for other combinations of open space cover type.

[4] Composite CN's for natural desert landscaping should be computed using figures 2-3 or 2-4 based on the impervious area percentage (CN = 98) and the pervious area CN. The pervious area CN's are assumed equivalent to desert shrub in poor hydrologic condition.

[5] Composite CN's to use for the design of temporary measures during grading and construction should be computed using figure 2-3 or 2-4 based on the degree of development (impervious area percentage) and the CN's for the newly graded pervious areas.

Table 2-2b Runoff curve numbers for cultivated agricultural lands [1/]

Cover description			Curve numbers for hydrologic soil group			
Cover type	Treatment [2/]	Hydrologic condition [3/]	A	B	C	D
Fallow	Bare soil	—	77	86	91	94
	Crop residue cover (CR)	Poor	76	85	90	93
		Good	74	83	88	90
Row crops	Straight row (SR)	Poor	72	81	88	91
		Good	67	78	85	89
	SR + CR	Poor	71	80	87	90
		Good	64	75	82	85
	Contoured (C)	Poor	70	79	84	88
		Good	65	75	82	86
	C + CR	Poor	69	78	83	87
		Good	64	74	81	85
	Contoured & terraced (C&T)	Poor	66	74	80	82
		Good	62	71	78	81
	C&T+ CR	Poor	65	73	79	81
		Good	61	70	77	80
Small grain	SR	Poor	65	76	84	88
		Good	63	75	83	87
	SR + CR	Poor	64	75	83	86
		Good	60	72	80	84
	C	Poor	63	74	82	85
		Good	61	73	81	84
	C + CR	Poor	62	73	81	84
		Good	60	72	80	83
	C&T	Poor	61	72	79	82
		Good	59	70	78	81
	C&T+ CR	Poor	60	71	78	81
		Good	58	69	77	80
Close-seeded or broadcast legumes or rotation meadow	SR	Poor	66	77	85	89
		Good	58	72	81	85
	C	Poor	64	75	83	85
		Good	55	69	78	83
	C&T	Poor	63	73	80	83
		Good	51	67	76	80

[1] Average runoff condition, and I_a=0.2S

[2] Crop residue cover applies only if residue is on at least 5% of the surface throughout the year.

[3] Hydraulic condition is based on combination factors that affect infiltration and runoff, including (a) density and canopy of vegetative areas, (b) amount of year-round cover, (c) amount of grass or close-seeded legumes, (d) percent of residue cover on the land surface (good ≥ 20%), and (e) degree of surface roughness.

Poor: Factors impair infiltration and tend to increase runoff.

Good: Factors encourage average and better than average infiltration and tend to decrease runoff.

STORMWATER TECHNICAL STANDARDS MANUAL
JOHNSON COUNTY, INDIANA

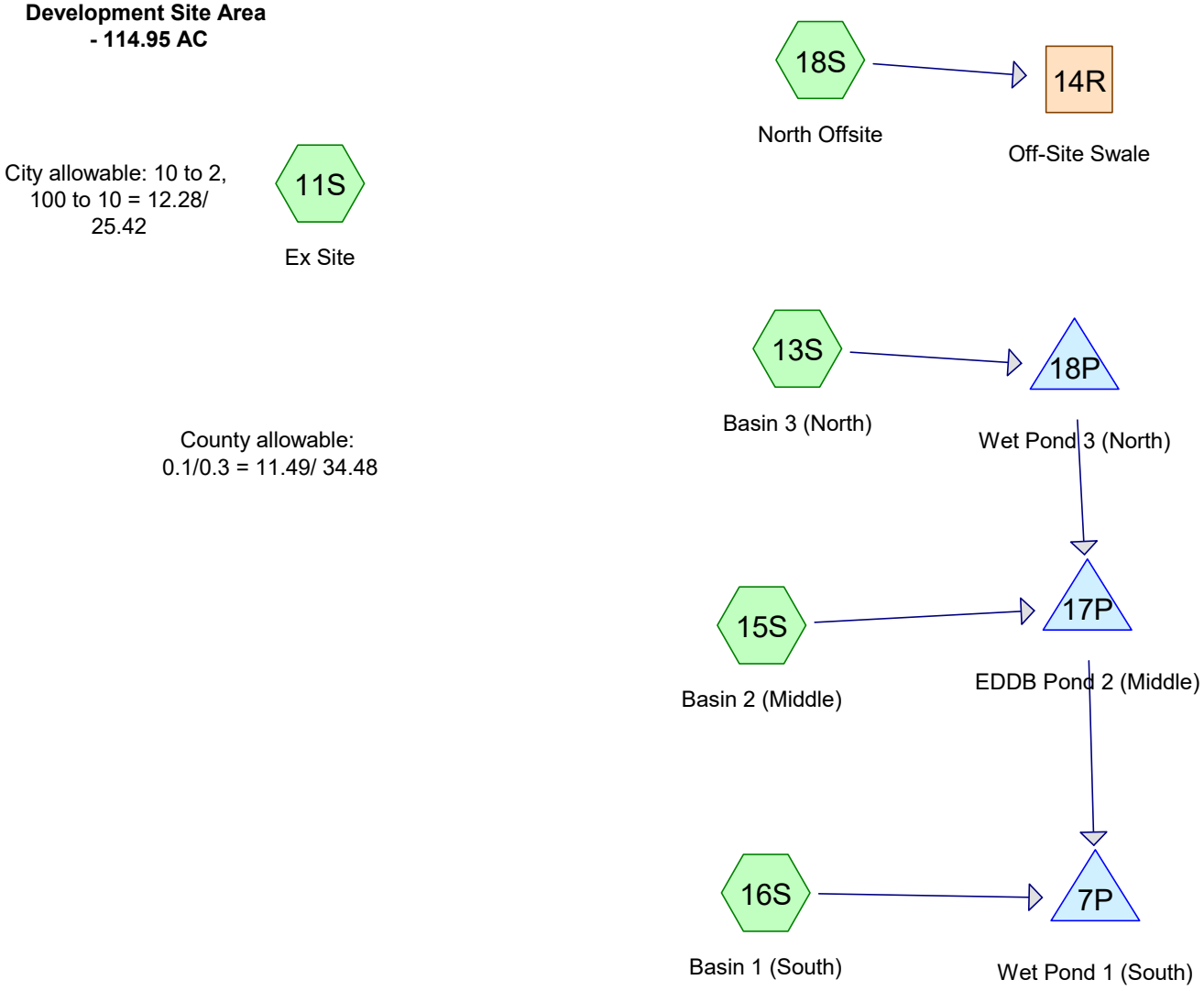
Version 1.0 (2023)

MODEL/CALCULATIONS
WITHOUT OFFSITE

Development Site Area
- 114.95 AC

City allowable: 10 to 2,
100 to 10 = 12.28/
25.42

County allowable:
0.1/0.3 = 11.49/ 34.48



Subcat Reach Pond Link

Routing Diagram for Malarkey IND_Huff_R1
Prepared by Kimley-Horn & Associates, Printed 8/7/2024

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	002yr-0.17hr	Indy Huff	1st Quartile	Scale	0.17	1	0.69	2
2	002yr-0.25hr	Indy Huff	1st Quartile	Scale	0.25	1	0.85	2
3	002yr-0.50hr	Indy Huff	1st Quartile	Scale	0.50	1	1.13	2
4	002yr-01hr	Indy Huff	1st Quartile	Scale	1.00	1	1.39	2
5	002yr-02hr	Indy Huff	1st Quartile	Scale	2.00	1	1.62	2
6	002yr-03hr	Indy Huff	1st Quartile	Scale	3.00	1	1.72	2
7	002yr-06hr	Indy Huff	1st Quartile	Scale	6.00	1	2.05	2
8	002yr-12hr	Indy Huff	2nd Quartile	Scale	12.00	1	2.45	2
9	002yr-24hr	Indy Huff	3rd Quartile	Scale	24.00	1	2.92	2
10	10 Yr-SCS 24Hr	Type II 24-Hr		Default	24.00	1	4.10	2
11	010yr-0.17hr	Indy Huff	1st Quartile	Scale	0.17	1	0.93	2
12	010yr-0.25hr	Indy Huff	1st Quartile	Scale	0.25	1	1.14	2
13	010yr-0.50hr	Indy Huff	1st Quartile	Scale	0.50	1	1.59	2
14	010yr-01hr	Indy Huff	1st Quartile	Scale	1.00	1	2.02	2
15	010yr-02hr	Indy Huff	1st Quartile	Scale	2.00	1	2.37	2
16	010yr-03hr	Indy Huff	1st Quartile	Scale	3.00	1	2.53	2
17	010yr-06hr	Indy Huff	1st Quartile	Scale	6.00	1	3.03	2
18	010yr-12hr	Indy Huff	2nd Quartile	Scale	12.00	1	3.52	2
19	010yr-24hr	Indy Huff	3rd Quartile	Scale	24.00	1	4.08	2
20	100 Yr-SCS 24Hr	Type II 24-Hr		Default	24.00	1	5.91	2
21	100yr-0.17hr	Indy Huff	1st Quartile	Scale	0.17	1	1.25	2
22	100yr-0.25hr	Indy Huff	1st Quartile	Scale	0.25	1	1.56	2
23	100yr-0.50hr	Indy Huff	1st Quartile	Scale	0.50	1	2.25	2
24	100yr-01hr	Indy Huff	1st Quartile	Scale	1.00	1	3.01	2
25	100yr-02hr	Indy Huff	1st Quartile	Scale	2.00	1	2.65	2
26	100yr-03hr	Indy Huff	1st Quartile	Scale	3.00	1	3.94	2
27	100yr-06hr	Indy Huff	1st Quartile	Scale	6.00	1	4.78	2
28	100yr-12hr	Indy Huff	2nd Quartile	Scale	12.00	1	5.37	2
29	100yr-24hr	Indy Huff	3rd Quartile	Scale	24.00	1	5.91	2
30	WQV-0.17hr	Indy Huff	1st Quartile	Scale	0.17	1	1.25	2
31	WQV-0.25hr	Indy Huff	1st Quartile	Scale	0.25	1	1.25	2
32	WQV-0.50hr	Indy Huff	1st Quartile	Scale	0.50	1	1.25	2
33	WQV-01hr	Indy Huff	1st Quartile	Scale	1.00	1	1.25	2
34	WQV-02hr	Indy Huff	1st Quartile	Scale	2.00	1	1.25	2
35	WQV-03hr	Indy Huff	1st Quartile	Scale	3.00	1	1.25	2
36	WQV-06hr	Indy Huff	1st Quartile	Scale	6.00	1	1.25	2
37	WQV-12hr	Indy Huff	2nd Quartile	Scale	12.00	1	1.25	2
38	WQV-24hr	Indy Huff	3rd Quartile	Scale	24.00	1	1.25	2

Use for existing condition to establish pre-development existing condition per City of Franklin code

Table 2-2c Runoff curve numbers for other agricultural lands [1/]

Cover description		Curve numbers for hydrologic soil group			
Cover type	Hydrologic condition	A	B	C	D
Pasture, grassland, or range—continuous forage for grazing. [2/]	Poor	68	79	86	89
	Fair	49	69	79	84
	Good	39	61	74	80
Meadow—continuous grass, protected from grazing and generally mowed for hay.	—	30	58	71	78
Brush—brush-weed-grass mixture with brush the major element. [3/]	Poor	48	67	77	83
	Fair	35	56	70	77
	Good	30 [4/]	48	65	73
Woods—grass combination (orchard or tree farm). [5/]	Poor	57	73	82	86
	Fair	43	65	76	82
	Good	32	58	72	79
Woods. [6/]	Poor	45	66	77	83
	Fair	36	60	73	79
	Good	30 [4/]	55	70	77
Farmsteads—buildings, lanes, driveways, and surrounding lots.	—	59	74	82	86

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

2 *Poor:* <50%) ground cover or heavily grazed with no mulch.
Fair: 50 to 75% ground cover and not heavily grazed.
Good: > 75% ground cover and lightly or only occasionally grazed.

3 *Poor:* <50% ground cover.
Fair: 50 to 75% ground cover.
Good: >75% ground cover.

4 Actual curve number is less than 30; use CN = 30 for runoff computations.

5 CN's shown were computed for areas with 50% woods and 50% grass (pasture) cover. Other combinations of conditions may be computed from the CN's for woods and pasture.

6 *Poor:* Forest litter, small trees, and brush are destroyed by heavy grazing or regular burning.
Fair: Woods are grazed but not burned, and some forest litter covers the soil.
Good: Woods are protected from grazing, and litter and brush adequately cover the soil.

Table 2-2d Runoff curve numbers for arid and semiarid rangelands [1/]

Cover description		Curve numbers for hydrologic soil group			
Cover type	Hydrologic condition [2/]	A [3/]	B	C	D
Herbaceous—mixture of grass, weeds, and low-growing brush, with brush the minor element.	Poor		80	87	93
	Fair		71	81	89
	Good		62	74	85
Oak-aspen—mountain brush mixture of oak brush, aspen, mountain mahogany, bitter brush, maple, and other brush.	Poor		66	74	79
	Fair		48	57	63
	Good		30	41	48
Pinyon-juniper—pinyon, juniper, or both; grass understory.	Poor		75	85	89
	Fair		58	73	80
	Good		41	61	71
Sagebrush with grass understory.	Poor		67	80	85
	Fair		51	63	70
	Good		35	47	55
Desert shrub—major plants include saltbush, greasewood, creosotebush, blackbrush, bursage, palo verde, mesquite, and cactus.	Poor	63	77	85	88
	Fair	55	72	81	86
	Good	49	68	79	84

1 Average runoff condition, and I_a, = 0.2S. For range in humid regions, use table 2-2c.
2 Poor: <30% ground cover (litter, grass, and brush overstory).
Fair: 30 to 70% ground cover.
Good: > 70% ground cover.
3 Curve numbers for group A have been developed only for desert shrub.

TABLE 2-3

Use 10 min due to anticipation of substantial length of storm sewer system

Runoff Coefficients by Land Use, Typical Inlet Times, and Storm Recurrence Interval

Land Use	*Runoff Coefficients "C" (by Storm Recurrence Interval)*												*Inlet Time (Minutes) (4)*
	Flat (1)				Rolling (2)				Steep (3)				
	< 25 year	*25 year*	*50 year*	*100 year*	*< 25 year*	*25 year*	*50 year*	*100 year*	*< 25 year*	*25 year*	*50 year*	*100 year*	
Commercial *(CBD)*	0.75	0.83	0.99	1.00	0.83	0.91	1.00	1.00	0.91	1.00	1.00	1.00	5
Commercial *(Neighborhood)*	0.54	0.59	0.71	0.89	0.60	0.66	0.79	0.99	0.66	0.73	0.87	1.00	
Industrial	0.63	0.69	0.83	1.00	0.70	0.77	0.92	1.00	0.77	0.85	1.00	1.00	5 - 10
Garden Apartments	0.54	0.59	0.71	0.89	0.60	0.66	0.79	0.99	0.66	0.73	0.87	1.00	
Churches	0.54	0.59	0.71	0.89	0.60	0.66	0.79	0.99	0.66	0.73	0.87	1.00	
Schools	0.31	0.34	0.41	0.51	0.35	0.39	0.46	0.58	0.39	0.43	0.51	0.64	
Semi Detached Residential	0.45	0.50	0.59	0.74	0.50	0.55	0.66	0.83	0.55	0.61	0.73	0.91	
Detached Residential	0.40	0.44	0.53	0.66	0.45	0.50	0.59	0.74	0.50	0.55	0.66	0.83	10 - 15
Quarter Acre Lots	0.36	0.40	0.48	0.59	0.40	0.44	0.53	0.66	0.44	0.48	0.58	0.73	
Half Acre Lots	0.31	0.34	0.41	0.51	0.35	0.39	0.46	0.58	0.39	0.43	0.51	0.64	
Parkland	0.18	0.20	0.24	0.30	0.20	0.22	0.26	0.33	0.22	0.24	0.29	0.36	To be Computed

Source: HERPICC Stormwater Drainage Manual, July 1995, and other sources.

(1) Flat terrain involves slopes of 0-2%.
(2) Rolling terrain involves slopes of 2-7%.
(3) Steep terrain involves slopes greater than 7%.
(4) Interpolation, extrapolation and adjustment for local conditions shall be based on engineering experience and judgment.

Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 11S: Ex Site Runoff Area=114.950 ac 0.00% Impervious Runoff Depth=3.11"
Flow Length=5,240' Tc=141.1 min CN=74 Runoff=98.87 cfs 29.785 af

Subcatchment 13S: Basin 3 (North) Runoff Area=74.111 ac 0.00% Impervious Runoff Depth=5.32"
Tc=10.0 min CN=95 Runoff=532.34 cfs 32.869 af

Subcatchment 15S: Basin 2 (Middle) Runoff Area=11.651 ac 0.00% Impervious Runoff Depth=5.32"
Tc=10.0 min CN=95 Runoff=83.69 cfs 5.167 af

Subcatchment 16S: Basin 1 (South) Runoff Area=47.476 ac 0.00% Impervious Runoff Depth=5.32"
Tc=10.0 min CN=95 Runoff=341.02 cfs 21.056 af

Subcatchment 18S: North Offsite Runoff Area=67.650 ac 1.06% Impervious Runoff Depth=3.11"
Tc=81.4 min CN=74 Runoff=88.88 cfs 17.529 af

Reach 14R: Off-Site Swale Avg. Flow Depth=1.67' Max Vel=4.96 fps Inflow=88.88 cfs 17.529 af
n=0.022 L=1,260.0' S=0.0054 '/' Capacity=334.55 cfs Outflow=88.47 cfs 17.529 af

Pond 7P: Wet Pond 1 (South) Peak Elev=775.31' Storage=1,645,819 cf Inflow=415.48 cfs 58.610 af
Outflow=25.10 cfs 42.456 af

Pond 17P: EDDB Pond 2 (Middle) Peak Elev=777.00' Storage=141,561 cf Inflow=178.30 cfs 37.591 af
42.0" Round Culvert x 2.00 n=0.013 L=810.0' S=0.0019 '/' Outflow=100.55 cfs 37.554 af

Pond 18P: Wet Pond 3 (North) Peak Elev=778.78' Storage=14.760 af Inflow=532.34 cfs 32.869 af
36.0" Round Culvert x 2.00 n=0.013 L=211.0' S=0.0047 '/' Outflow=97.03 cfs 32.424 af

Total Runoff Area = 315.838 ac Runoff Volume = 106.407 af Average Runoff Depth = 4.04"
99.77% Pervious = 315.118 ac 0.23% Impervious = 0.720 ac

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
133.238	95	(13S, 15S, 16S)
66.930	74	From Paul Hand Drainage Report (Structure 11) (18S)
0.720	98	From Paul Hand Drainage Report (Structure 11) (18S)
114.950	74	Pasture/grassland/range, Good, HSG C (11S)
315.838	**83**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
114.950	HSG C	11S
0.000	HSG D	
200.888	Other	13S, 15S, 16S, 18S
315.838		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover
0.000	0.000	0.000	0.000	133.238	133.238	
0.000	0.000	0.000	0.000	67.650	67.650	From Paul Hand Drainage Report (Structure 11)
0.000	0.000	114.950	0.000	0.000	114.950	Pasture/grassland/range, Good
0.000	**0.000**	**114.950**	**0.000**	**200.888**	**315.838**	**TOTAL AREA**

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Width (inches)	Diam/Height (inches)	Inside-Fill (inches)	Node Name
1	17P	773.00	771.50	810.0	0.0019	0.013	0.0	42.0	0.0	
2	18P	774.00	773.00	211.0	0.0047	0.013	0.0	36.0	0.0	

Events for Subcatchment 13S: Basin 3 (North)

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
002yr-0.17hr	0.69	115.53	1.901	0.31
002yr-0.25hr	0.85	129.97	2.695	0.44
002yr-0.50hr	1.13	125.94	4.181	0.68
002yr-01hr	1.39	113.79	5.629	0.91
002yr-02hr	1.62	81.37	6.943	1.12
002yr-03hr	1.72	61.32	7.521	1.22
002yr-06hr	2.05	40.32	9.452	1.53
002yr-12hr	2.45	23.43	11.826	1.91
002yr-24hr	2.92	17.64	14.645	2.37
10 Yr-SCS 24Hr	4.10	361.52	21.799	3.53
010yr-0.17hr	0.93	187.73	3.109	0.50
010yr-0.25hr	1.14	201.69	4.236	0.69
010yr-0.50hr	1.59	217.72	6.770	1.10
010yr-01hr	2.02	195.02	9.276	1.50
010yr-02hr	2.37	138.21	11.349	1.84
010yr-03hr	2.53	104.05	12.304	1.99
010yr-06hr	3.03	67.23	15.308	2.48
010yr-12hr	3.52	35.61	18.273	2.96
010yr-24hr	4.08	25.46	21.677	3.51
100 Yr-SCS 24Hr	**5.91**	**532.34**	32.869	5.32
100yr-0.17hr	1.25	290.94	4.843	0.78
100yr-0.25hr	1.56	312.23	6.597	1.07
100yr-0.50hr	2.25	353.19	10.636	1.72
100yr-01hr	3.01	330.96	15.188	2.46
100yr-02hr	2.65	159.89	13.023	2.11
100yr-03hr	3.94	180.17	20.825	3.37
100yr-06hr	4.78	115.46	25.949	4.20
100yr-12hr	5.37	56.54	29.560	4.79
100yr-24hr	5.91	37.69	**32.869**	**5.32**
WQV-0.17hr	1.25	290.94	4.843	0.78
WQV-0.25hr	1.25	230.02	4.843	0.78
WQV-0.50hr	1.25	147.68	4.843	0.78
WQV-01hr	1.25	96.58	4.843	0.78
WQV-02hr	1.25	54.92	4.843	0.78
WQV-03hr	1.25	37.85	4.843	0.78
WQV-06hr	1.25	19.37	4.843	0.78
WQV-12hr	1.25	9.79	4.843	0.78
WQV-24hr	1.25	6.54	4.843	0.78

Summary for Subcatchment 13S: Basin 3 (North)

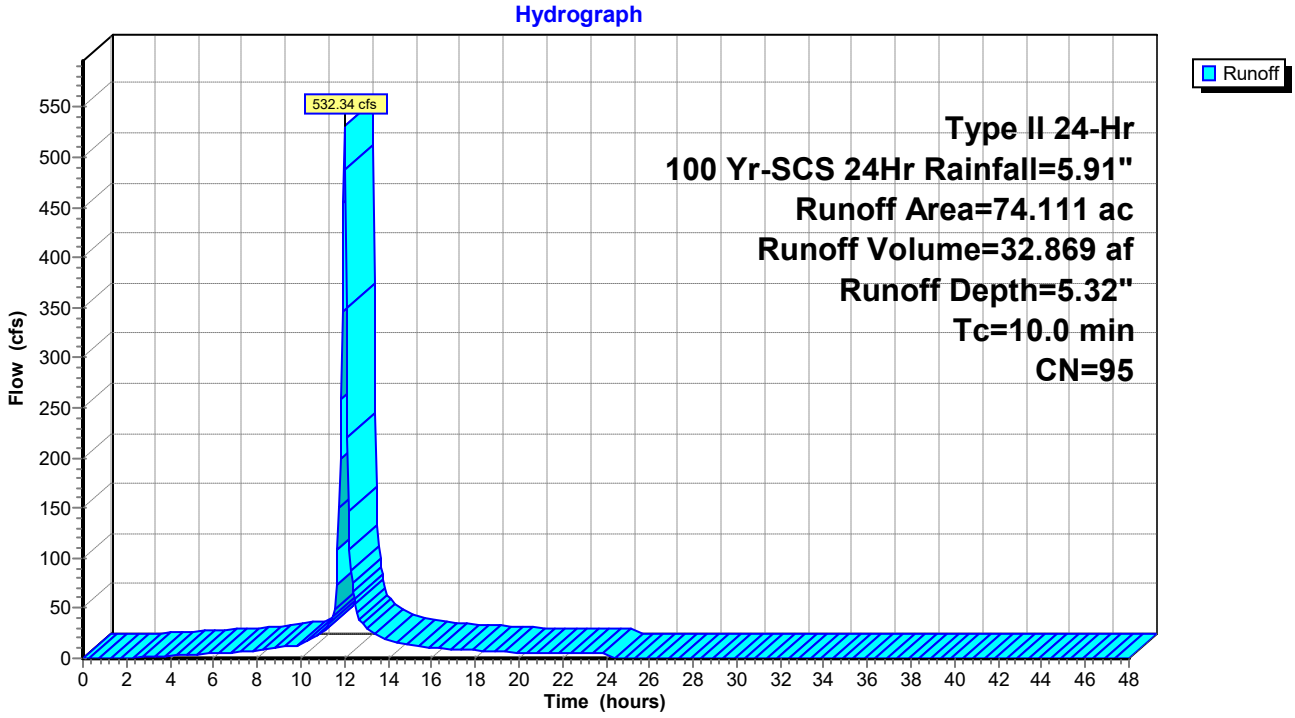
Runoff = 532.34 cfs @ 12.01 hrs, Volume= 32.869 af, Depth= 5.32"
Routed to Pond 18P : Wet Pond 3 (North)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-Hr 100 Yr-SCS 24Hr Rainfall=5.91"

	Area (ac)	CN	Description
*	74.111	95	
	74.111		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry,**

Subcatchment 13S: Basin 3 (North)



Events for Subcatchment 15S: Basin 2 (Middle)

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
002yr-0.17hr	0.69	18.16	0.299	0.31
002yr-0.25hr	0.85	20.43	0.424	0.44
002yr-0.50hr	1.13	19.80	0.657	0.68
002yr-01hr	1.39	17.89	0.885	0.91
002yr-02hr	1.62	12.79	1.091	1.12
002yr-03hr	1.72	9.64	1.182	1.22
002yr-06hr	2.05	6.34	1.486	1.53
002yr-12hr	2.45	3.68	1.859	1.91
002yr-24hr	2.92	2.77	2.302	2.37
10 Yr-SCS 24Hr	4.10	56.83	3.427	3.53
010yr-0.17hr	0.93	29.51	0.489	0.50
010yr-0.25hr	1.14	31.71	0.666	0.69
010yr-0.50hr	1.59	34.23	1.064	1.10
010yr-01hr	2.02	30.66	1.458	1.50
010yr-02hr	2.37	21.73	1.784	1.84
010yr-03hr	2.53	16.36	1.934	1.99
010yr-06hr	3.03	10.57	2.407	2.48
010yr-12hr	3.52	5.60	2.873	2.96
010yr-24hr	4.08	4.00	3.408	3.51
100 Yr-SCS 24Hr	**5.91**	**83.69**	**5.167**	**5.32**
100yr-0.17hr	1.25	45.74	0.761	0.78
100yr-0.25hr	1.56	49.09	1.037	1.07
100yr-0.50hr	2.25	55.52	1.672	1.72
100yr-01hr	3.01	52.03	2.388	2.46
100yr-02hr	2.65	25.14	2.047	2.11
100yr-03hr	3.94	28.32	3.274	3.37
100yr-06hr	4.78	18.15	4.079	4.20
100yr-12hr	5.37	8.89	4.647	4.79
100yr-24hr	5.91	5.93	5.167	5.32
WQV-0.17hr	1.25	45.74	0.761	0.78
WQV-0.25hr	1.25	36.16	0.761	0.78
WQV-0.50hr	1.25	23.22	0.761	0.78
WQV-01hr	1.25	15.18	0.761	0.78
WQV-02hr	1.25	8.63	0.761	0.78
WQV-03hr	1.25	5.95	0.761	0.78
WQV-06hr	1.25	3.05	0.761	0.78
WQV-12hr	1.25	1.54	0.761	0.78
WQV-24hr	1.25	1.03	0.761	0.78

Summary for Subcatchment 15S: Basin 2 (Middle)

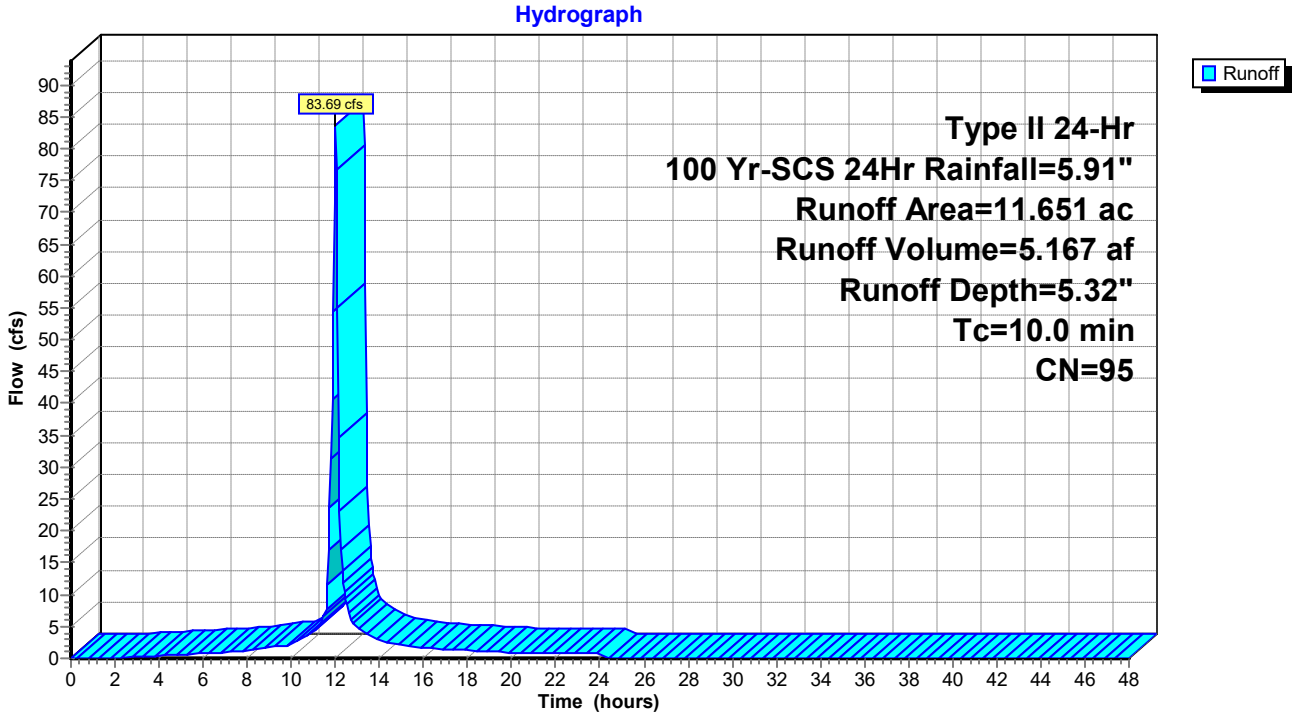
Runoff = 83.69 cfs @ 12.01 hrs, Volume= 5.167 af, Depth= 5.32"
Routed to Pond 17P : EDDB Pond 2 (Middle)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-Hr 100 Yr-SCS 24Hr Rainfall=5.91"

	Area (ac)	CN	Description
*	11.651	95	
	11.651		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry,**

Subcatchment 15S: Basin 2 (Middle)



Events for Subcatchment 16S: Basin 1 (South)

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
002yr-0.17hr	0.69	74.01	1.218	0.31
002yr-0.25hr	0.85	83.26	1.726	0.44
002yr-0.50hr	1.13	80.68	2.678	0.68
002yr-01hr	1.39	72.89	3.606	0.91
002yr-02hr	1.62	52.13	4.447	1.12
002yr-03hr	1.72	39.28	4.818	1.22
002yr-06hr	2.05	25.83	6.055	1.53
002yr-12hr	2.45	15.01	7.576	1.91
002yr-24hr	2.92	11.30	9.382	2.37
10 Yr-SCS 24Hr	4.10	231.59	13.965	3.53
010yr-0.17hr	0.93	120.26	1.992	0.50
010yr-0.25hr	1.14	129.20	2.714	0.69
010yr-0.50hr	1.59	139.47	4.337	1.10
010yr-01hr	2.02	124.93	5.942	1.50
010yr-02hr	2.37	88.54	7.270	1.84
010yr-03hr	2.53	66.65	7.882	1.99
010yr-06hr	3.03	43.07	9.807	2.48
010yr-12hr	3.52	22.81	11.706	2.96
010yr-24hr	4.08	16.31	13.887	3.51
100 Yr-SCS 24Hr	**5.91**	**341.02**	**21.056**	**5.32**
100yr-0.17hr	1.25	186.38	3.103	0.78
100yr-0.25hr	1.56	200.02	4.226	1.07
100yr-0.50hr	2.25	226.25	6.813	1.72
100yr-01hr	3.01	212.02	9.729	2.46
100yr-02hr	2.65	102.43	8.342	2.11
100yr-03hr	3.94	115.42	13.341	3.37
100yr-06hr	4.78	73.96	16.623	4.20
100yr-12hr	5.37	36.22	18.936	4.79
100yr-24hr	5.91	24.15	21.056	5.32
WQV-0.17hr	1.25	186.38	3.103	0.78
WQV-0.25hr	1.25	147.35	3.103	0.78
WQV-0.50hr	1.25	94.60	3.103	0.78
WQV-01hr	1.25	61.87	3.103	0.78
WQV-02hr	1.25	35.18	3.103	0.78
WQV-03hr	1.25	24.24	3.103	0.78
WQV-06hr	1.25	12.41	3.103	0.78
WQV-12hr	1.25	6.27	3.103	0.78
WQV-24hr	1.25	4.19	3.103	0.78

Summary for Subcatchment 16S: Basin 1 (South)

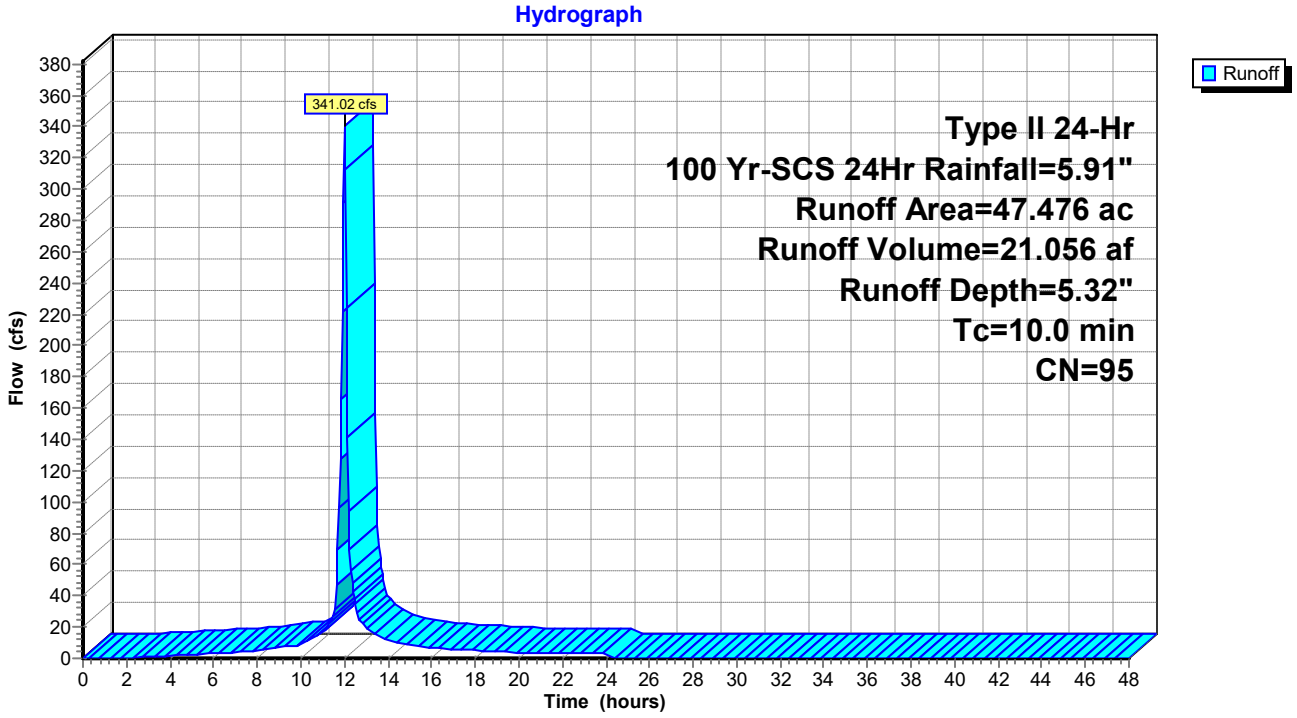
Runoff = 341.02 cfs @ 12.01 hrs, Volume= 21.056 af, Depth= 5.32"
Routed to Pond 7P : Wet Pond 1 (South)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-Hr 100 Yr-SCS 24Hr Rainfall=5.91"

	Area (ac)	CN	Description
*	47.476	95	
	47.476		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry,**

Subcatchment 16S: Basin 1 (South)



Events for Subcatchment 11S: Ex Site

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
002yr-0.17hr	0.69	0.00	0.000	0.00
002yr-0.25hr	0.85	0.33	0.057	0.01
002yr-0.50hr	1.13	2.54	0.444	0.05
002yr-01hr	1.39	6.05	1.077	0.11
002yr-02hr	1.62	9.37	1.819	0.19
002yr-03hr	1.72	9.85	2.188	0.23
002yr-06hr	2.05	9.98	3.577	0.37
002yr-12hr	2.45	9.91	5.559	0.58
002yr-24hr	2.92	12.28	8.218	0.86
10 Yr-SCS 24Hr	4.10	50.99	15.998	1.67
010yr-0.17hr	0.93	0.76	0.132	0.01
010yr-0.25hr	1.14	2.68	0.464	0.05
010yr-0.50hr	1.59	9.79	1.714	0.18
010yr-01hr	2.02	19.19	3.441	0.36
010yr-02hr	2.37	25.42	5.140	0.54
010yr-03hr	2.53	24.96	5.989	0.63
010yr-06hr	3.03	21.74	8.883	0.93
010yr-12hr	3.52	21.84	12.010	1.25
010yr-24hr	4.08	22.56	15.856	1.66
100 Yr-SCS 24Hr	**5.91**	**98.87**	**29.785**	**3.11**
100yr-0.17hr	1.25	4.08	0.707	0.07
100yr-0.25hr	1.56	9.30	1.611	0.17
100yr-0.50hr	2.25	25.88	4.532	0.47
100yr-01hr	3.01	48.36	8.761	0.91
100yr-02hr	2.65	32.68	6.652	0.69
100yr-03hr	3.94	58.75	14.871	1.55
100yr-06hr	4.78	47.15	20.979	2.19
100yr-12hr	5.37	46.75	25.507	2.66
100yr-24hr	5.91	40.28	29.785	3.11
WQV-0.17hr	1.25	4.08	0.707	0.07
WQV-0.25hr	1.25	4.08	0.707	0.07
WQV-0.50hr	1.25	4.04	0.707	0.07
WQV-01hr	1.25	3.98	0.707	0.07
WQV-02hr	1.25	3.79	0.707	0.07
WQV-03hr	1.25	3.48	0.707	0.07
WQV-06hr	1.25	2.57	0.707	0.07
WQV-12hr	1.25	1.54	0.707	0.07
WQV-24hr	1.25	1.20	0.707	0.07

10 YR POST ALLOWABLE RELEASE, PER CITY OF FRANKLIN STORMWATER MANAGEMENT ORDINANCE

100 YR POST ALLOWABLE RELEASE, PER CITY OF FRANKLIN STORMWATER MANAGEMENT ORDINANCE

Summary for Subcatchment 11S: Ex Site

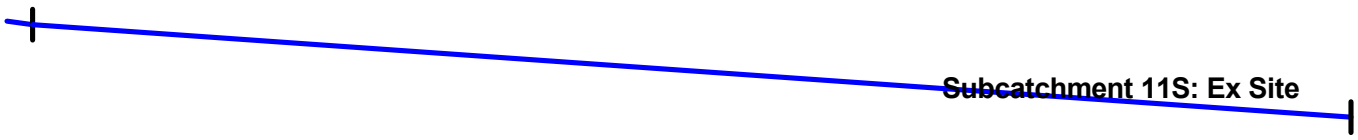
Runoff = 12.28 cfs @ 18.70 hrs, Volume= 8.218 af, Depth= 0.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Indy Huff 3rd Quartile scaled to 24.00 hrs 002yr-24hr Rainfall=2.92"

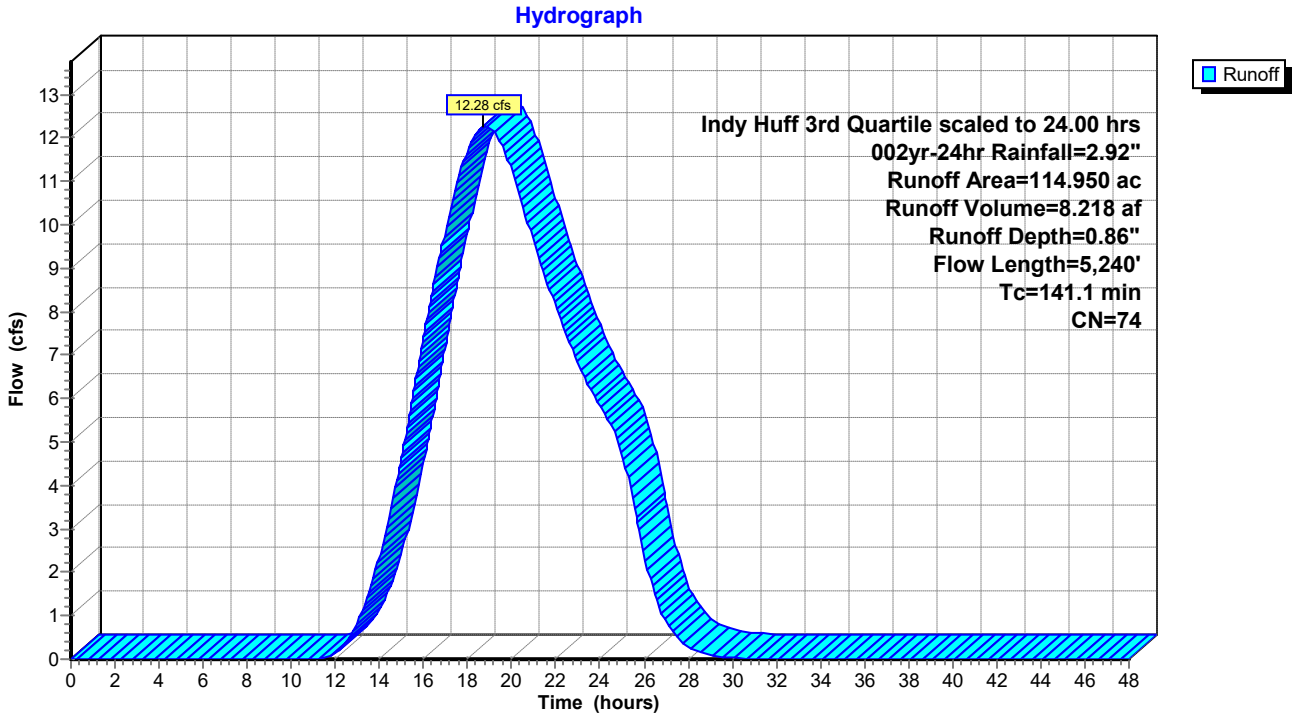
10 YR POST ALLOWABLE RELEASE, PER CITY OF FRANKLIN STORMWATER MANAGEMENT ORDINANCE

Area (ac)	CN	Description
114.950	74	Pasture/grassland/range, Good, HSG C
114.950		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	100	0.0100	0.26		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 2.91"
134.6	5,140	0.0050	0.64		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
141.1	5,240	Total			



Subcatchment 11S: Ex Site



Summary for Subcatchment 11S: Ex Site

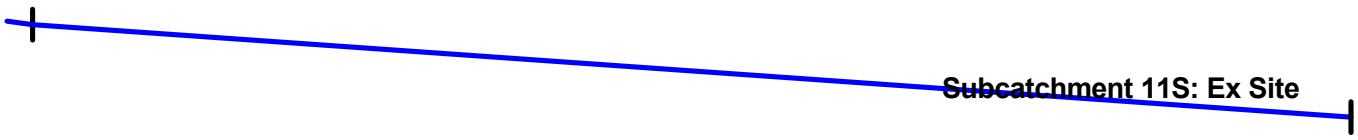
Runoff = 25.42 cfs @ 3.02 hrs, Volume= 5.140 af, Depth= 0.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Indy Huff 1st Quartile scaled to 2.00 hrs 010yr-02hr Rainfall=2.37"

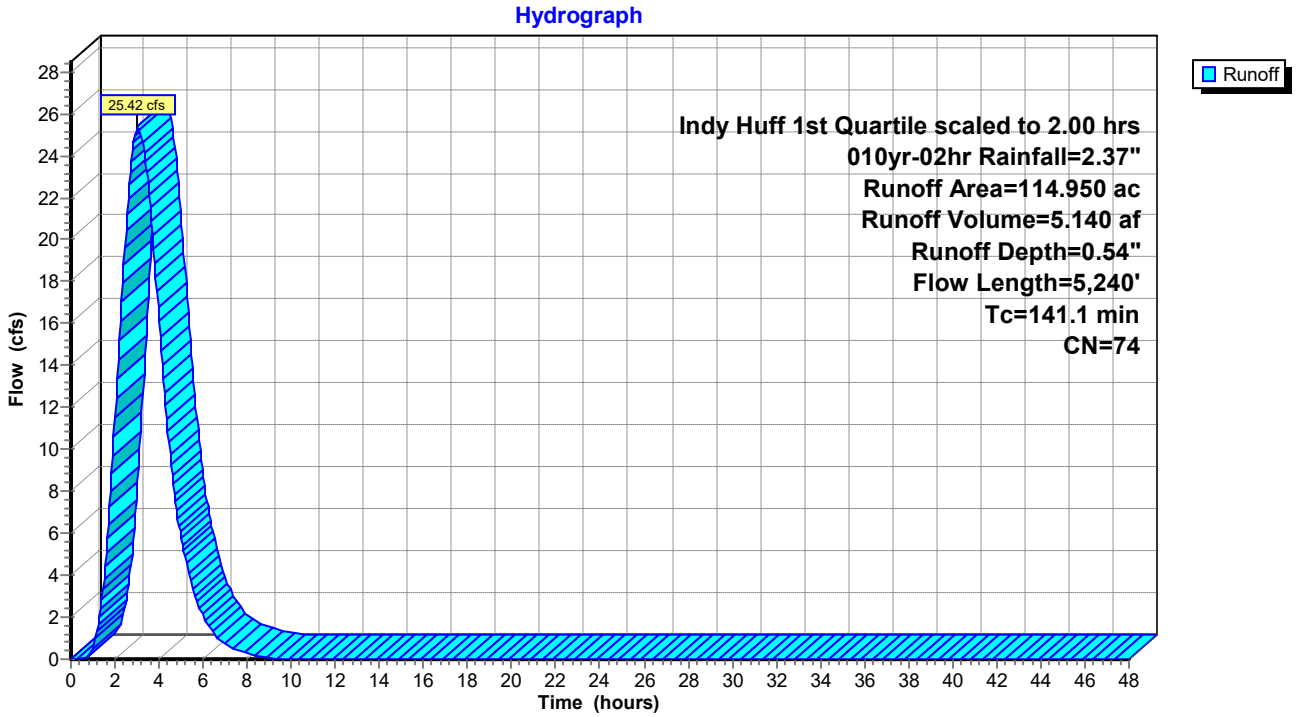
100 YR POST ALLOWABLE RELEASE, PER CITY OF FRANKLIN STORMWATER MANAGEMENT ORDINANCE

Area (ac)	CN	Description
114.950	74	Pasture/grassland/range, Good, HSG C
114.950		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	100	0.0100	0.26		**Sheet Flow,** Cultivated: Residue<=20% n= 0.060 P2= 2.91"
134.6	5,140	0.0050	0.64		**Shallow Concentrated Flow,** Cultivated Straight Rows Kv= 9.0 fps
141.1	5,240	Total			



Subcatchment 11S: Ex Site



Events for Pond 7P: Wet Pond 1 (South)

Event	Inflow (cfs)	Primary (cfs)	Elevation (feet)	Storage (cubic-feet)
002yr-0.17hr	77.32	0.39	771.78	113,442
002yr-0.25hr	88.92	0.77	771.89	161,109
002yr-0.50hr	85.69	1.72	772.11	250,002
002yr-01hr	78.60	2.90	772.32	336,246
002yr-02hr	58.33	4.07	772.50	414,260
002yr-03hr	45.55	4.59	772.58	447,984
002yr-06hr	34.06	6.08	772.84	555,948
002yr-12hr	33.74	7.22	773.11	672,686
002yr-24hr	29.60	8.28	773.40	794,865
10 Yr-SCS 24Hr	279.53	10.98	774.28	1,180,737
010yr-0.17hr	126.46	1.00	771.95	185,933
010yr-0.25hr	138.07	1.76	772.12	253,269
010yr-0.50hr	144.04	3.92	772.48	404,325
010yr-01hr	135.22	6.07	772.84	555,674
010yr-02hr	99.99	7.34	773.14	685,508
010yr-03hr	78.72	7.85	773.28	743,624
010yr-06hr	61.68	9.18	773.67	913,490
010yr-12hr	53.80	10.12	773.99	1,050,769
010yr-24hr	42.34	10.99	774.28	1,181,693
100 Yr-SCS 24Hr	**415.48**	**25.10**	**775.31**	**1,645,819**
100yr-0.17hr	196.32	2.24	772.20	289,482
100yr-0.25hr	213.64	3.76	772.46	394,036
100yr-0.50hr	239.91	6.92	773.04	641,299
100yr-01hr	229.29	9.32	773.72	932,520
100yr-02hr	116.08	8.26	773.39	792,174
100yr-03hr	142.19	12.79	774.50	1,277,145
100yr-06hr	114.70	20.14	775.03	1,517,581
100yr-12hr	87.70	23.63	775.23	1,609,230
100yr-24hr	61.05	24.05	775.26	1,619,833
WQV-0.17hr	196.32	2.24	772.20	289,482
WQV-0.25hr	157.47	2.24	772.20	289,482
WQV-0.50hr	100.39	2.24	772.20	289,478
WQV-01hr	66.63	2.24	772.20	289,452
WQV-02hr	39.18	2.23	772.20	289,305
WQV-03hr	27.85	2.23	772.20	289,026
WQV-06hr	15.35	2.21	772.20	287,409
WQV-12hr	11.85	2.16	772.19	283,695
WQV-24hr	9.70	2.10	772.18	279,283

Summary for Pond 7P: Wet Pond 1 (South)

Inflow Area = 133.238 ac, 0.00% Impervious, Inflow Depth > 3.48" for 010yr-24hr event
Inflow = 42.34 cfs @ 16.88 hrs, Volume= 38.600 af
Outflow = 10.99 cfs @ 24.17 hrs, Volume= 25.582 af, Atten= 74%, Lag= 437.4 min
Primary = 10.99 cfs @ 24.17 hrs, Volume= 25.582 af
Routed to nonexistent node 20L

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 774.28' @ 24.17 hrs Surf.Area= 443,271 sf Storage= 1,181,693 cf

Plug-Flow detention time= 942.4 min calculated for 25.582 af (66% of inflow)
Center-of-Mass det. time= 760.0 min (1,789.6 - 1,029.6)

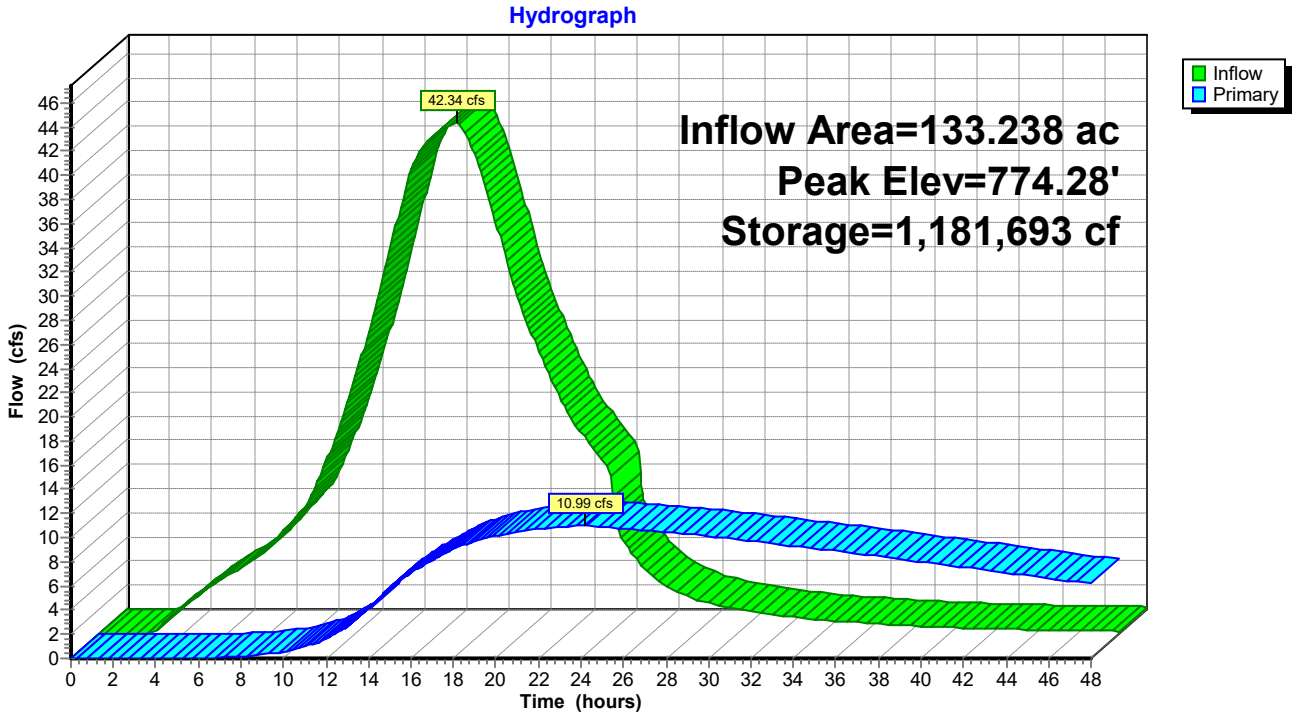
Volume	Invert	Avail.Storage	Storage Description
#1	771.50'	2,921,766 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
771.50	406,211	0	0
778.00	492,794	2,921,766	2,921,766

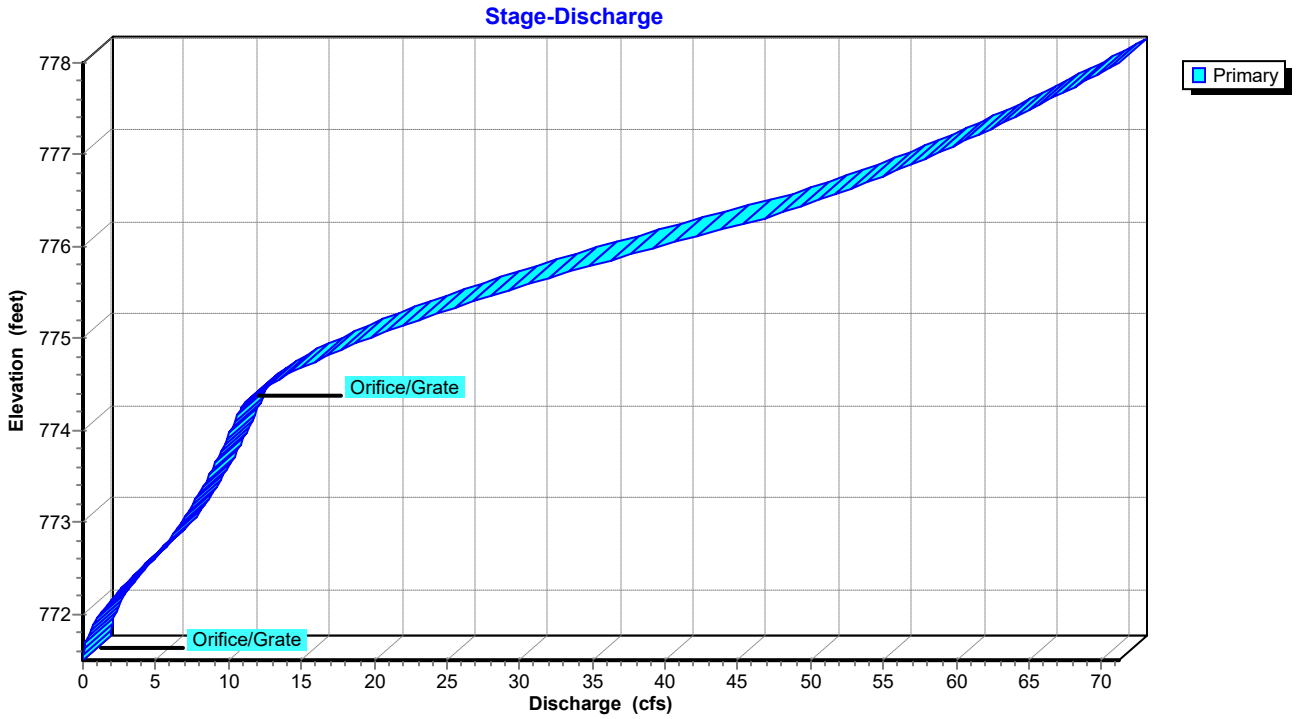
Device	Routing	Invert	Outlet Devices
#1	Primary	771.50'	**17.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	774.25'	**40.0" W x 24.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=10.99 cfs @ 24.17 hrs HW=774.28' (Free Discharge)
└─**1=Orifice/Grate** (Orifice Controls 10.93 cfs @ 6.93 fps)
└─**2=Orifice/Grate** (Orifice Controls 0.06 cfs @ 0.58 fps)

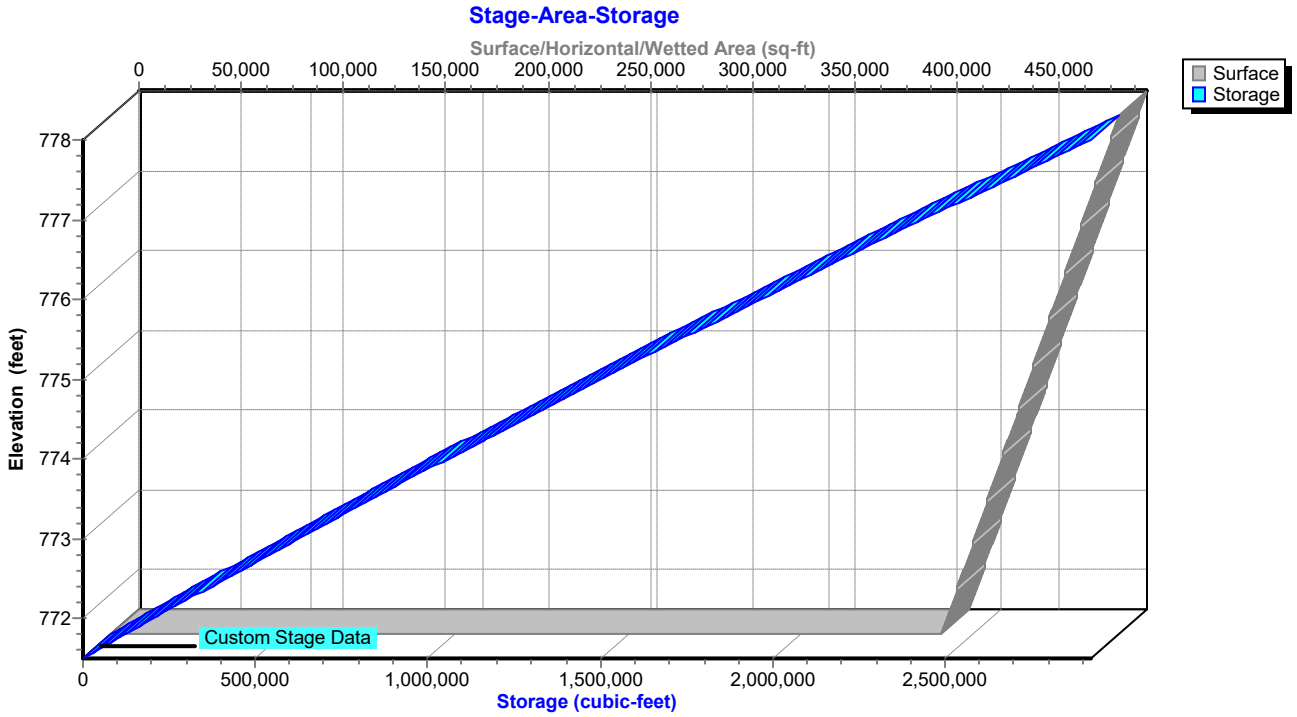
Pond 7P: Wet Pond 1 (South)



Pond 7P: Wet Pond 1 (South)



Pond 7P: Wet Pond 1 (South)



Summary for Pond 7P: Wet Pond 1 (South)

Inflow Area = 133.238 ac, 0.00% Impervious, Inflow Depth > 5.28" for 100 Yr-SCS 24Hr event
Inflow = 415.48 cfs @ 12.01 hrs, Volume= 58.610 af
Outflow = 25.10 cfs @ 16.74 hrs, Volume= 42.456 af, Atten= 94%, Lag= 283.4 min
Primary = 25.10 cfs @ 16.74 hrs, Volume= 42.456 af
Routed to nonexistent node 20L

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 775.31' @ 16.74 hrs Surf.Area= 457,005 sf Storage= 1,645,819 cf

Plug-Flow detention time= 845.4 min calculated for 42.456 af (72% of inflow)
Center-of-Mass det. time= 687.0 min (1,583.3 - 896.3)

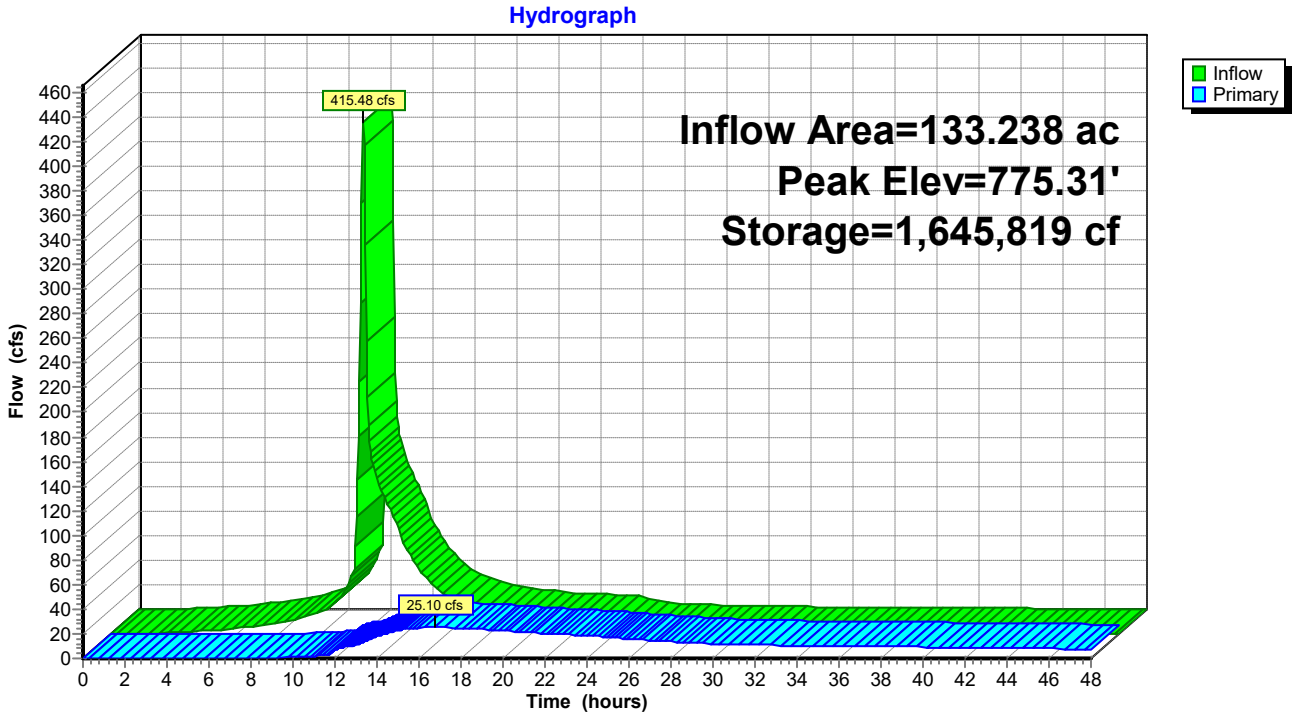
Volume	Invert	Avail.Storage	Storage Description
#1	771.50'	2,921,766 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
771.50	406,211	0	0
778.00	492,794	2,921,766	2,921,766

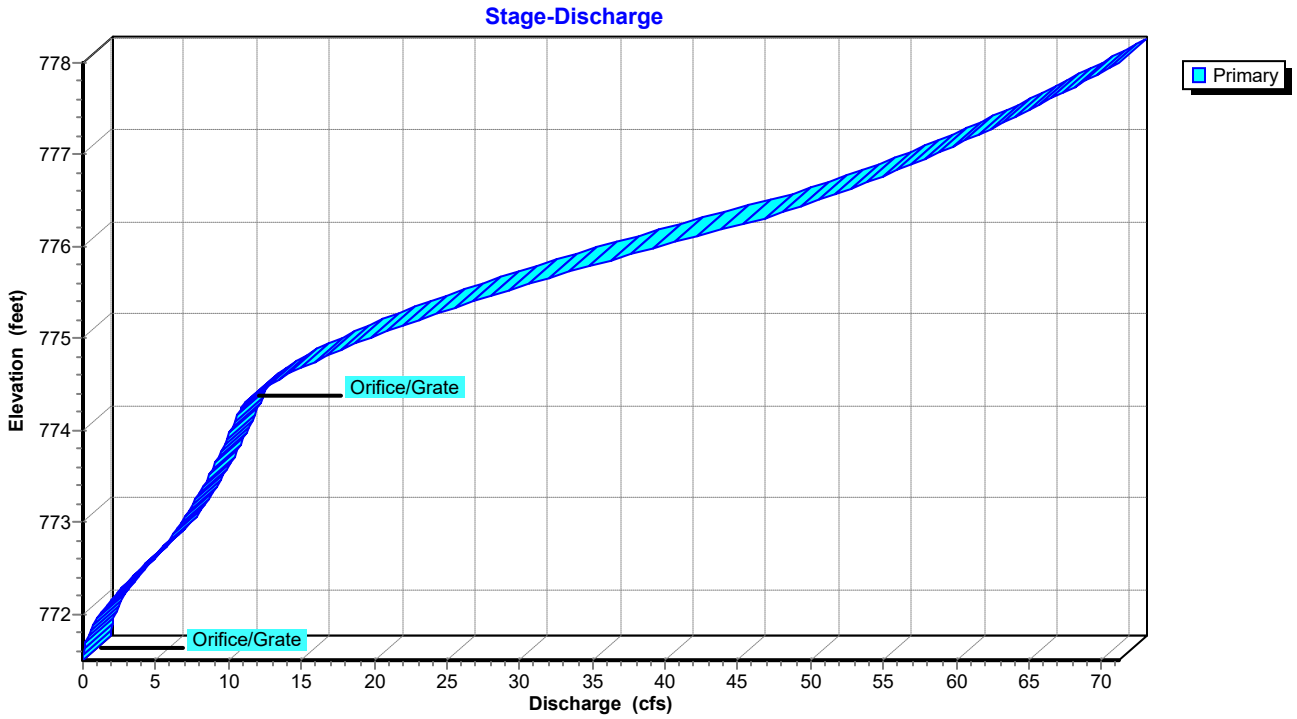
Device	Routing	Invert	Outlet Devices
#1	Primary	771.50'	**17.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	774.25'	**40.0" W x 24.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=25.10 cfs @ 16.74 hrs HW=775.31' (Free Discharge)
└─**1=Orifice/Grate** (Orifice Controls 13.37 cfs @ 8.48 fps)
└─**2=Orifice/Grate** (Orifice Controls 11.73 cfs @ 3.31 fps)

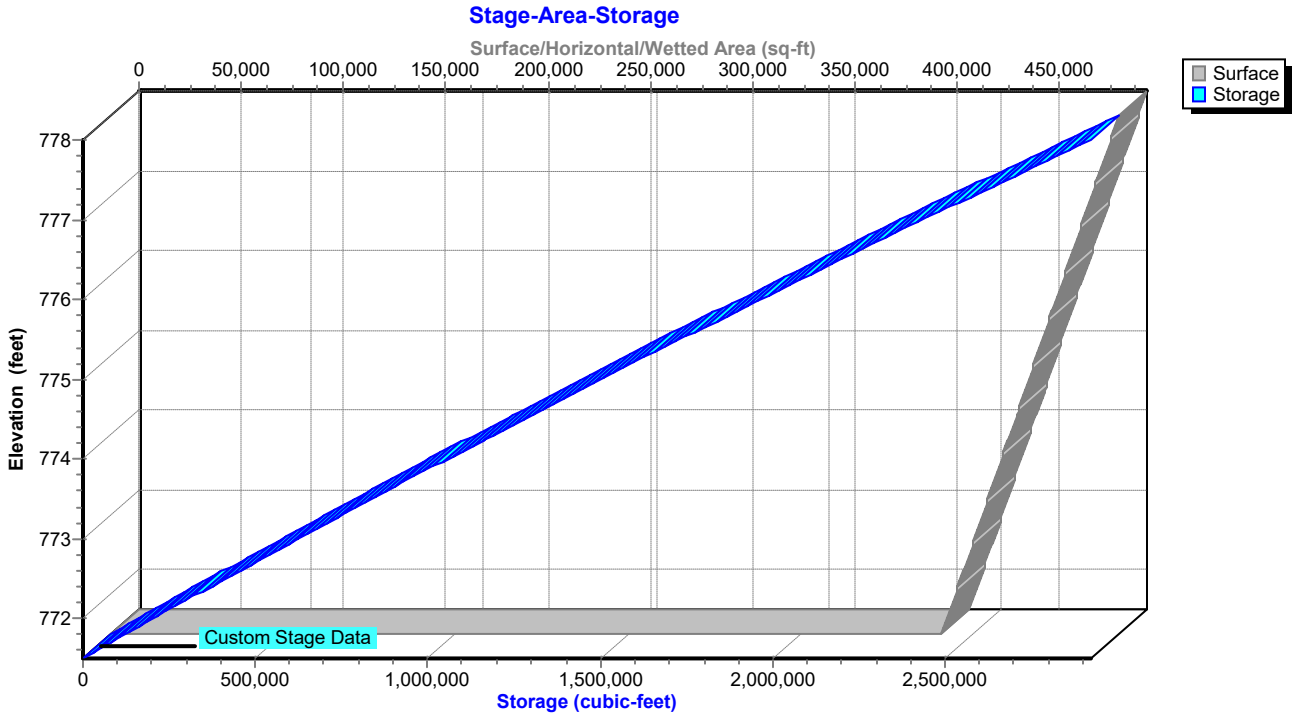
Pond 7P: Wet Pond 1 (South)



Pond 7P: Wet Pond 1 (South)



Pond 7P: Wet Pond 1 (South)



Events for Pond 17P: EDDB Pond 2 (Middle)

Event	Inflow (cfs)	Primary (cfs)	Elevation (feet)	Storage (cubic-feet)
002yr-0.17hr	19.26	7.23	773.90	9,785
002yr-0.25hr	23.47	10.89	774.10	14,647
002yr-0.50hr	28.78	18.72	774.45	25,016
002yr-01hr	32.40	26.02	774.72	34,119
002yr-02hr	29.45	27.82	774.78	36,312
002yr-03hr	25.28	24.67	774.67	32,465
002yr-06hr	19.55	19.32	774.47	25,789
002yr-12hr	21.21	20.87	774.53	27,746
002yr-24hr	18.96	18.52	774.49	26,226
10 Yr-SCS 24Hr	124.40	77.12	776.23	99,067
010yr-0.17hr	32.64	13.25	774.22	17,810
010yr-0.25hr	39.55	19.81	774.49	26,413
010yr-0.50hr	54.48	36.48	775.06	46,753
010yr-01hr	58.98	49.54	775.45	62,555
010yr-02hr	51.15	49.09	775.44	62,005
010yr-03hr	43.11	42.36	775.24	53,819
010yr-06hr	37.03	35.12	775.02	45,118
010yr-12hr	34.19	33.76	774.98	43,475
010yr-24hr	27.26	26.41	774.90	40,663
100 Yr-SCS 24Hr	**178.30**	**100.55**	**777.00**	**141,561**
100yr-0.17hr	54.05	24.07	774.65	31,729
100yr-0.25hr	68.55	36.47	775.06	46,733
100yr-0.50hr	94.63	63.97	775.86	80,841
100yr-01hr	98.40	83.65	776.42	109,075
100yr-02hr	59.21	56.90	775.66	71,729
100yr-03hr	76.91	72.85	776.11	92,927
100yr-06hr	69.63	65.92	775.91	83,432
100yr-12hr	56.05	54.95	775.67	72,357
100yr-24hr	39.40	37.48	775.62	69,913
WQV-0.17hr	54.05	24.07	774.65	31,729
WQV-0.25hr	46.55	23.87	774.64	31,476
WQV-0.50hr	35.05	23.01	774.61	30,420
WQV-01hr	26.68	21.14	774.54	28,086
WQV-02hr	19.25	17.64	774.40	23,631
WQV-03hr	15.26	14.75	774.28	19,830
WQV-06hr	9.54	9.43	774.03	12,695
WQV-12hr	7.07	6.95	773.88	9,406
WQV-24hr	6.03	5.99	773.82	8,136

Summary for Pond 17P: EDDB Pond 2 (Middle)

Inflow Area = 85.762 ac, 0.00% Impervious, Inflow Depth > 5.26" for 100 Yr-SCS 24Hr event
Inflow = 178.30 cfs @ 12.02 hrs, Volume= 37.591 af
Outflow = 100.55 cfs @ 12.42 hrs, Volume= 37.554 af, Atten= 44%, Lag= 23.7 min
Primary = 100.55 cfs @ 12.42 hrs, Volume= 37.554 af
Routed to Pond 7P : Wet Pond 1 (South)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 777.00' @ 12.42 hrs Surf.Area= 59,097 sf Storage= 141,561 cf

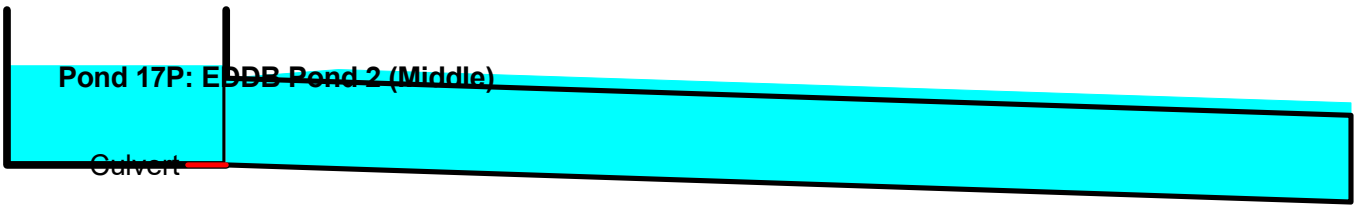
Plug-Flow detention time= 49.0 min calculated for 37.554 af (100% of inflow)
Center-of-Mass det. time= 47.1 min (970.5 - 923.4)

Volume	Invert	Avail.Storage	Storage Description
#1	773.00'	296,520 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

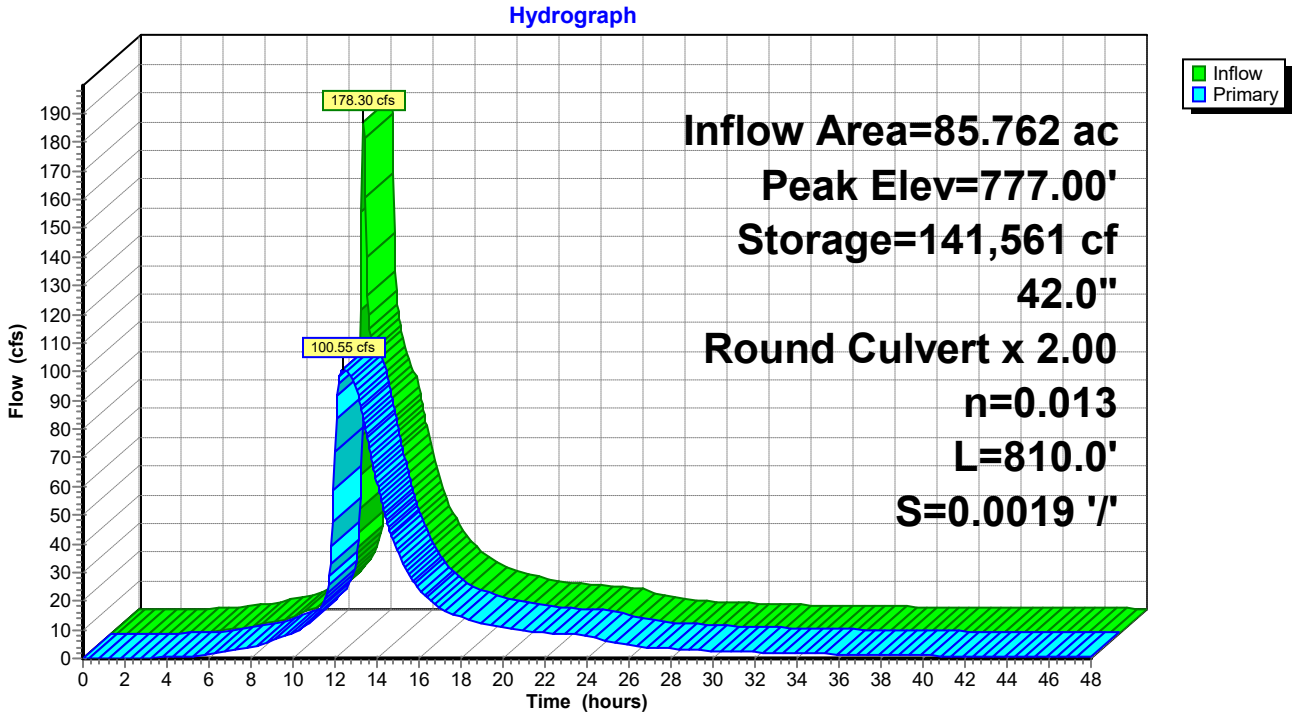
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
773.00	0	0	0
774.25	30,144	18,840	18,840
777.25	61,725	137,804	156,644
779.25	78,151	139,876	296,520

Device	Routing	Invert	Outlet Devices
#1	Primary	773.00'	**42.0" Round Culvert X 2.00** L= 810.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 773.00' / 771.50' S= 0.0019 '/' Cc= 0.900 n= 0.013, Flow Area= 9.62 sf

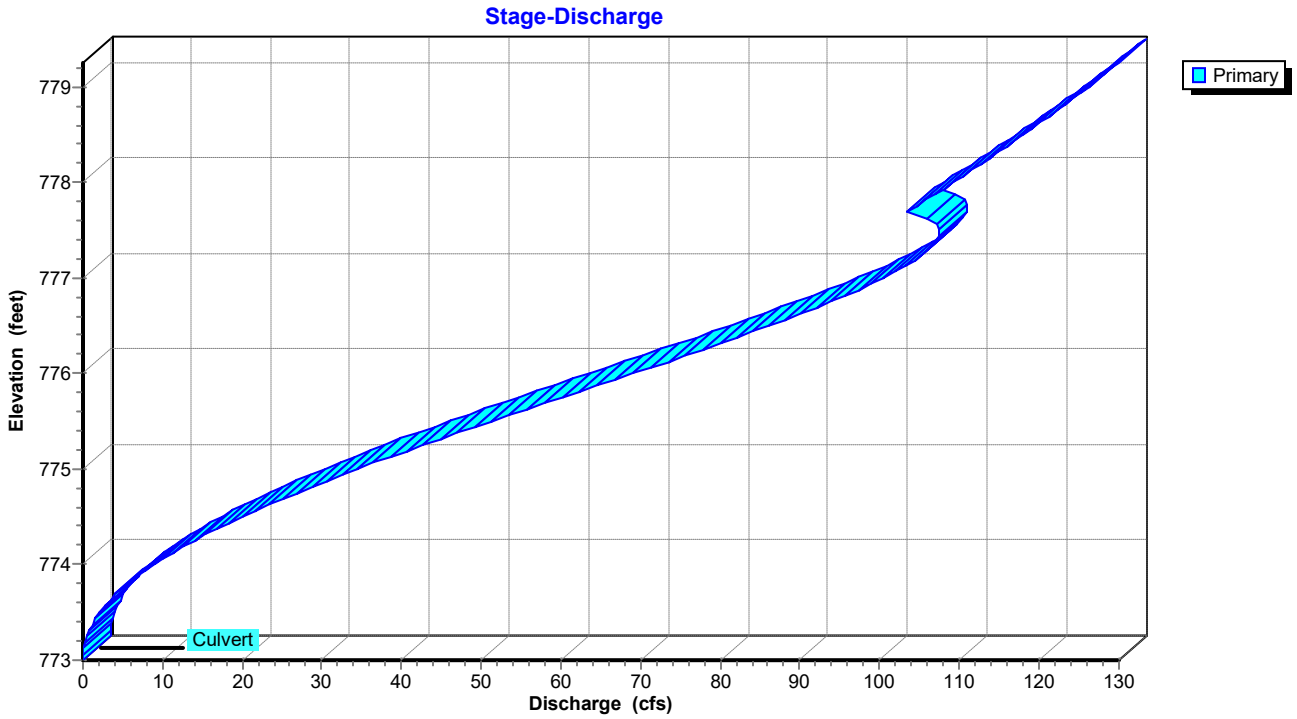
Primary OutFlow Max=100.54 cfs @ 12.42 hrs HW=777.00' TW=773.72' (Dynamic Tailwater)
1=Culvert (Barrel Controls 100.54 cfs @ 5.73 fps)



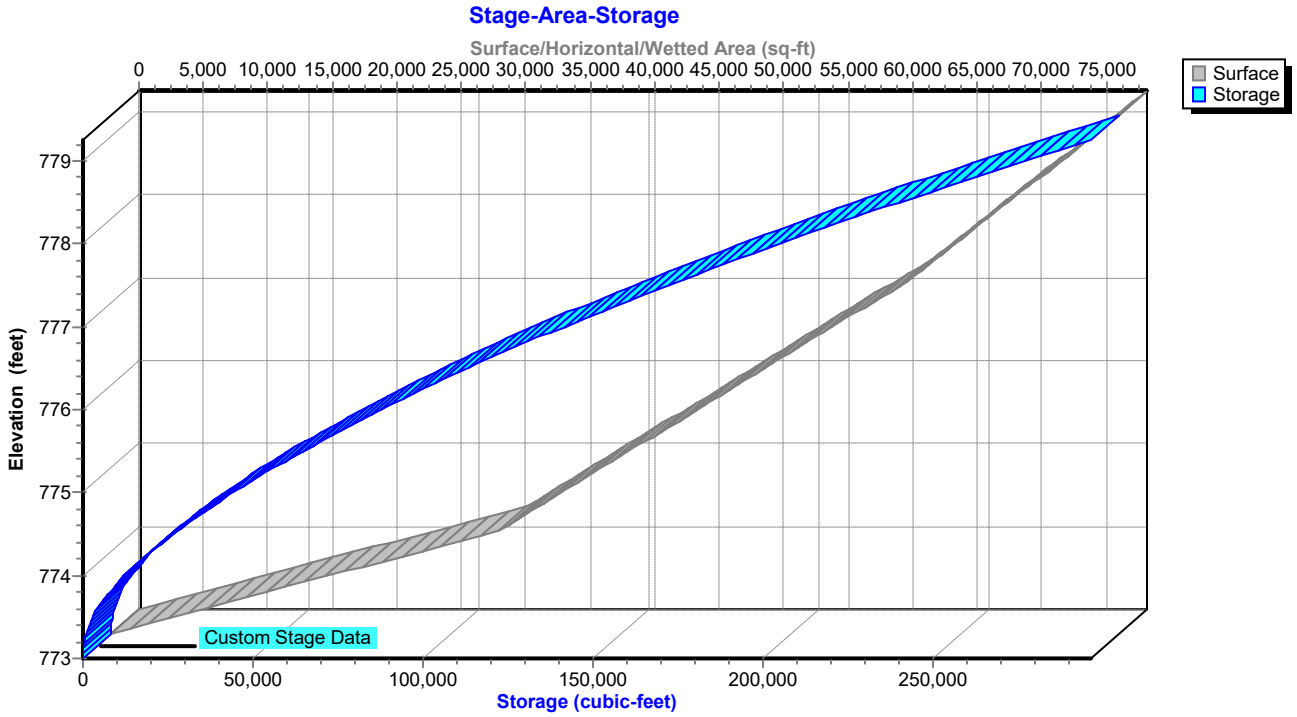
Pond 17P: EDDB Pond 2 (Middle)



Pond 17P: EDDB Pond 2 (Middle)



Pond 17P: EDDB Pond 2 (Middle)



Events for Pond 18P: Wet Pond 3 (North)

Event	Inflow (cfs)	Primary (cfs)	Elevation (feet)	Storage (acre-feet)
002yr-0.17hr	115.53	4.60	774.68	1.793
002yr-0.25hr	129.97	8.64	774.94	2.493
002yr-0.50hr	125.94	17.90	775.36	3.688
002yr-01hr	113.79	24.75	775.64	4.506
002yr-02hr	81.37	24.76	775.68	4.600
002yr-03hr	61.32	21.49	775.55	4.228
002yr-06hr	40.32	16.77	775.34	3.632
002yr-12hr	23.43	18.16	775.40	3.810
002yr-24hr	17.64	16.27	775.33	3.589
10 Yr-SCS 24Hr	361.52	79.49	777.40	9.997
010yr-0.17hr	187.73	11.16	775.07	2.863
010yr-0.25hr	201.69	18.97	775.40	3.810
010yr-0.50hr	217.72	37.06	776.05	5.707
010yr-01hr	195.02	46.75	776.44	6.907
010yr-02hr	138.21	43.15	776.38	6.722
010yr-03hr	104.05	36.88	776.16	6.036
010yr-06hr	67.23	31.02	775.92	5.334
010yr-12hr	35.61	29.33	775.87	5.172
010yr-24hr	25.46	23.36	775.68	4.599
100 Yr-SCS 24Hr	**532.34**	**97.03**	**778.78**	**14.760**
100yr-0.17hr	290.94	23.73	775.58	4.333
100yr-0.25hr	312.23	38.09	776.06	5.744
100yr-0.50hr	353.19	66.32	776.98	8.615
100yr-01hr	330.96	77.87	777.62	10.703
100yr-02hr	159.89	49.96	776.63	7.498
100yr-03hr	180.17	63.17	777.14	9.137
100yr-06hr	115.46	58.23	776.92	8.427
100yr-12hr	56.54	48.11	776.58	7.339
100yr-24hr	37.69	33.63	776.22	6.232
WQV-0.17hr	290.94	23.73	775.58	4.333
WQV-0.25hr	230.02	23.61	775.58	4.315
WQV-0.50hr	147.68	22.64	775.54	4.216
WQV-01hr	96.58	20.06	775.46	3.960
WQV-02hr	54.92	15.90	775.29	3.485
WQV-03hr	37.85	12.97	775.16	3.105
WQV-06hr	19.37	8.18	774.90	2.386
WQV-12hr	9.79	6.02	774.76	2.013
WQV-24hr	6.54	5.18	774.70	1.854

Summary for Pond 18P: Wet Pond 3 (North)

Inflow Area = 74.111 ac, 0.00% Impervious, Inflow Depth = 5.32" for 100 Yr-SCS 24Hr event
Inflow = 532.34 cfs @ 12.01 hrs, Volume= 32.869 af
Outflow = 97.03 cfs @ 12.10 hrs, Volume= 32.424 af, Atten= 82%, Lag= 5.8 min
Primary = 97.03 cfs @ 12.10 hrs, Volume= 32.424 af
Routed to Pond 17P : EDDB Pond 2 (Middle)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 778.78' @ 12.29 hrs Surf.Area= 3.620 ac Storage= 14.760 af

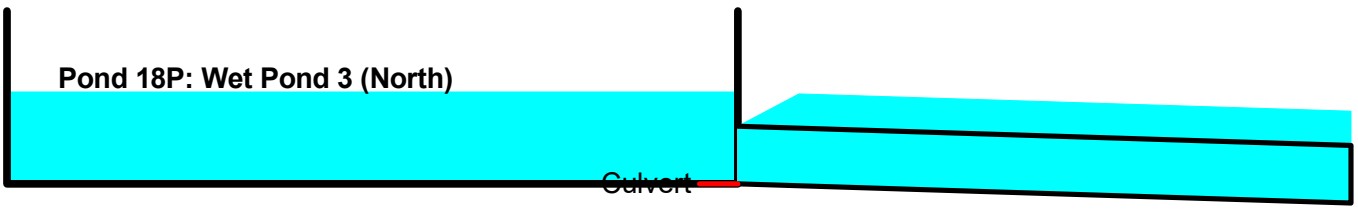
Plug-Flow detention time= 192.4 min calculated for 32.390 af (99% of inflow)
Center-of-Mass det. time= 184.9 min (948.8 - 764.0)

Volume	Invert	Avail.Storage	Storage Description
#1	774.00'	32.027 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

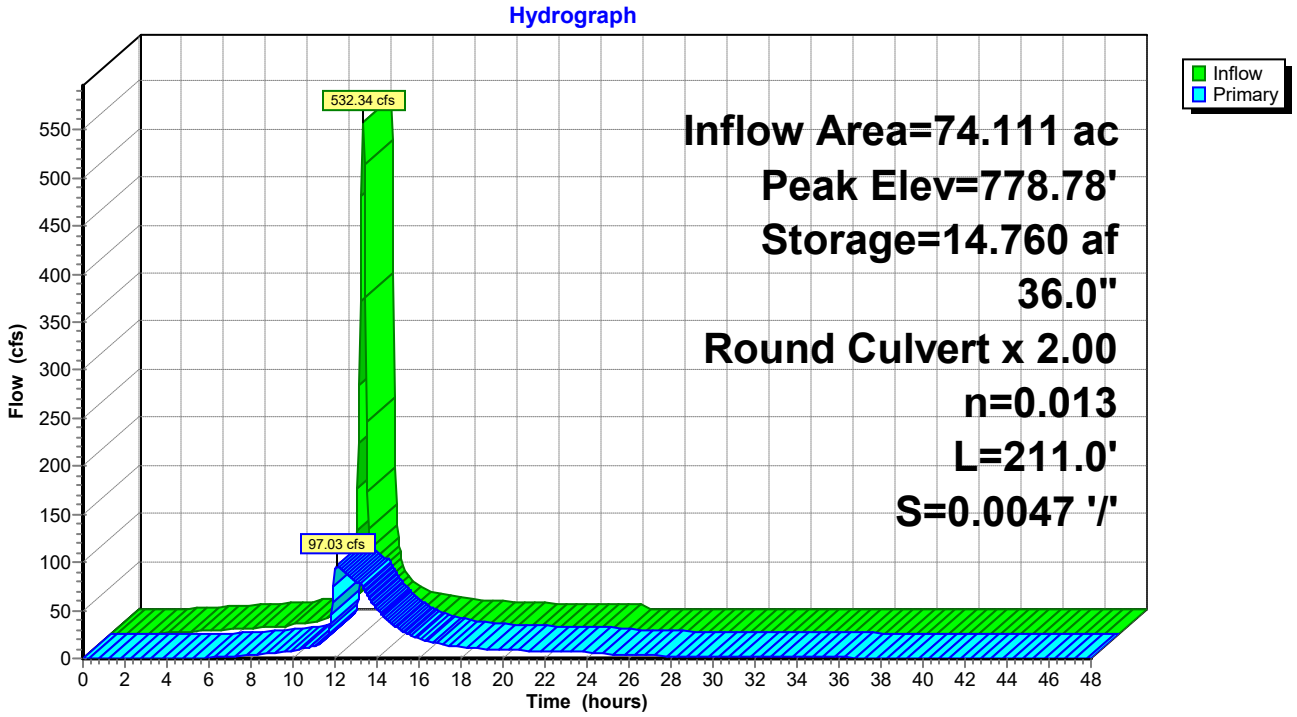
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
774.00	2.558	0.000	0.000
783.00	4.559	32.027	32.027

Device	Routing	Invert	Outlet Devices
#1	Primary	774.00'	**36.0" Round Culvert X 2.00** L= 211.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 774.00' / 773.00' S= 0.0047 '/' Cc= 0.900 n= 0.013, Flow Area= 7.07 sf

Primary OutFlow Max=90.93 cfs @ 12.10 hrs HW=778.43' TW=776.68' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 90.93 cfs @ 6.43 fps)



Pond 18P: Wet Pond 3 (North)



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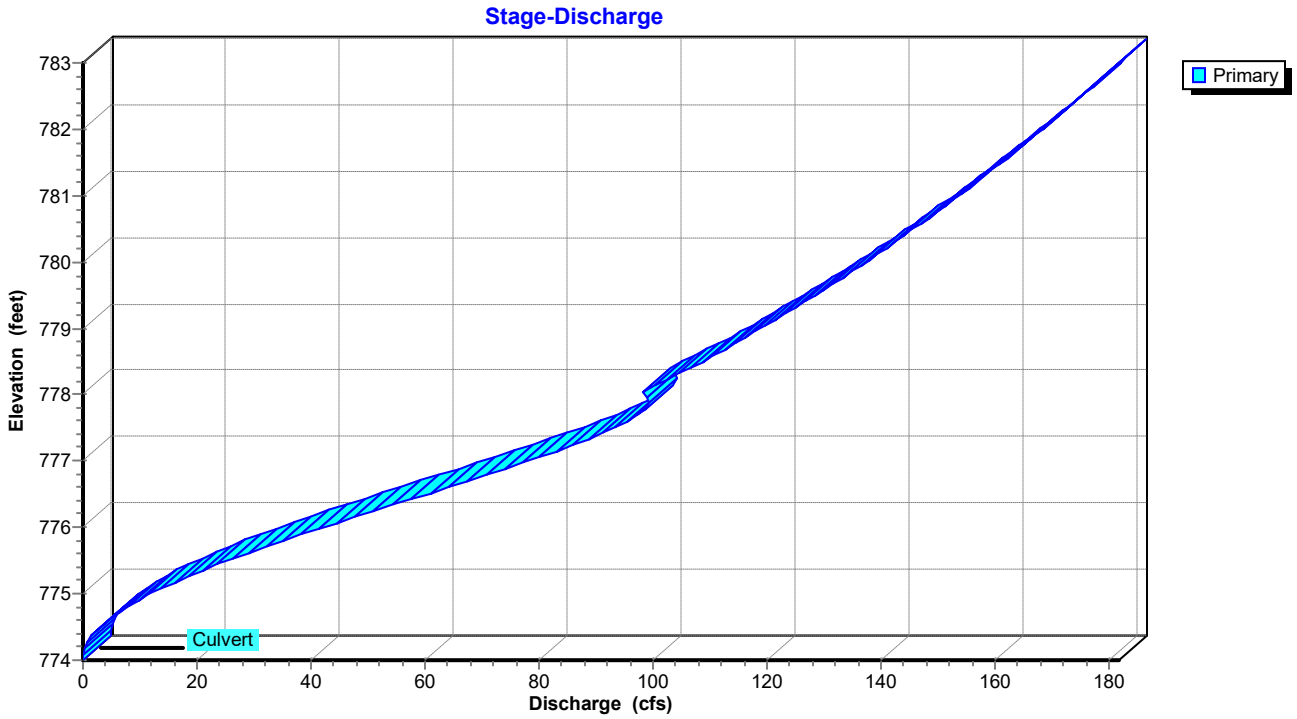
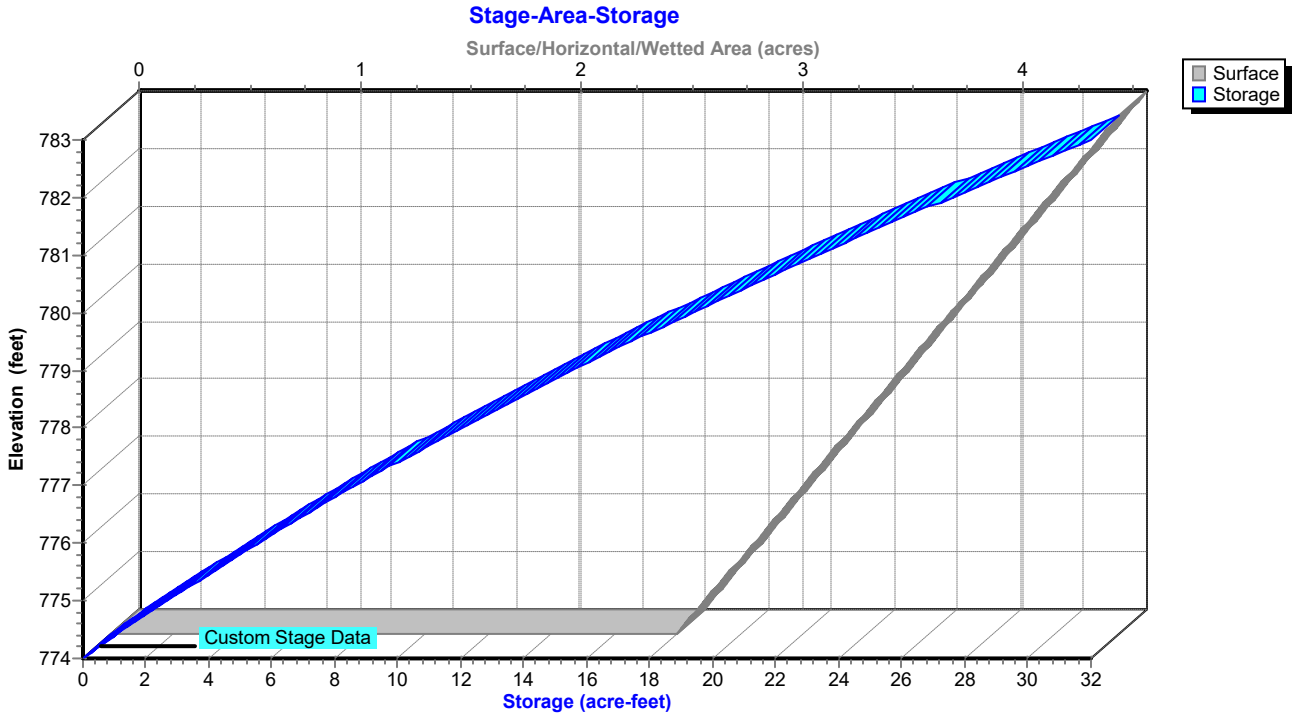


Pond 18P: Wet Pond 3 (North)

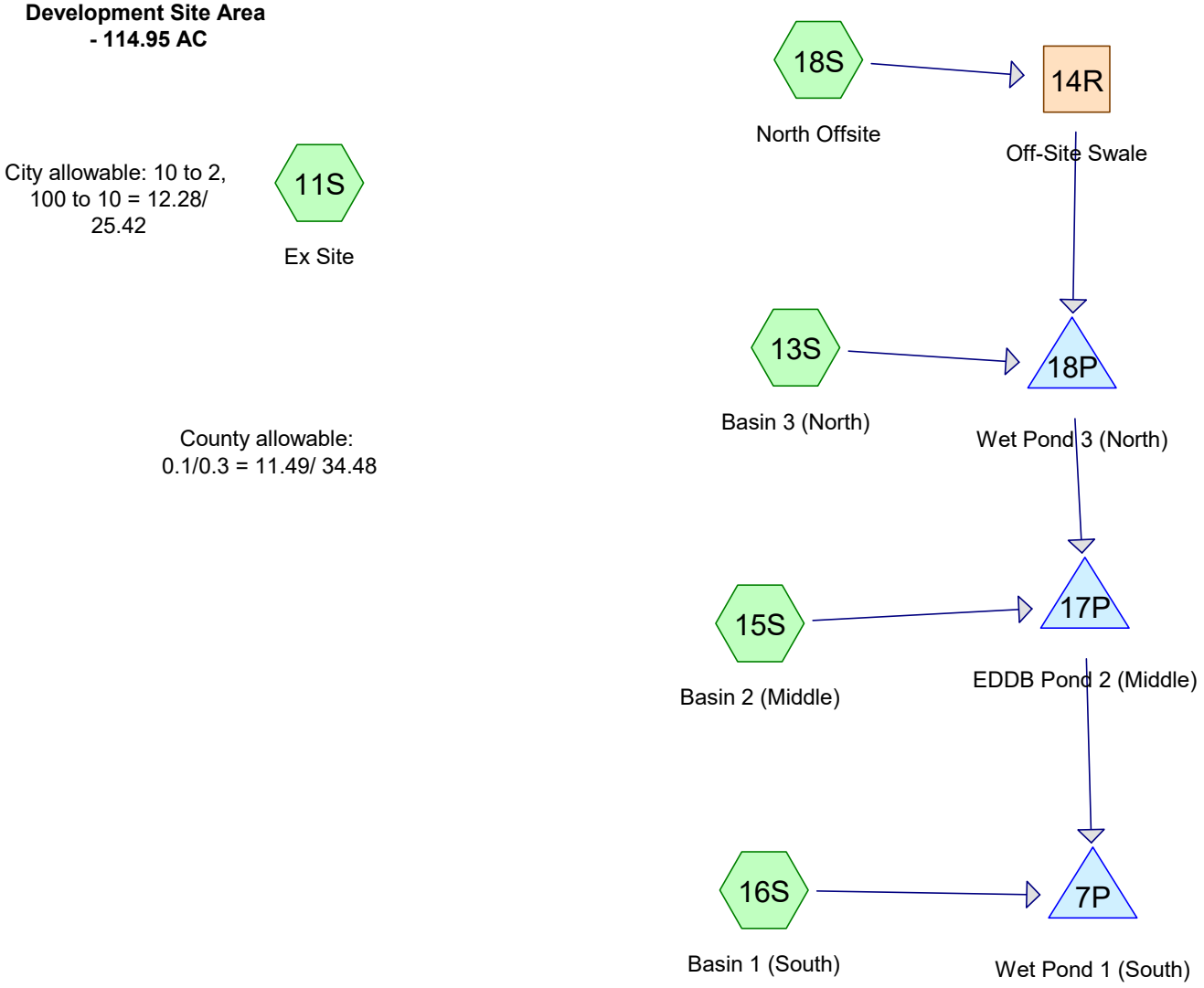


MODEL/CALCULATIONS
WITH OFFSITE

Development Site Area
- 114.95 AC

City allowable: 10 to 2,
100 to 10 = 12.28/
25.42

County allowable:
0.1/0.3 = 11.49/ 34.48



Subcat Reach Pond Link

Routing Diagram for Malarkey IND_Huff_R1
Prepared by Kimley-Horn & Associates, Printed 8/7/2024

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	002yr-0.17hr	Indy Huff	1st Quartile	Scale	0.17	1	0.69	2
2	002yr-0.25hr	Indy Huff	1st Quartile	Scale	0.25	1	0.85	2
3	002yr-0.50hr	Indy Huff	1st Quartile	Scale	0.50	1	1.13	2
4	002yr-01hr	Indy Huff	1st Quartile	Scale	1.00	1	1.39	2
5	002yr-02hr	Indy Huff	1st Quartile	Scale	2.00	1	1.62	2
6	002yr-03hr	Indy Huff	1st Quartile	Scale	3.00	1	1.72	2
7	002yr-06hr	Indy Huff	1st Quartile	Scale	6.00	1	2.05	2
8	002yr-12hr	Indy Huff	2nd Quartile	Scale	12.00	1	2.45	2
9	002yr-24hr	Indy Huff	3rd Quartile	Scale	24.00	1	2.92	2
10	10 Yr-SCS 24Hr	Type II 24-Hr		Default	24.00	1	4.10	2
11	010yr-0.17hr	Indy Huff	1st Quartile	Scale	0.17	1	0.93	2
12	010yr-0.25hr	Indy Huff	1st Quartile	Scale	0.25	1	1.14	2
13	010yr-0.50hr	Indy Huff	1st Quartile	Scale	0.50	1	1.59	2
14	010yr-01hr	Indy Huff	1st Quartile	Scale	1.00	1	2.02	2
15	010yr-02hr	Indy Huff	1st Quartile	Scale	2.00	1	2.37	2
16	010yr-03hr	Indy Huff	1st Quartile	Scale	3.00	1	2.53	2
17	010yr-06hr	Indy Huff	1st Quartile	Scale	6.00	1	3.03	2
18	010yr-12hr	Indy Huff	2nd Quartile	Scale	12.00	1	3.52	2
19	010yr-24hr	Indy Huff	3rd Quartile	Scale	24.00	1	4.08	2
20	100 Yr-SCS 24Hr	Type II 24-Hr		Default	24.00	1	5.91	2
21	100yr-0.17hr	Indy Huff	1st Quartile	Scale	0.17	1	1.25	2
22	100yr-0.25hr	Indy Huff	1st Quartile	Scale	0.25	1	1.56	2
23	100yr-0.50hr	Indy Huff	1st Quartile	Scale	0.50	1	2.25	2
24	100yr-01hr	Indy Huff	1st Quartile	Scale	1.00	1	3.01	2
25	100yr-02hr	Indy Huff	1st Quartile	Scale	2.00	1	2.65	2
26	100yr-03hr	Indy Huff	1st Quartile	Scale	3.00	1	3.94	2
27	100yr-06hr	Indy Huff	1st Quartile	Scale	6.00	1	4.78	2
28	100yr-12hr	Indy Huff	2nd Quartile	Scale	12.00	1	5.37	2
29	100yr-24hr	Indy Huff	3rd Quartile	Scale	24.00	1	5.91	2
30	WQV-0.17hr	Indy Huff	1st Quartile	Scale	0.17	1	1.25	2
31	WQV-0.25hr	Indy Huff	1st Quartile	Scale	0.25	1	1.25	2
32	WQV-0.50hr	Indy Huff	1st Quartile	Scale	0.50	1	1.25	2
33	WQV-01hr	Indy Huff	1st Quartile	Scale	1.00	1	1.25	2
34	WQV-02hr	Indy Huff	1st Quartile	Scale	2.00	1	1.25	2
35	WQV-03hr	Indy Huff	1st Quartile	Scale	3.00	1	1.25	2
36	WQV-06hr	Indy Huff	1st Quartile	Scale	6.00	1	1.25	2
37	WQV-12hr	Indy Huff	2nd Quartile	Scale	12.00	1	1.25	2
38	WQV-24hr	Indy Huff	3rd Quartile	Scale	24.00	1	1.25	2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
133.238	95	(13S, 15S, 16S)
66.930	74	From Paul Hand Drainage Report (Structure 11) (18S)
0.720	98	From Paul Hand Drainage Report (Structure 11) (18S)
114.950	74	Pasture/grassland/range, Good, HSG C (11S)
315.838	**83**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
114.950	HSG C	11S
0.000	HSG D	
200.888	Other	13S, 15S, 16S, 18S
315.838		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover
0.000	0.000	0.000	0.000	133.238	133.238	
0.000	0.000	0.000	0.000	67.650	67.650	From Paul Hand Drainage Report (Structure 11)
0.000	0.000	114.950	0.000	0.000	114.950	Pasture/grassland/range, Good
0.000	**0.000**	**114.950**	**0.000**	**200.888**	**315.838**	**TOTAL AREA**

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Width (inches)	Diam/Height (inches)	Inside-Fill (inches)	Node Name
1	17P	773.00	771.50	810.0	0.0019	0.013	0.0	42.0	0.0	
2	18P	774.00	773.00	211.0	0.0047	0.013	0.0	36.0	0.0	

Events for Subcatchment 13S: Basin 3 (North)

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
002yr-0.17hr	0.69	115.53	1.901	0.31
002yr-0.25hr	0.85	129.97	2.695	0.44
002yr-0.50hr	1.13	125.94	4.181	0.68
002yr-01hr	1.39	113.79	5.629	0.91
002yr-02hr	1.62	81.37	6.943	1.12
002yr-03hr	1.72	61.32	7.521	1.22
002yr-06hr	2.05	40.32	9.452	1.53
002yr-12hr	2.45	23.43	11.826	1.91
002yr-24hr	2.92	17.64	14.645	2.37
10 Yr-SCS 24Hr	4.10	361.52	21.799	3.53
010yr-0.17hr	0.93	187.73	3.109	0.50
010yr-0.25hr	1.14	201.69	4.236	0.69
010yr-0.50hr	1.59	217.72	6.770	1.10
010yr-01hr	2.02	195.02	9.276	1.50
010yr-02hr	2.37	138.21	11.349	1.84
010yr-03hr	2.53	104.05	12.304	1.99
010yr-06hr	3.03	67.23	15.308	2.48
010yr-12hr	3.52	35.61	18.273	2.96
010yr-24hr	4.08	25.46	21.677	3.51
100 Yr-SCS 24Hr	**5.91**	**532.34**	32.869	5.32
100yr-0.17hr	1.25	290.94	4.843	0.78
100yr-0.25hr	1.56	312.23	6.597	1.07
100yr-0.50hr	2.25	353.19	10.636	1.72
100yr-01hr	3.01	330.96	15.188	2.46
100yr-02hr	2.65	159.89	13.023	2.11
100yr-03hr	3.94	180.17	20.825	3.37
100yr-06hr	4.78	115.46	25.949	4.20
100yr-12hr	5.37	56.54	29.560	4.79
100yr-24hr	5.91	37.69	**32.869**	**5.32**
WQV-0.17hr	1.25	290.94	4.843	0.78
WQV-0.25hr	1.25	230.02	4.843	0.78
WQV-0.50hr	1.25	147.68	4.843	0.78
WQV-01hr	1.25	96.58	4.843	0.78
WQV-02hr	1.25	54.92	4.843	0.78
WQV-03hr	1.25	37.85	4.843	0.78
WQV-06hr	1.25	19.37	4.843	0.78
WQV-12hr	1.25	9.79	4.843	0.78
WQV-24hr	1.25	6.54	4.843	0.78

Summary for Subcatchment 13S: Basin 3 (North)

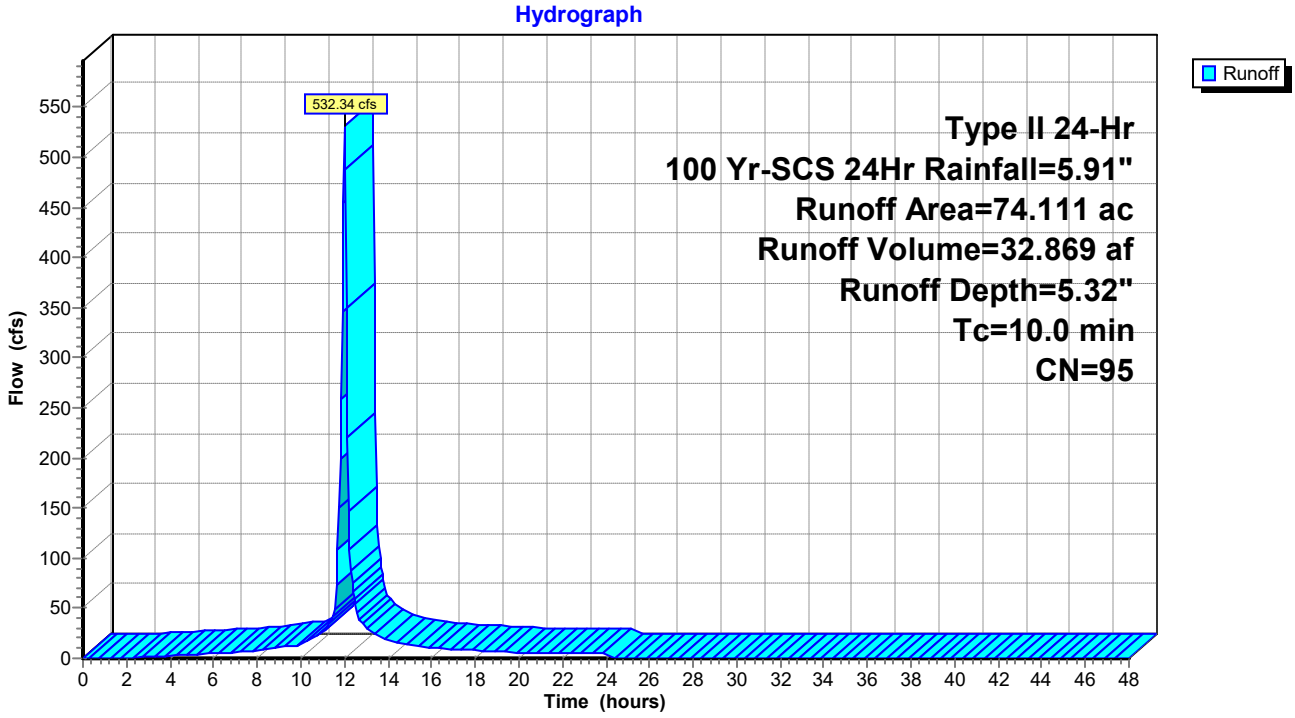
Runoff = 532.34 cfs @ 12.01 hrs, Volume= 32.869 af, Depth= 5.32"
Routed to Pond 18P : Wet Pond 3 (North)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-Hr 100 Yr-SCS 24Hr Rainfall=5.91"

	Area (ac)	CN	Description
*	74.111	95	
	74.111		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry,**

Subcatchment 13S: Basin 3 (North)



Events for Subcatchment 15S: Basin 2 (Middle)

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
002yr-0.17hr	0.69	18.16	0.299	0.31
002yr-0.25hr	0.85	20.43	0.424	0.44
002yr-0.50hr	1.13	19.80	0.657	0.68
002yr-01hr	1.39	17.89	0.885	0.91
002yr-02hr	1.62	12.79	1.091	1.12
002yr-03hr	1.72	9.64	1.182	1.22
002yr-06hr	2.05	6.34	1.486	1.53
002yr-12hr	2.45	3.68	1.859	1.91
002yr-24hr	2.92	2.77	2.302	2.37
10 Yr-SCS 24Hr	4.10	56.83	3.427	3.53
010yr-0.17hr	0.93	29.51	0.489	0.50
010yr-0.25hr	1.14	31.71	0.666	0.69
010yr-0.50hr	1.59	34.23	1.064	1.10
010yr-01hr	2.02	30.66	1.458	1.50
010yr-02hr	2.37	21.73	1.784	1.84
010yr-03hr	2.53	16.36	1.934	1.99
010yr-06hr	3.03	10.57	2.407	2.48
010yr-12hr	3.52	5.60	2.873	2.96
010yr-24hr	4.08	4.00	3.408	3.51
100 Yr-SCS 24Hr	**5.91**	**83.69**	**5.167**	**5.32**
100yr-0.17hr	1.25	45.74	0.761	0.78
100yr-0.25hr	1.56	49.09	1.037	1.07
100yr-0.50hr	2.25	55.52	1.672	1.72
100yr-01hr	3.01	52.03	2.388	2.46
100yr-02hr	2.65	25.14	2.047	2.11
100yr-03hr	3.94	28.32	3.274	3.37
100yr-06hr	4.78	18.15	4.079	4.20
100yr-12hr	5.37	8.89	4.647	4.79
100yr-24hr	5.91	5.93	5.167	5.32
WQV-0.17hr	1.25	45.74	0.761	0.78
WQV-0.25hr	1.25	36.16	0.761	0.78
WQV-0.50hr	1.25	23.22	0.761	0.78
WQV-01hr	1.25	15.18	0.761	0.78
WQV-02hr	1.25	8.63	0.761	0.78
WQV-03hr	1.25	5.95	0.761	0.78
WQV-06hr	1.25	3.05	0.761	0.78
WQV-12hr	1.25	1.54	0.761	0.78
WQV-24hr	1.25	1.03	0.761	0.78

Summary for Subcatchment 15S: Basin 2 (Middle)

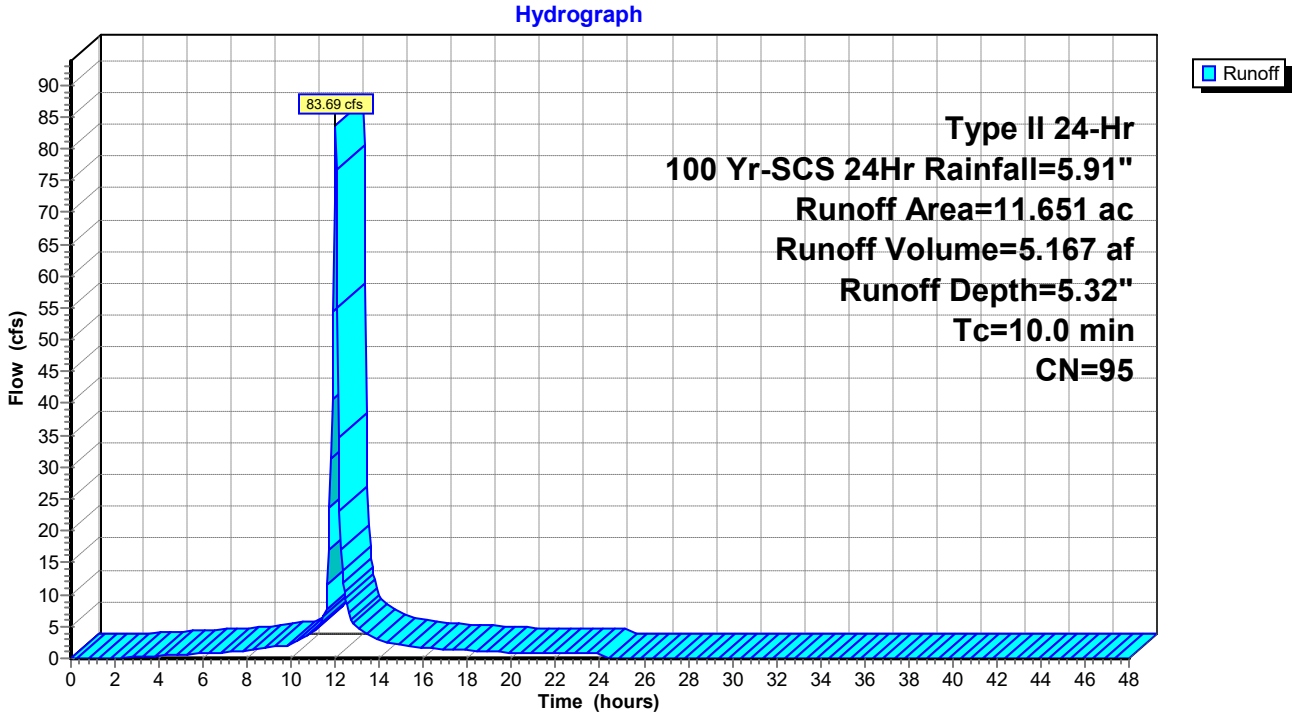
Runoff = 83.69 cfs @ 12.01 hrs, Volume= 5.167 af, Depth= 5.32"
Routed to Pond 17P : EDDB Pond 2 (Middle)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-Hr 100 Yr-SCS 24Hr Rainfall=5.91"

	Area (ac)	CN	Description
*	11.651	95	
	11.651		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry,**

Subcatchment 15S: Basin 2 (Middle)



Events for Subcatchment 16S: Basin 1 (South)

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
002yr-0.17hr	0.69	74.01	1.218	0.31
002yr-0.25hr	0.85	83.26	1.726	0.44
002yr-0.50hr	1.13	80.68	2.678	0.68
002yr-01hr	1.39	72.89	3.606	0.91
002yr-02hr	1.62	52.13	4.447	1.12
002yr-03hr	1.72	39.28	4.818	1.22
002yr-06hr	2.05	25.83	6.055	1.53
002yr-12hr	2.45	15.01	7.576	1.91
002yr-24hr	2.92	11.30	9.382	2.37
10 Yr-SCS 24Hr	4.10	231.59	13.965	3.53
010yr-0.17hr	0.93	120.26	1.992	0.50
010yr-0.25hr	1.14	129.20	2.714	0.69
010yr-0.50hr	1.59	139.47	4.337	1.10
010yr-01hr	2.02	124.93	5.942	1.50
010yr-02hr	2.37	88.54	7.270	1.84
010yr-03hr	2.53	66.65	7.882	1.99
010yr-06hr	3.03	43.07	9.807	2.48
010yr-12hr	3.52	22.81	11.706	2.96
010yr-24hr	4.08	16.31	13.887	3.51
100 Yr-SCS 24Hr	**5.91**	**341.02**	**21.056**	**5.32**
100yr-0.17hr	1.25	186.38	3.103	0.78
100yr-0.25hr	1.56	200.02	4.226	1.07
100yr-0.50hr	2.25	226.25	6.813	1.72
100yr-01hr	3.01	212.02	9.729	2.46
100yr-02hr	2.65	102.43	8.342	2.11
100yr-03hr	3.94	115.42	13.341	3.37
100yr-06hr	4.78	73.96	16.623	4.20
100yr-12hr	5.37	36.22	18.936	4.79
100yr-24hr	5.91	24.15	21.056	5.32
WQV-0.17hr	1.25	186.38	3.103	0.78
WQV-0.25hr	1.25	147.35	3.103	0.78
WQV-0.50hr	1.25	94.60	3.103	0.78
WQV-01hr	1.25	61.87	3.103	0.78
WQV-02hr	1.25	35.18	3.103	0.78
WQV-03hr	1.25	24.24	3.103	0.78
WQV-06hr	1.25	12.41	3.103	0.78
WQV-12hr	1.25	6.27	3.103	0.78
WQV-24hr	1.25	4.19	3.103	0.78

Summary for Subcatchment 16S: Basin 1 (South)

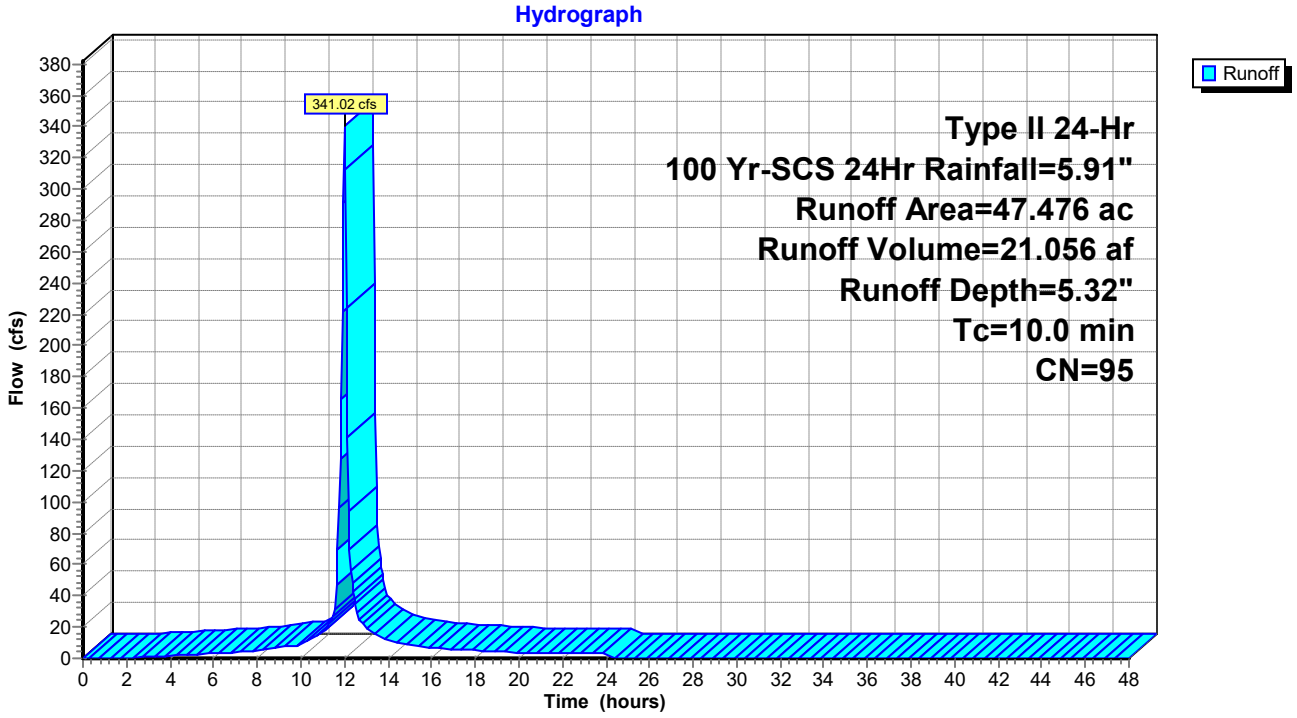
Runoff = 341.02 cfs @ 12.01 hrs, Volume= 21.056 af, Depth= 5.32"
Routed to Pond 7P : Wet Pond 1 (South)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-Hr 100 Yr-SCS 24Hr Rainfall=5.91"

	Area (ac)	CN	Description
*	47.476	95	
	47.476		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry,**

Subcatchment 16S: Basin 1 (South)



Events for Subcatchment 18S: North Offsite

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
002yr-0.17hr	0.69	0.00	0.000	0.00
002yr-0.25hr	0.85	0.33	0.033	0.01
002yr-0.50hr	1.13	2.58	0.261	0.05
002yr-01hr	1.39	5.91	0.634	0.11
002yr-02hr	1.62	8.02	1.071	0.19
002yr-03hr	1.72	7.44	1.288	0.23
002yr-06hr	2.05	6.24	2.105	0.37
002yr-12hr	2.45	6.51	3.272	0.58
002yr-24hr	2.92	7.59	4.836	0.86
10 Yr-SCS 24Hr	4.10	46.18	9.415	1.67
010yr-0.17hr	0.93	0.78	0.078	0.01
010yr-0.25hr	1.14	2.70	0.273	0.05
010yr-0.50hr	1.59	9.90	1.009	0.18
010yr-01hr	2.02	18.22	2.025	0.36
010yr-02hr	2.37	20.53	3.025	0.54
010yr-03hr	2.53	17.73	3.525	0.63
010yr-06hr	3.03	13.22	5.228	0.93
010yr-12hr	3.52	14.20	7.068	1.25
010yr-24hr	4.08	13.84	9.332	1.66
100 Yr-SCS 24Hr	**5.91**	**88.88**	**17.529**	**3.11**
100yr-0.17hr	1.25	4.16	0.416	0.07
100yr-0.25hr	1.56	9.36	0.948	0.17
100yr-0.50hr	2.25	25.85	2.667	0.47
100yr-01hr	3.01	45.38	5.156	0.91
100yr-02hr	2.65	25.95	3.915	0.69
100yr-03hr	3.94	39.56	8.752	1.55
100yr-06hr	4.78	33.95	12.346	2.19
100yr-12hr	5.37	29.96	15.011	2.66
100yr-24hr	5.91	24.52	17.529	3.11
WQV-0.17hr	1.25	4.16	0.416	0.07
WQV-0.25hr	1.25	4.11	0.416	0.07
WQV-0.50hr	1.25	4.11	0.416	0.07
WQV-01hr	1.25	3.92	0.416	0.07
WQV-02hr	1.25	3.43	0.416	0.07
WQV-03hr	1.25	2.83	0.416	0.07
WQV-06hr	1.25	1.74	0.416	0.07
WQV-12hr	1.25	0.95	0.416	0.07
WQV-24hr	1.25	0.76	0.416	0.07

Summary for Subcatchment 18S: North Offsite

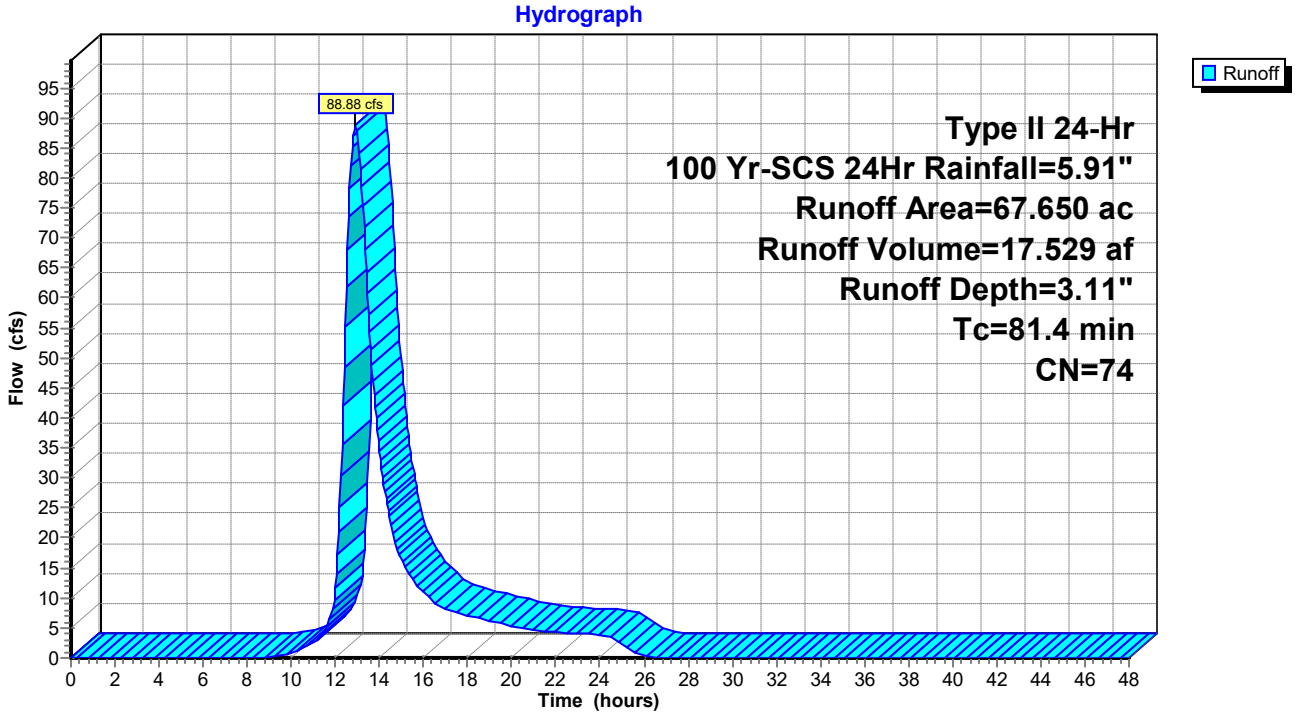
Runoff = 88.88 cfs @ 12.92 hrs, Volume= 17.529 af, Depth= 3.11"
Routed to Reach 14R : Off-Site Swale

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-Hr 100 Yr-SCS 24Hr Rainfall=5.91"

	Area (ac)	CN	Description
*	66.930	74	From Paul Hand Drainage Report (Structure 11)
	0.720	98	From Paul Hand Drainage Report (Structure 11)
	67.650	74	Weighted Average
	66.930		98.94% Pervious Area
	0.720		1.06% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
81.4					**Direct Entry, From Paul Hand Drainage Report (Structure 11)**

Subcatchment 18S: North Offsite



Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 11S: Ex Site Runoff Area=114.950 ac 0.00% Impervious Runoff Depth=3.11"
Flow Length=5,240' Tc=141.1 min CN=74 Runoff=98.87 cfs 29.785 af

Subcatchment 13S: Basin 3 (North) Runoff Area=74.111 ac 0.00% Impervious Runoff Depth=5.32"
Tc=10.0 min CN=95 Runoff=532.34 cfs 32.869 af

Subcatchment 15S: Basin 2 (Middle) Runoff Area=11.651 ac 0.00% Impervious Runoff Depth=5.32"
Tc=10.0 min CN=95 Runoff=83.69 cfs 5.167 af

Subcatchment 16S: Basin 1 (South) Runoff Area=47.476 ac 0.00% Impervious Runoff Depth=5.32"
Tc=10.0 min CN=95 Runoff=341.02 cfs 21.056 af

Subcatchment 18S: North Offsite Runoff Area=67.650 ac 1.06% Impervious Runoff Depth=3.11"
Tc=81.4 min CN=74 Runoff=88.88 cfs 17.529 af

Reach 14R: Off-Site Swale Avg. Flow Depth=1.67' Max Vel=4.96 fps Inflow=88.88 cfs 17.529 af
n=0.022 L=1,260.0' S=0.0054 '/' Capacity=334.55 cfs Outflow=88.47 cfs 17.529 af

Pond 7P: Wet Pond 1 (South) Peak Elev=776.01' Storage=1,965,830 cf Inflow=417.42 cfs 75.981 af
Outflow=39.70 cfs 57.333 af

Pond 17P: EDDB Pond 2 (Middle) Peak Elev=777.17' Storage=151,698 cf Inflow=180.22 cfs 55.005 af
42.0" Round Culvert x 2.00 n=0.013 L=810.0' S=0.0019 '/' Outflow=103.62 cfs 54.925 af

Pond 18P: Wet Pond 3 (North) Peak Elev=779.29' Storage=16.646 af Inflow=541.61 cfs 50.398 af
36.0" Round Culvert x 2.00 n=0.013 L=211.0' S=0.0047 '/' Outflow=100.82 cfs 49.838 af

Total Runoff Area = 315.838 ac Runoff Volume = 106.407 af Average Runoff Depth = 4.04"
99.77% Pervious = 315.118 ac 0.23% Impervious = 0.720 ac

Events for Reach 14R: Off-Site Swale

Event	Inflow (cfs)	Outflow (cfs)	Elevation (feet)	Storage (cubic-feet)
002yr-0.17hr	0.00	0.00	783.07	0
002yr-0.25hr	0.33	0.28	783.15	410
002yr-0.50hr	2.58	2.46	783.34	1,719
002yr-01hr	5.91	5.76	783.50	3,094
002yr-02hr	8.02	7.92	783.58	3,877
002yr-03hr	7.44	7.38	783.56	3,687
002yr-06hr	6.24	6.23	783.52	3,273
002yr-12hr	6.51	6.50	783.53	3,369
002yr-24hr	7.59	7.58	783.57	3,756
10 Yr-SCS 24Hr	46.18	45.80	784.30	13,810
010yr-0.17hr	0.78	0.70	783.20	746
010yr-0.25hr	2.70	2.57	783.35	1,772
010yr-0.50hr	9.90	9.65	783.64	4,459
010yr-01hr	18.22	17.96	783.85	6,968
010yr-02hr	20.53	20.40	783.90	7,644
010yr-03hr	17.73	17.68	783.84	6,890
010yr-06hr	13.22	13.21	783.74	5,582
010yr-12hr	14.20	14.18	783.76	5,876
010yr-24hr	13.84	13.82	783.75	5,768
100 Yr-SCS 24Hr	**88.88**	**88.47**	**784.74**	**22,462**
100yr-0.17hr	4.16	4.03	783.42	2,411
100yr-0.25hr	9.36	9.13	783.62	4,286
100yr-0.50hr	25.85	25.50	784.00	8,991
100yr-01hr	45.38	45.05	784.29	13,643
100yr-02hr	25.95	25.85	784.00	9,081
100yr-03hr	39.56	39.54	784.22	12,394
100yr-06hr	33.95	33.86	784.13	11,061
100yr-12hr	29.96	29.92	784.07	10,105
100yr-24hr	24.52	24.50	783.98	8,733
WQV-0.17hr	4.16	4.03	783.42	2,411
WQV-0.25hr	4.11	3.95	783.42	2,380
WQV-0.50hr	4.11	3.95	783.42	2,380
WQV-01hr	3.92	3.80	783.41	2,314
WQV-02hr	3.43	3.33	783.39	2,116
WQV-03hr	2.83	2.79	783.36	1,871
WQV-06hr	1.74	1.73	783.29	1,353
WQV-12hr	0.95	0.94	783.23	906
WQV-24hr	0.76	0.75	783.21	781

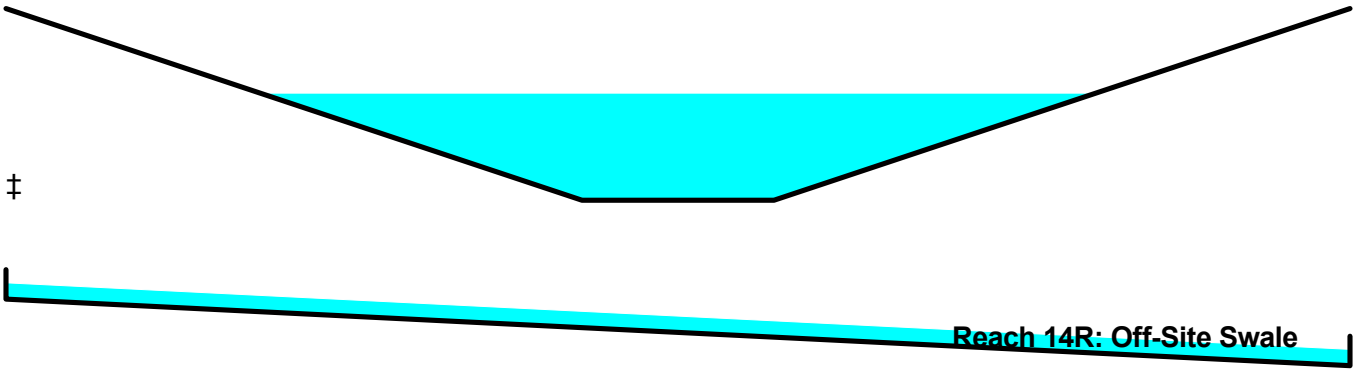
Summary for Reach 14R: Off-Site Swale

Inflow Area = 67.650 ac, 1.06% Impervious, Inflow Depth = 3.11" for 100 Yr-SCS 24Hr event
Inflow = 88.88 cfs @ 12.92 hrs, Volume= 17.529 af
Outflow = 88.47 cfs @ 12.96 hrs, Volume= 17.529 af, Atten= 0%, Lag= 2.7 min
Routed to Pond 18P : Wet Pond 3 (North)

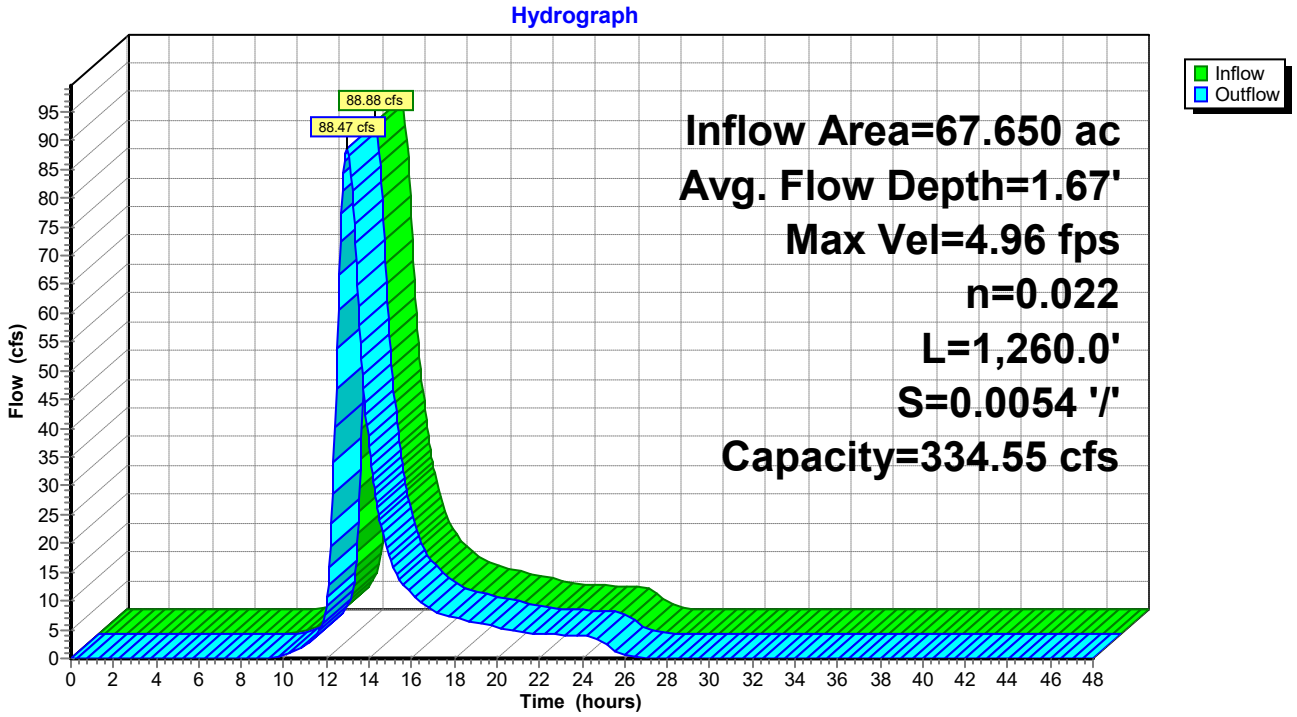
Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.96 fps, Min. Travel Time= 4.2 min
Avg. Velocity = 1.85 fps, Avg. Travel Time= 11.3 min

Peak Storage= 22,462 cf @ 12.96 hrs
Average Depth at Peak Storage= 1.67' , Surface Width= 17.36'
Bank-Full Depth= 3.00' Flow Area= 48.0 sf, Capacity= 334.55 cfs

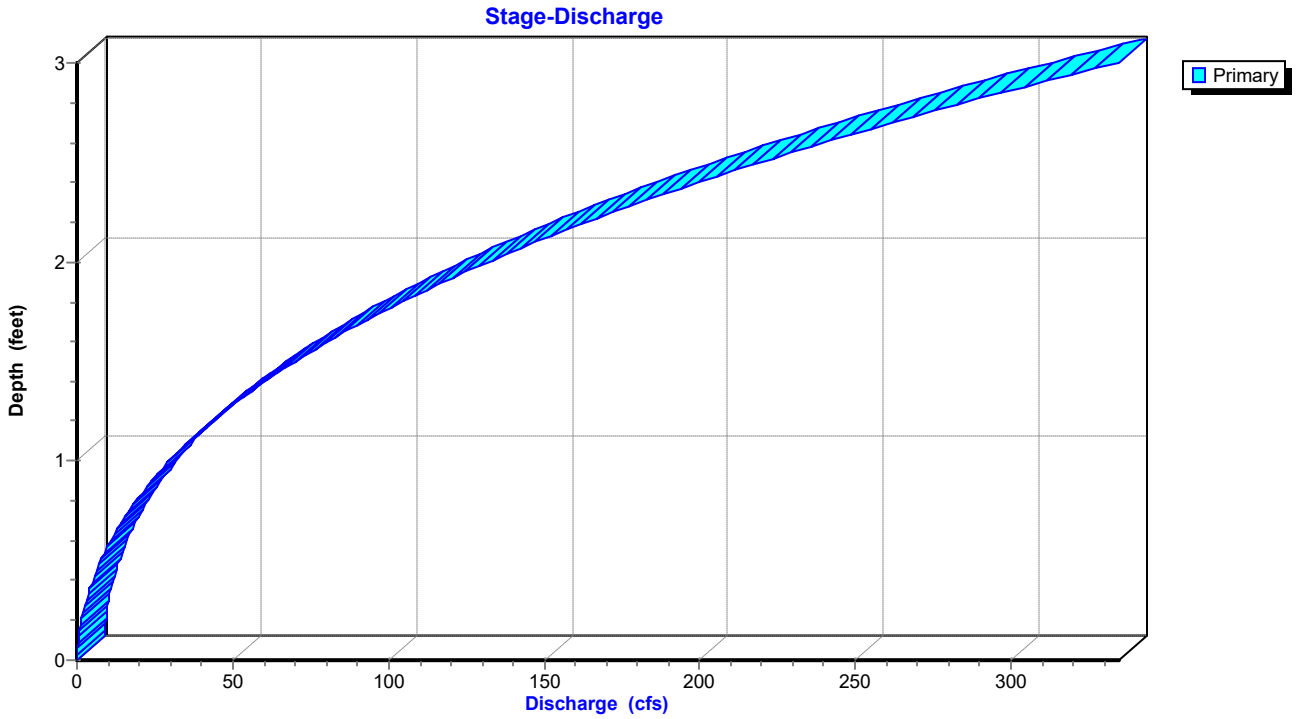
4.00' x 3.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 4.0 '/' Top Width= 28.00'
Length= 1,260.0' Slope= 0.0054 '/'
Inlet Invert= 783.07', Outlet Invert= 776.30'



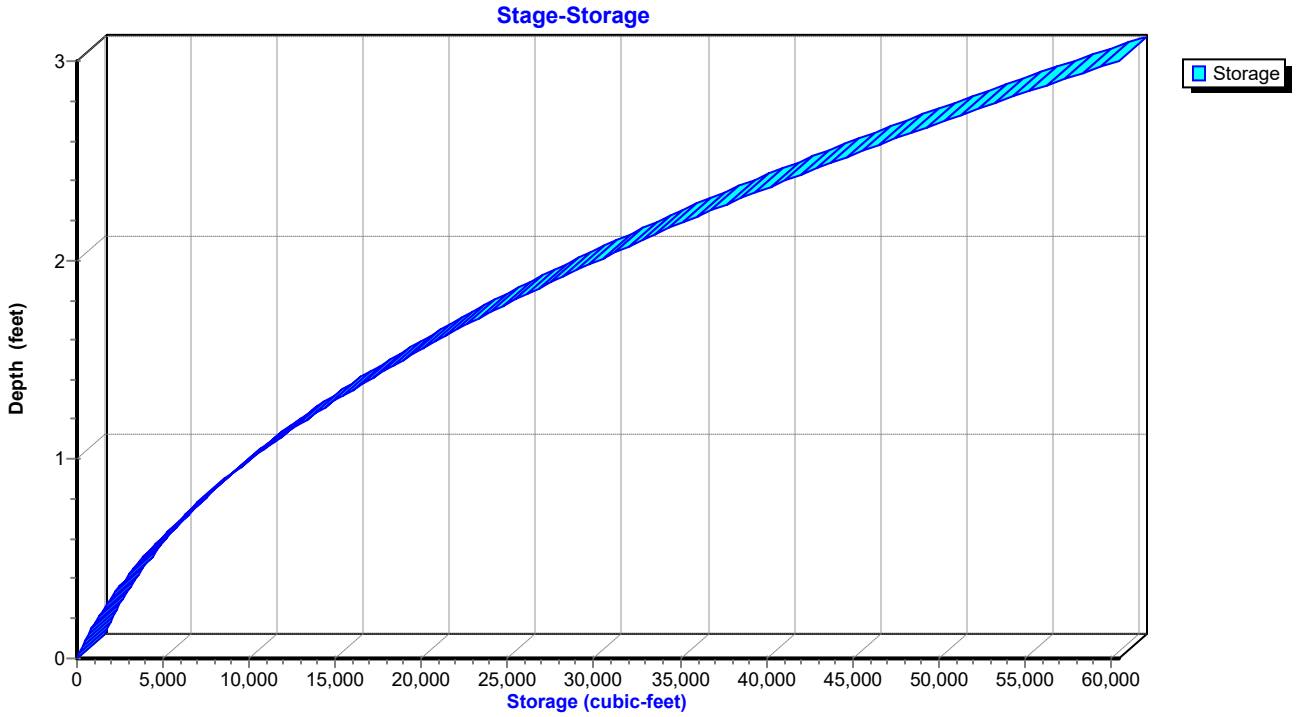
Reach 14R: Off-Site Swale



Reach 14R: Off-Site Swale



Reach 14R: Off-Site Swale



Events for Pond 7P: Wet Pond 1 (South)

Event	Inflow (cfs)	Primary (cfs)	Elevation (feet)	Storage (cubic-feet)
002yr-0.17hr	77.32	0.39	771.78	113,442
002yr-0.25hr	88.92	0.77	771.90	162,148
002yr-0.50hr	85.69	1.82	772.13	258,010
002yr-01hr	78.60	3.18	772.36	355,305
002yr-02hr	58.33	4.55	772.58	445,939
002yr-03hr	45.55	5.15	772.67	485,631
002yr-06hr	34.06	6.69	772.98	617,559
002yr-12hr	34.96	8.05	773.33	767,301
002yr-24hr	34.14	9.34	773.72	936,131
10 Yr-SCS 24Hr	279.86	16.14	774.77	1,398,944
010yr-0.17hr	126.46	1.03	771.96	188,366
010yr-0.25hr	138.07	1.87	772.14	261,651
010yr-0.50hr	144.04	4.38	772.55	434,769
010yr-01hr	135.22	6.70	772.99	619,134
010yr-02hr	99.99	8.17	773.37	781,431
010yr-03hr	78.72	8.75	773.54	854,958
010yr-06hr	61.73	10.28	774.04	1,076,628
010yr-12hr	58.84	12.40	774.46	1,259,880
010yr-24hr	51.78	16.66	774.81	1,415,398
100 Yr-SCS 24Hr	**417.42**	**39.70**	**776.01**	**1,965,830**
100yr-0.17hr	196.32	2.41	772.24	302,247
100yr-0.25hr	213.64	4.20	772.52	422,738
100yr-0.50hr	239.91	7.71	773.24	726,810
100yr-01hr	229.29	10.44	774.10	1,101,195
100yr-02hr	116.08	9.21	773.68	917,961
100yr-03hr	142.19	19.87	775.01	1,510,052
100yr-06hr	115.13	31.45	775.63	1,792,643
100yr-12hr	101.53	36.48	775.87	1,900,220
100yr-24hr	78.02	37.62	775.92	1,923,656
WQV-0.17hr	196.32	2.41	772.24	302,247
WQV-0.25hr	157.47	2.41	772.24	302,183
WQV-0.50hr	100.39	2.41	772.23	302,144
WQV-01hr	66.63	2.41	772.23	302,028
WQV-02hr	39.18	2.40	772.23	301,717
WQV-03hr	27.85	2.40	772.23	301,259
WQV-06hr	15.45	2.37	772.23	299,122
WQV-12hr	11.85	2.31	772.22	294,684
WQV-24hr	9.71	2.24	772.21	289,690

PEAK INFLOW FOR EMERGENCY SPILLWAY CALCULATIONS
417.42 x 1.25 = 522

PEAK ELEVATION WITH OFFSITE

Summary for Pond 7P: Wet Pond 1 (South)

Inflow Area = 200.888 ac, 0.36% Impervious, Inflow Depth > 4.54" for 100 Yr-SCS 24Hr event
Inflow = 417.42 cfs @ 12.01 hrs, Volume= 75.981 af
Outflow = 39.70 cfs @ 17.13 hrs, Volume= 57.333 af, Atten= 90%, Lag= 306.9 min
Primary = 39.70 cfs @ 17.13 hrs, Volume= 57.333 af
Routed to nonexistent node 20L

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 776.01' @ 17.13 hrs Surf.Area= 466,239 sf Storage= 1,965,830 cf

PEAK ELEVATION WITH OFFSITE

Plug-Flow detention time= 741.8 min calculated for 57.274 af (75% of inflow)
Center-of-Mass det. time= 585.9 min (1,529.2 - 943.4)

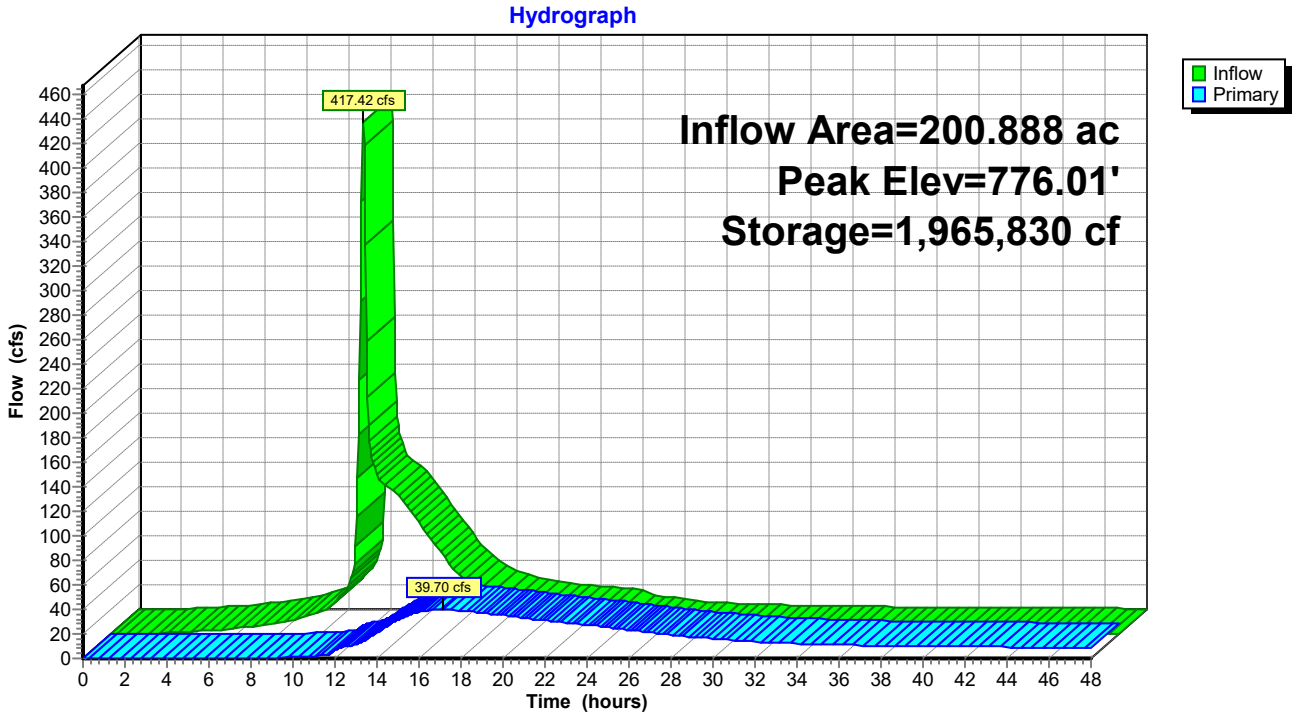
Volume	Invert	Avail.Storage	Storage Description
#1	771.50'	2,921,766 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
771.50	406,211	0	0
778.00	492,794	2,921,766	2,921,766

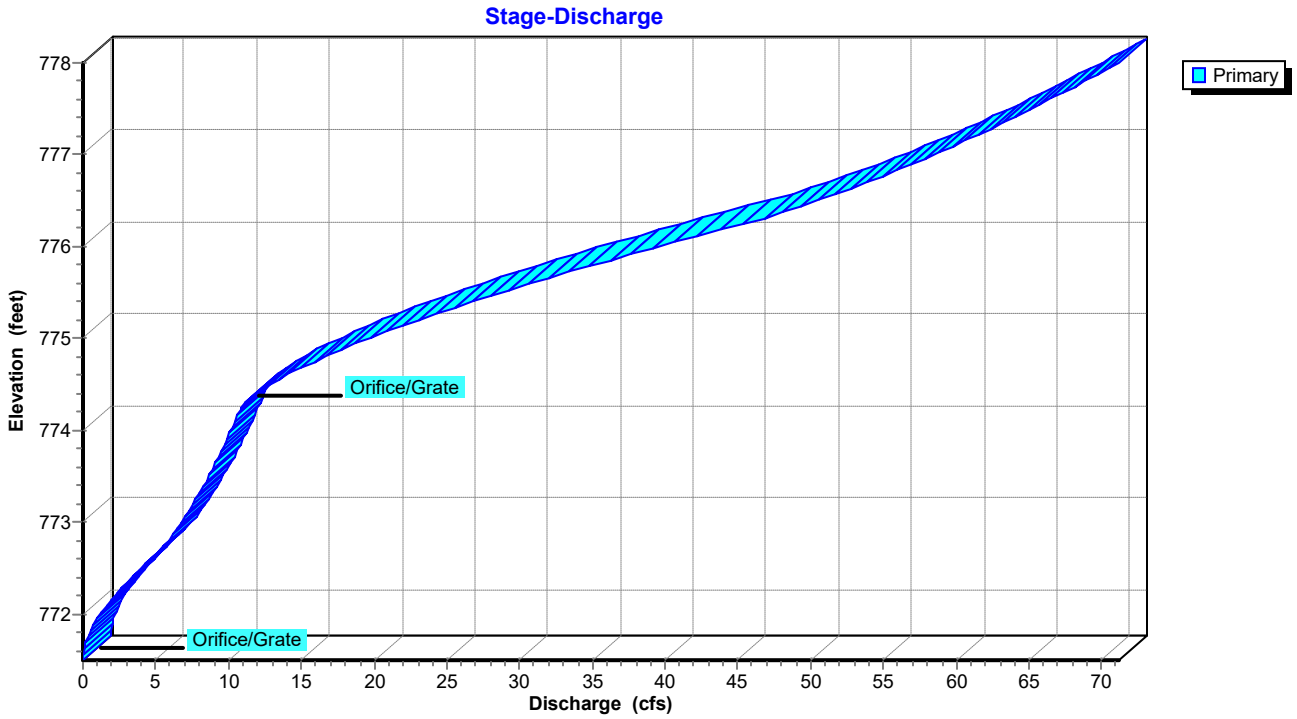
Device	Routing	Invert	Outlet Devices
#1	Primary	771.50'	**17.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	774.25'	**40.0" W x 24.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=39.70 cfs @ 17.13 hrs HW=776.01' (Free Discharge)
└─**1=Orifice/Grate** (Orifice Controls 14.79 cfs @ 9.38 fps)
└─**2=Orifice/Grate** (Orifice Controls 24.91 cfs @ 4.25 fps)

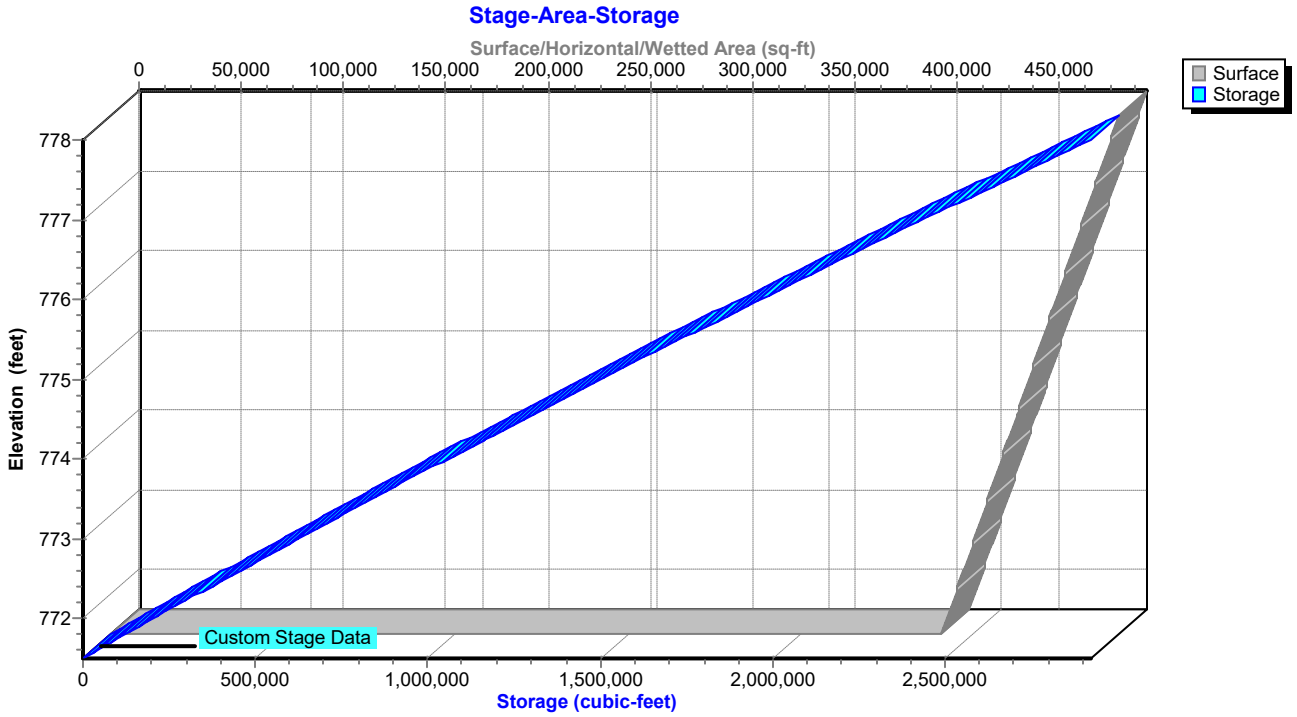
Pond 7P: Wet Pond 1 (South)



Pond 7P: Wet Pond 1 (South)



Pond 7P: Wet Pond 1 (South)



Events for Pond 17P: EDDB Pond 2 (Middle)

Event	Inflow (cfs)	Primary (cfs)	Elevation (feet)	Storage (cubic-feet)
002yr-0.17hr	19.26	7.23	773.90	9,785
002yr-0.25hr	23.47	10.89	774.10	14,647
002yr-0.50hr	28.78	18.72	774.45	25,018
002yr-01hr	32.44	26.06	774.72	34,169
002yr-02hr	30.77	28.63	774.81	37,297
002yr-03hr	27.54	26.75	774.74	35,009
002yr-06hr	22.94	22.76	774.60	30,104
002yr-12hr	23.77	23.48	774.63	31,004
002yr-24hr	24.28	23.72	774.70	33,573
10 Yr-SCS 24Hr	125.19	78.36	776.26	100,911
010yr-0.17hr	32.64	13.25	774.22	17,810
010yr-0.25hr	39.55	19.81	774.49	26,415
010yr-0.50hr	54.48	36.51	775.06	46,783
010yr-01hr	59.72	49.93	775.46	63,034
010yr-02hr	56.35	53.10	775.55	66,959
010yr-03hr	50.62	49.65	775.45	62,693
010yr-06hr	40.99	40.57	775.26	54,547
010yr-12hr	41.68	41.22	775.21	52,445
010yr-24hr	37.83	36.50	775.32	57,010
100 Yr-SCS 24Hr	**180.22**	**103.62**	**777.17**	**151,698**
100yr-0.17hr	54.05	24.07	774.65	31,733
100yr-0.25hr	68.55	36.48	775.06	46,750
100yr-0.50hr	94.69	64.11	775.86	81,025
100yr-01hr	99.91	84.77	776.45	110,867
100yr-02hr	66.26	62.45	775.81	78,854
100yr-03hr	90.79	88.63	776.57	117,322
100yr-06hr	77.61	75.67	776.56	116,601
100yr-12hr	74.05	70.78	776.33	104,481
100yr-24hr	58.43	55.02	776.39	107,666
WQV-0.17hr	54.05	24.07	774.65	31,733
WQV-0.25hr	46.55	23.87	774.64	31,479
WQV-0.50hr	35.05	23.02	774.61	30,424
WQV-01hr	26.69	21.16	774.54	28,104
WQV-02hr	19.52	17.76	774.41	23,784
WQV-03hr	15.75	15.07	774.30	20,257
WQV-06hr	10.03	9.97	774.05	13,410
WQV-12hr	7.08	6.97	773.88	9,441
WQV-24hr	6.17	6.13	773.83	8,331

PEAK ELEVATION WITH OFFSITE

Summary for Pond 17P: EDDB Pond 2 (Middle)

Inflow Area = 153.412 ac, 0.47% Impervious, Inflow Depth > 4.30" for 100 Yr-SCS 24Hr event
Inflow = 180.22 cfs @ 12.02 hrs, Volume= 55.005 af
Outflow = 103.62 cfs @ 13.36 hrs, Volume= 54.925 af, Atten= 43%, Lag= 80.7 min
Primary = 103.62 cfs @ 13.36 hrs, Volume= 54.925 af
Routed to Pond 7P : Wet Pond 1 (South)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 777.17' @ 13.90 hrs Surf.Area= 60,876 sf Storage= 151,698 cf

PEAK ELEVATION WITH OFFSITE

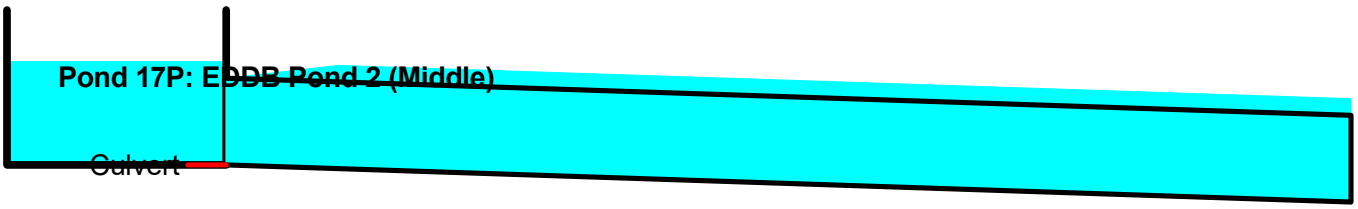
Plug-Flow detention time= 49.2 min calculated for 54.868 af (100% of inflow)
Center-of-Mass det. time= 46.6 min (1,012.1 - 965.5)

Volume	Invert	Avail.Storage	Storage Description
#1	773.00'	296,520 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

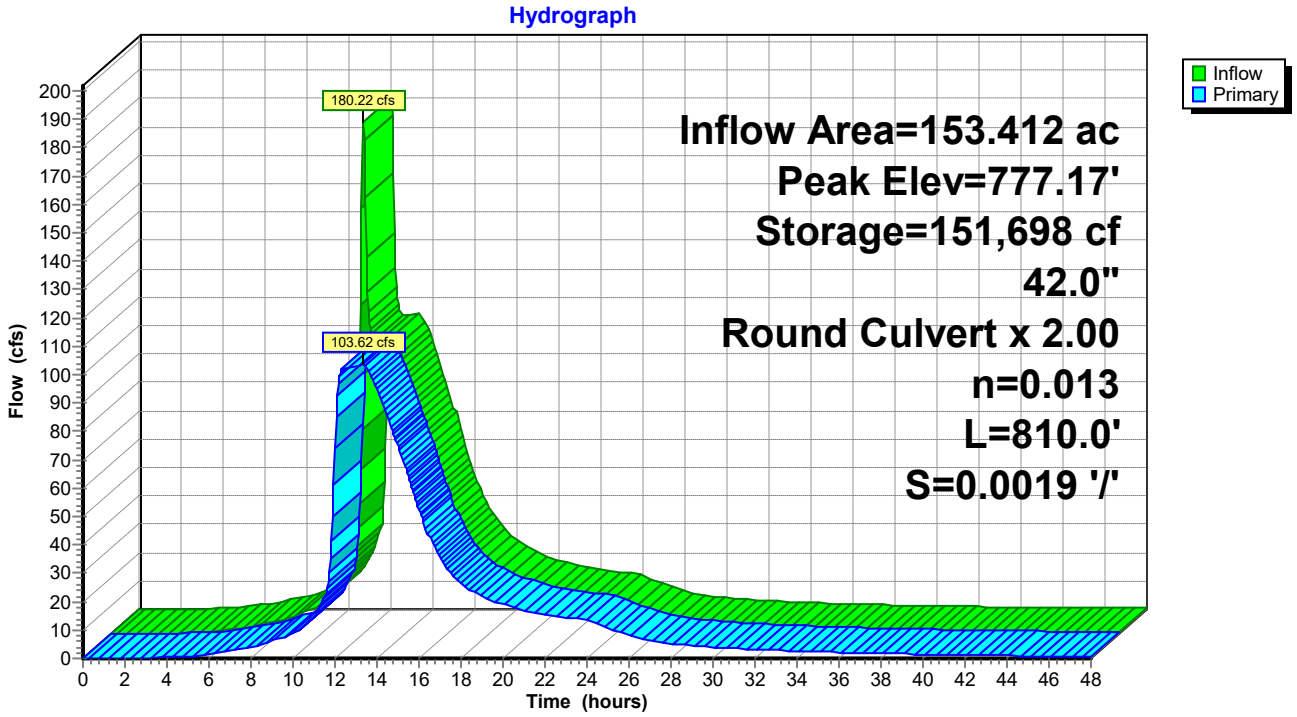
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
773.00	0	0	0
774.25	30,144	18,840	18,840
777.25	61,725	137,804	156,644
779.25	78,151	139,876	296,520

Device	Routing	Invert	Outlet Devices
#1	Primary	773.00'	**42.0" Round Culvert X 2.00** L= 810.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 773.00' / 771.50' S= 0.0019 '/' Cc= 0.900 n= 0.013, Flow Area= 9.62 sf

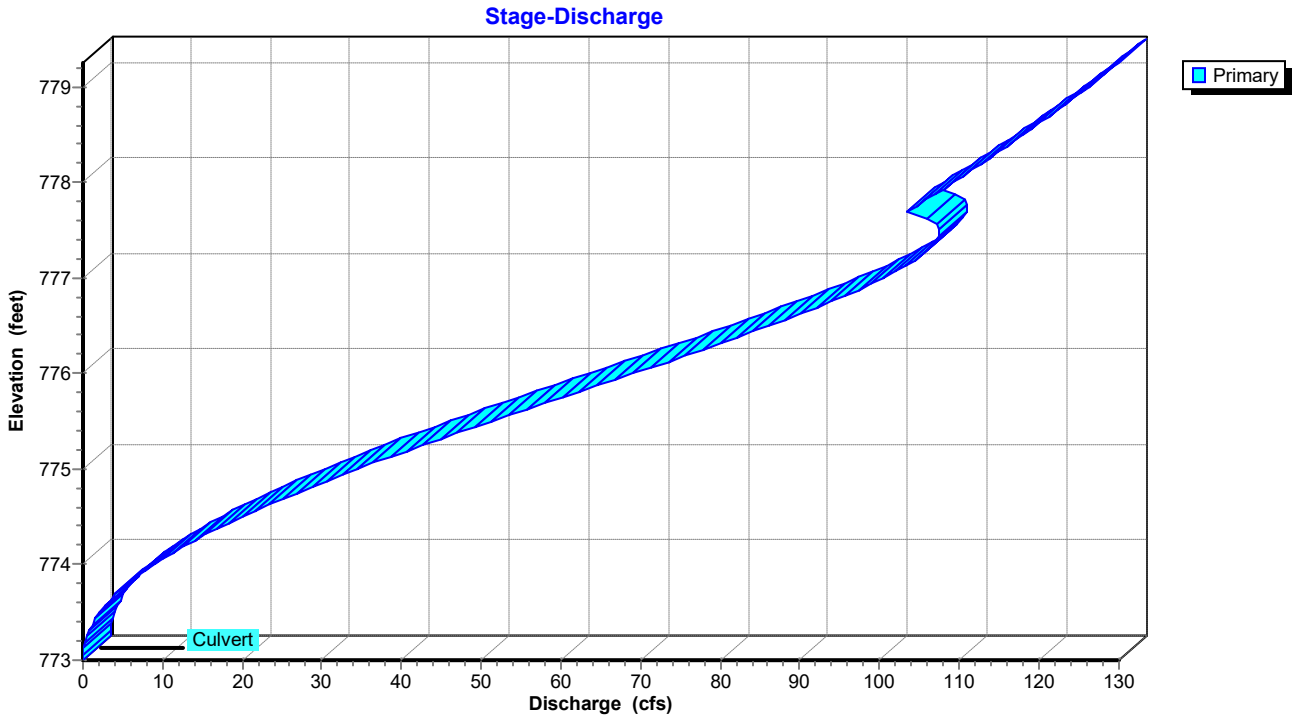
Primary OutFlow Max=103.31 cfs @ 13.36 hrs HW=777.14' TW=774.62' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 103.31 cfs @ 5.72 fps)



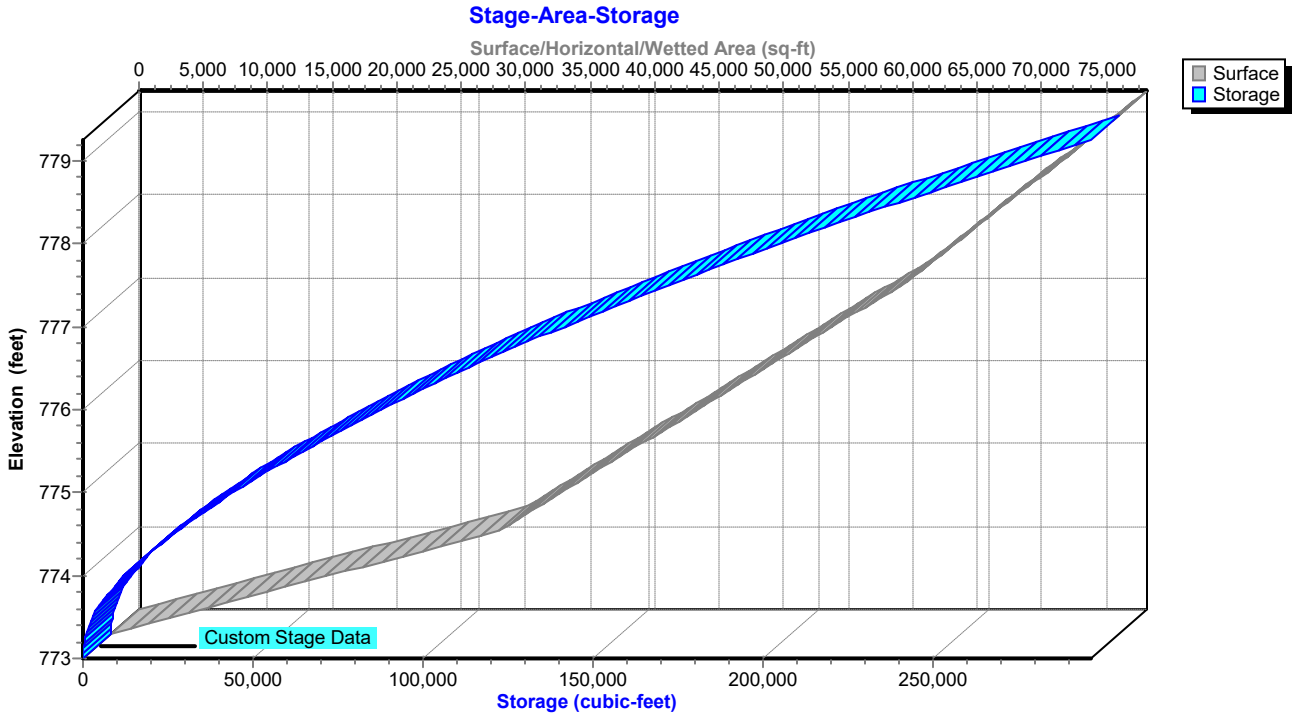
Pond 17P: EDDB Pond 2 (Middle)



Pond 17P: EDDB Pond 2 (Middle)



Pond 17P: EDDB Pond 2 (Middle)



Events for Pond 18P: Wet Pond 3 (North)

Event	Inflow (cfs)	Primary (cfs)	Elevation (feet)	Storage (acre-feet)
002yr-0.17hr	115.53	4.60	774.68	1.793
002yr-0.25hr	129.97	8.64	774.94	2.493
002yr-0.50hr	125.94	17.90	775.36	3.689
002yr-01hr	113.79	24.83	775.65	4.515
002yr-02hr	81.37	26.21	775.72	4.739
002yr-03hr	61.32	24.30	775.65	4.531
002yr-06hr	40.32	20.53	775.50	4.084
002yr-12hr	25.95	21.23	775.53	4.168
002yr-24hr	24.28	21.85	775.57	4.278
10 Yr-SCS 24Hr	364.26	80.48	777.45	10.148
010yr-0.17hr	187.73	11.16	775.07	2.863
010yr-0.25hr	201.69	18.97	775.40	3.811
010yr-0.50hr	217.72	37.09	776.05	5.711
010yr-01hr	195.02	47.58	776.47	6.983
010yr-02hr	138.21	49.41	776.56	7.286
010yr-03hr	104.05	45.63	776.44	6.910
010yr-06hr	67.23	36.82	776.14	5.997
010yr-12hr	44.02	37.66	776.16	6.046
010yr-24hr	37.96	34.22	776.11	5.888
100 Yr-SCS 24Hr	**541.61**	**100.82**	**779.29**	**16.646**
100yr-0.17hr	290.95	23.74	775.58	4.334
100yr-0.25hr	312.24	38.10	776.06	5.745
100yr-0.50hr	353.19	66.50	776.98	8.626
100yr-01hr	330.97	80.40	777.71	11.022
100yr-02hr	159.90	58.44	776.88	8.278
100yr-03hr	180.19	82.04	777.92	11.740
100yr-06hr	115.75	70.29	777.38	9.912
100yr-12hr	78.03	67.05	777.25	9.478
100yr-24hr	60.38	52.90	777.03	8.787
WQV-0.17hr	290.95	23.74	775.58	4.334
WQV-0.25hr	230.03	23.62	775.58	4.315
WQV-0.50hr	147.68	22.64	775.54	4.216
WQV-01hr	96.58	20.09	775.46	3.964
WQV-02hr	54.92	16.15	775.30	3.514
WQV-03hr	37.85	13.53	775.18	3.173
WQV-06hr	19.37	8.84	774.93	2.487
WQV-12hr	9.79	6.08	774.76	2.022
WQV-24hr	6.66	5.38	774.72	1.891

PEAK ELEVATION WITH OFFSITE

Summary for Pond 18P: Wet Pond 3 (North)

[62] Hint: Exceeded Reach 14R OUTLET depth by 1.77' @ 12.20 hrs

Inflow Area = 141.761 ac, 0.51% Impervious, Inflow Depth = 4.27" for 100 Yr-SCS 24Hr event
Inflow = 541.61 cfs @ 12.01 hrs, Volume= 50.398 af
Outflow = 100.82 cfs @ 13.24 hrs, Volume= 49.838 af, Atten= 81%, Lag= 73.9 min
Primary = 100.82 cfs @ 13.24 hrs, Volume= 49.838 af
Routed to Pond 17P : EDDB Pond 2 (Middle)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 779.29' @ 13.29 hrs Surf.Area= 3.734 ac Storage= 16.646 af

PEAK ELEVATION WITH OFFSITE

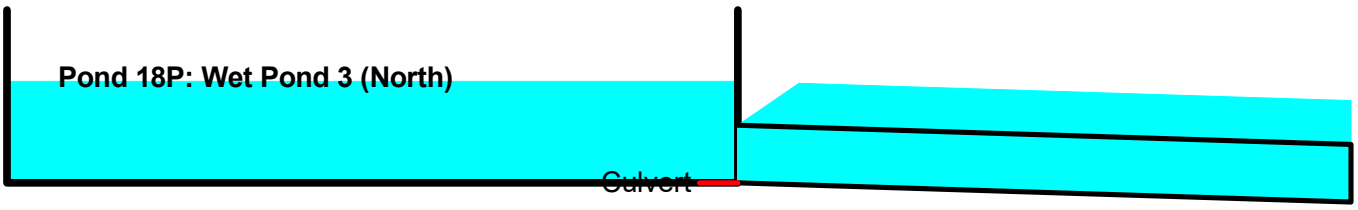
Plug-Flow detention time= 181.8 min calculated for 49.838 af (99% of inflow)
Center-of-Mass det. time= 174.3 min (986.4 - 812.1)

Volume	Invert	Avail.Storage	Storage Description
#1	774.00'	32.027 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

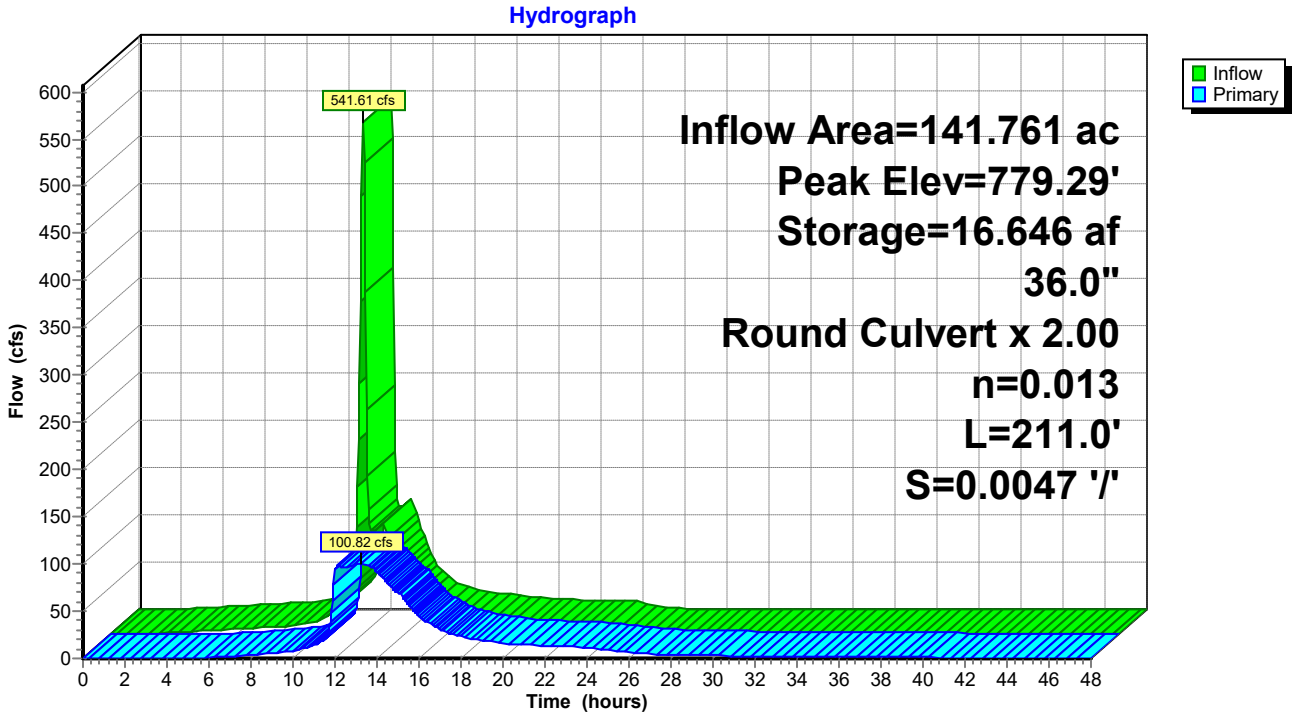
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
774.00	2.558	0.000	0.000
783.00	4.559	32.027	32.027

Device	Routing	Invert	Outlet Devices
#1	Primary	774.00'	**36.0" Round Culvert X 2.00** L= 211.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 774.00' / 773.00' S= 0.0047 '/' Cc= 0.900 n= 0.013, Flow Area= 7.07 sf

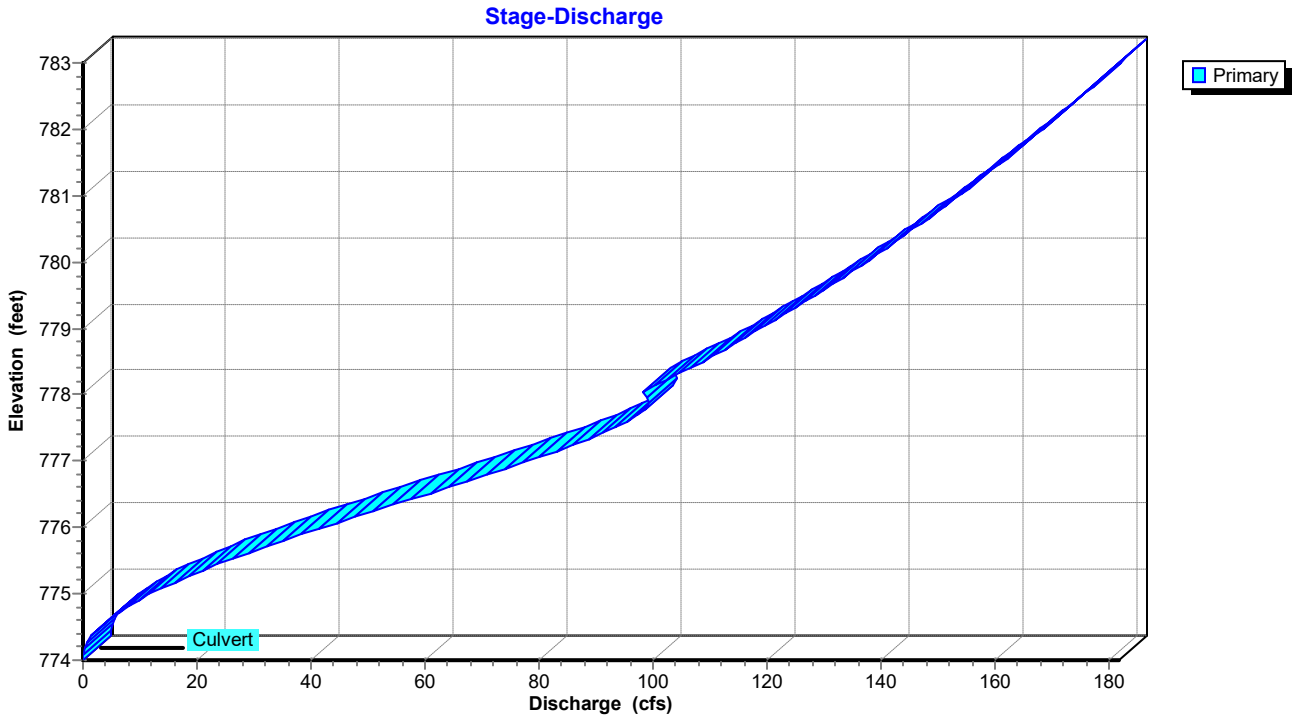
Primary OutFlow Max=100.71 cfs @ 13.24 hrs HW=779.29' TW=777.14' (Dynamic Tailwater)
1=Culvert (Outlet Controls 100.71 cfs @ 7.12 fps)



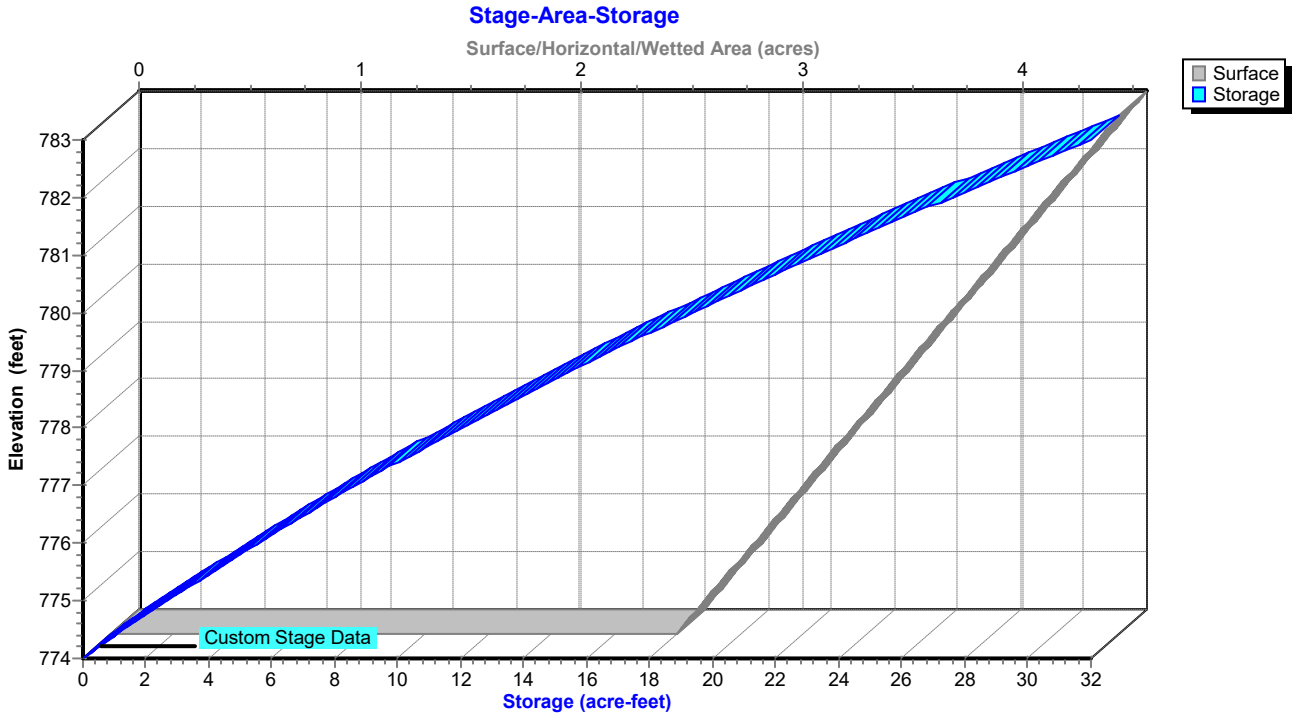
Pond 18P: Wet Pond 3 (North)



Pond 18P: Wet Pond 3 (North)



Pond 18P: Wet Pond 3 (North)



Worksheet for Pond 1 (South) Emergency Spillway

Project Description	
Friction Method	Manning Formula
Solve For	Bottom Width

Input Data		
Roughness Coefficient	0.030	
Channel Slope	1.000	%
Normal Depth	6.00	in
Left Side Slope	3.000	H:V
Right Side Slope	3.000	H:V
Discharge	522.00	cfs

PEAK 100 YEAR INFLOW RATE 417.42 X 1.25

Results		
Bottom Width	334.19	ft
Flow Area	167.8	ft²
Wetted Perimeter	337.4	ft
Hydraulic Radius	5.97	in
Top Width	337.19	ft
Critical Depth	5.07	in
Critical Slope	1.751	%
Velocity	3.11	ft/s
Velocity Head	0.15	ft
Specific Energy	0.65	ft
Froude Number	0.777	
Flow Type	Subcritical	

PROPOSED BTM WIDTH = 335'

GVF Input Data		
Downstream Depth	0.00	in
Length	0.0	ft
Number Of Steps	0	

GVF Output Data		
Upstream Depth	0.00	in
Profile Description	N/A	
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	6.00	in
Critical Depth	5.07	in
Channel Slope	1.000	%
Critical Slope	1.751	%

Appendix G: Outfall Design Calculations

Events for Pond 7P: Wet Pond 1 (South)

Event	Inflow (cfs)	Primary (cfs)	Elevation (feet)	Storage (cubic-feet)
002yr-0.17hr	77.32	0.39	771.78	113,442
002yr-0.25hr	88.92	0.77	771.90	162,148
002yr-0.50hr	85.69	1.82	772.13	258,010
002yr-01hr	78.60	3.18	772.36	355,305
002yr-02hr	58.33	4.55	772.58	445,939
002yr-03hr	45.55	5.15	772.67	485,631
002yr-06hr	34.06	6.69	772.98	617,559
002yr-12hr	34.96	8.05	773.33	767,301
002yr-24hr	34.14	9.34	773.72	936,131
10 Yr-SCS 24Hr	279.86	16.14	774.77	1,398,944
010yr-0.17hr	126.46	1.03	771.96	188,366
010yr-0.25hr	138.07	1.87	772.14	261,651
010yr-0.50hr	144.04	4.38	772.55	434,769
010yr-01hr	135.22	6.70	772.99	619,134
010yr-02hr	99.99	8.17	773.37	781,431
010yr-03hr	78.72	8.75	773.54	854,958
010yr-06hr	61.73	10.28	774.04	1,076,628
010yr-12hr	58.84	12.40	774.46	1,259,880
010yr-24hr	51.78	16.66	774.81	1,415,398
100 Yr-SCS 24Hr	**417.42**	**39.70**	**776.01**	**1,965,830**
100yr-0.17hr	196.32	2.41	772.24	302,247
100yr-0.25hr	213.64	4.20	772.52	422,738
100yr-0.50hr	239.91	7.71	773.24	726,810
100yr-01hr	229.29	10.44	774.10	1,101,195
100yr-02hr	116.08	9.21	773.68	917,961
100yr-03hr	142.19	19.87	775.01	1,510,052
100yr-06hr	115.13	31.45	775.63	1,792,643
100yr-12hr	101.53	36.48	775.87	1,900,220
100yr-24hr	78.02	37.62	775.92	1,923,656
WQV-0.17hr	196.32	2.41	772.24	302,247
WQV-0.25hr	157.47	2.41	772.24	302,183
WQV-0.50hr	100.39	2.41	772.23	302,144
WQV-01hr	66.63	2.41	772.23	302,028
WQV-02hr	39.18	2.40	772.23	301,717
WQV-03hr	27.85	2.40	772.23	301,259
WQV-06hr	15.45	2.37	772.23	299,122
WQV-12hr	11.85	2.31	772.22	294,684
WQV-24hr	9.71	2.24	772.21	289,690

PEAK ELEVATION WITH OFFSITE

Worksheet for OCS Outfall Pipe

Project Description	
Friction Method	Manning Formula
Solve For	Channel Slope

Input Data	
Roughness Coefficient	0.013
Normal Depth	36.00 in
Diameter	36.0 in
Discharge	39.70 cfs

Results	
Channel Slope	0.354 %
Flow Area	7.1 ft²
Wetted Perimeter	9.4 ft
Hydraulic Radius	9.00 in
Top Width	0.00 ft
Critical Depth	24.62 in
Percent Full	100.0 %
Critical Slope	0.538 %
Velocity	5.62 ft/s
Velocity Head	0.49 ft
Specific Energy	3.49 ft
Froude Number	(N/A)
Maximum Discharge	42.71 cfs
Discharge Full	39.70 cfs
Slope Full	0.354 %
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.00 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.00 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	100.0 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	36.00 in
Critical Depth	24.62 in
Channel Slope	0.354 %
Critical Slope	0.538 %

Appendix H: Stormwater Quality Calculations

Events for Pond 7P: Wet Pond 1 (South)

Event	Inflow (cfs)	Primary (cfs)	Elevation (feet)	Storage (cubic-feet)
002yr-0.17hr	77.32	0.39	771.78	113,442
002yr-0.25hr	88.92	0.77	771.89	161,109
002yr-0.50hr	85.69	1.72	772.11	250,002
002yr-01hr	78.60	2.90	772.32	336,246
002yr-02hr	58.33	4.07	772.50	414,260
002yr-03hr	45.55	4.59	772.58	447,984
002yr-06hr	34.06	6.08	772.84	555,948
002yr-12hr	33.74	7.22	773.11	672,686
002yr-24hr	29.60	8.28	773.40	794,865
10 Yr-SCS 24Hr	279.53	10.98	774.28	1,180,737
010yr-0.17hr	126.46	1.00	771.95	185,933
010yr-0.25hr	138.07	1.76	772.12	253,269
010yr-0.50hr	144.04	3.92	772.48	404,325
010yr-01hr	135.22	6.07	772.84	555,674
010yr-02hr	99.99	7.34	773.14	685,508
010yr-03hr	78.72	7.85	773.28	743,624
010yr-06hr	61.68	9.18	773.67	913,490
010yr-12hr	53.80	10.12	773.99	1,050,769
010yr-24hr	42.34	10.99	774.28	1,181,693
100 Yr-SCS 24Hr	**415.48**	**25.10**	**775.31**	**1,645,819**
100yr-0.17hr	196.32	2.24	772.20	289,482
100yr-0.25hr	213.64	3.76	772.46	394,036
100yr-0.50hr	239.91	6.92	773.04	641,299
100yr-01hr	229.29	9.32	773.72	932,520
100yr-02hr	116.08	8.26	773.39	792,174
100yr-03hr	142.19	12.79	774.50	1,277,145
100yr-06hr	114.70	20.14	775.03	1,517,581
100yr-12hr	87.70	23.63	775.23	1,609,230
100yr-24hr	61.05	24.05	775.26	1,619,833
WQV-0.17hr	196.32	2.24	772.20	289,482
WQV-0.25hr	157.47	2.24	772.20	289,482
WQV-0.50hr	100.39	2.24	772.20	289,478
WQV-01hr	66.63	2.24	772.20	289,452
WQV-02hr	39.18	2.23	772.20	289,305
WQV-03hr	27.85	2.23	772.20	289,026
WQV-06hr	15.35	2.21	772.20	287,409
WQV-12hr	11.85	2.16	772.19	283,695
WQV-24hr	9.70	2.10	772.18	279,283