DRAINAGE REPORT

FOR

JOHNSON COUNTY ANIMAL SHELTER

NEW BUILDING & PARKING ADDITIONS

2160 N. GRAHAM RD

July 2022

PREPARED BY:
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Indianapolis, IN 46256

TECHNICAL DRAINAGE REPORT
TABLE OF CONTENTS

DRAINAGE REPORT

NEW BUILDING & PARKING ADDITIONS PROJECT

PROJECT NARRATIVE:

The proposed project will include improvements to the existing Johnson County Animal Shelter located at 2160 S. Graham Road in Franklin, Indiana and will consist of three (3) small building additions totaling 3,350 SF, a new employee parking lot, and other site improvements and demolition work. The site was originally developed in 2008 and some minor outbuilding additions have been made since the original construction. The work of this project will disturb approximately 0.42 acres of the 4.66 acre site.

EXISTING CONDITIONS:

The existing property is developed as an animal control shelter and kennel and includes an 8,940 SF primary building (including covered kennels), a single drive entrance off Graham Road, and asphalt parking lots along the east and south sides of an asphalt drive that loops around the building. The site includes a wet detention pond with outlet control structure that discharges into Canary Ditch just west of the property.

Stormwater runoff from the site (including the impervious roofs and pavement areas) generally sheet drains overland to the wet detention pond. The northern portion of the site sheet drains to an existing paved ditch with an 18" RCP pipe that outlets into the pond. This concrete lined ditch extends north into the adjacent property which directs offsite drainage into the wet pond. The southern portion of the property sheet drains into a shallow swale that flows west directly into the wet pond. Finally, a portion existing building and pavement along the west side of the development sheet drains directly into the pond.

The original drainage design was performed by Schneider Engineering as submitted to the City of Franklin in a report titled "Drainage Report for Johnson County Animal Shelter" dated July 8, 2008 (latest revision). The narrative portion of this report is included at the end of this drainage report for reference. It should be noted that the original drainage design accounted for an area of 5.7 acres of "off-site" storage to be detained in the wet detention pond.

From the previous drainage report, the total drainage area (including the 2008 Animal Shelter development) Peak Discharge Rates were calculated as follows:

Storm Event	Pre-Developed Flow	Post Developed Flow
Q2	1.56 CFS	7.16 CFS
Q10	8.95 CFS	18.85 CFS
Q100	22.85 CFS	36.90 CFS

The wet pond outfall structure was designed in accordance with the City of Franklin's Subdivision Control Ordinance that restricts the pond outfall rate of a 10 year post developed storm to a 2 year

pre-developed rate, and the 100 year post-developed rated to a 10 year pre-developed rate as follows:

Storm Event	Allowable Discharge	Design Discharge
Q2	1.56 CFS	0.28 CFS
Q10	8.95 CFS	0.51 CFS
Q100	22.85 CFS	1.57 CFS

Site Soils

The majority of the soils within the property and project area are Brookston Silty Clay loam (YbvA) soil which is a Group B soil, with a smaller portion being Crosby Silt Loam (CrA) which is a Group C soil.

PROPOSED CONDITIONS:

The proposed improvements include construction of three (3) new small building additions totaling 3,350 SF with the largest addition being built on the north end of the existing building. A small amount of asphalt will be added to the northeast corner of the existing parking lot (with parking layout reconfigure) and a larger new employee parking lot will be constructed south of the existing building and looped drive. The project will also include minor improvements such as a new dumpster pad and enclosure (which will relocate the existing dumpster) and reconfiguring of existing fencing.

As part of the project, a significant amount of existing asphalt pavement will also be demolished to accommodate the new building additions and much of this demolished pavement will be turned into grassed lawns.

The total area disturbed by the project will be approximately 0.42 Acres. The proposed improvements will not significantly alter current drainage patterns and the site will continue to use overland sheeting to the existing wet detention pond as the method of handling stormwater runoff.

In order to evaluate the impact of the proposed development on the existing site drainage and detention pond storage, it determined that the first step is to compare the pre and post-developed impervious surface quantity. Based on both the proposed improvements and demolition work, the following summary of impervious surfaces is provided:

Surface Description	Added Area (SF)	Demolished Area (SF)	Net Change (SF)
Building Roofs	3,350	126	3,224
Asphalt Pavement	5,890	6,623	(733)
Concrete Pavement	160	270	(90)
Total	9,400 SF	7,019 SF	2,401 SF

As summarized above, the proposed improvements will increase the impervious surface of the site by only 2,401 SF, or 0.055 Acres. Since the impervious area of the site is increased by this slight amount, we have run stormwater hydrographs as included in this report for the pre and post-developed

conditions. As defined in the original 2008 drainage report, the project area is contained within parts of basins 631, 635, Swale #2, and Swale #1 totaling 7.42 acres which includes 5.80 acres of off site field to the north.

Based on the hydrographs attached, the projected stormwater runoff from the comparable pre-developed and post-developed site are as follows:

Storm Event	Pre-Developed	Post Developed
Q_2	1.028 cfs	1.045 cfs
Q_{10}	3.720 cfs	3.779 cfs
Q_{100}	9.523 cfs	9.646 cfs

As shown in the hydrographs, the proposed project will marginally increase the storm runoff for each storm event due to the slight increase in impervious area. At the 100 year storm event, the increase is only 1.3%.

When comparing the stormwater volume that will be detained in the wet detention pond, the maximum increase in water volume occurs with the 24 hour 100 year storm, which volume is 89,002 CF post-developed vs. 88,464 CF pre-developed, a difference of only 538 CF. Based on our field survey information, at the time of the survey the surface water area of the pond was 26,400 Sf which means the difference in water level in the wet detention pond would be 0.02' (1/4") which is negligible.

STORM WATER QUALITY:

The project will only disturb 0.44 acres and will therefore not be subject to the Construction Stormwater General Permit Rules as administered by IDEM. However, the existing pond was designed to meet the City of Franklin Subdivision Control Ordinance with regard to detaining at least 20% of the runoff from either a 1.25 inch storm or 0.50 inches of direct runoff, whichever is greater. The calculations for these conditions were provided in the original 2008 Drainage Report.

SUMMARY AND CONCLUSIONS:

The proposed project will disturb approximately 0.44 acres of the 4.66 acre site and the new development will result in a very minimal increase in hard surface (impervious). When comparing the pre and post developed conditions, the peak runoff from the site will increase by only 1.2% and the effect on the existing wet detention pond will be negligible. Therefore, it is conclusion of this report that the proposed project will have no adverse on either the storage volume or release rate of the existing stormwater infrastructure.

DRAINAGE CALCULATIONS

Existing (Pre-Developed) Conditions

The pre-developed project area includes 7.42 acres including 5.80 acres of off-site runoff of the grass field to the north. A summary of thecurrent land use designations is as follows:

Description	Total	Grass	Pavement	Roof
Basin #1	7.42 Acres	6.593 Ac.	0.594 Ac.	0.233 Ac.

Existing Basin #1 Runoff (SCS Method)
Area= 7.42 acres, Tc= 16 min. (from 2008 Schneider Report)
Weighted C = (6.593 x 71) + (0.594 x 98) + (0.233 x 98)/7.42 = 74.0

Peak Storm Water Runoff (Q) From Hydrographs

Storm Event	Basin #1
Q_2	1.028 cfs
Q_{10}	3.720 cfs
Q_{100}	9.532 cfs

Post Developed Conditions

Description	Total	Grass	Pavement	Roof
Basin #1	7.42 Acres	6.538 Ac.	0.575 Ac.	0.307 Ac.

Existing Basin #1 Runoff (SCS Method)
Area= 7.42 acres, Tc= 16 min. (from 2008 Schneider Report)
Weighted C = (6.538 x 71) + (0.575 x 98) + (0.307 x 98)/7.42 = 74.2

Peak Storm Water Runoff (Q) From Hydrographs

Storm Event	Basin #1
Q_2	1.045 cfs
Q_{10}	3.779 cfs
Q_{100}	9.646 cfs

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	0.777	3	51	2,031	------	------	------	Basin 1 Pre-developed 1 hour
2	SCS Runoff	0.962	3	60	4,281	------	------	------	Basin 1 Pre-developed 2 hour
3	SCS Runoff	0.651	3	84	4,284	------	------	------	Basin 1 Pre-developed 3 hour
4	SCS Runoff	0.796	3	99	9,457	------	------	------	Basin 1 Pre-developed 6 hour
5	SCS Runoff	1.028	3	327	15,356	------	------	------	Basin 1 Pre-developed 12 hour
6	SCS Runoff	0.916	3	936	19,125	------	------	------	Basin 1 Pre-developed 24 hour
7	SCS Runoff	0.797	3	51	2,102	------	------	------	Post Dev Basin1 - 1 hour
8	SCS Runoff	0.986	3	57	4,385	------	------	------	Post Dev Basin 1 - 2 Hour
9	SCS Runoff	0.931	3	66	6,029	------	------	------	Post Dev Basin 1 - 3 Hour
10	SCS Runoff	0.815	3	99	9,625	------	------	------	Post Dev Basin 1 - 6 Hour
11	SCS Runoff	1.045	3	327	15,575	------	------	------	Post Dev Basin 1 - 12 Hour
12	SCS Runoff	0.926	3	936	19,373	------	------	------	Post Dev Basin 1 - 24 Hour

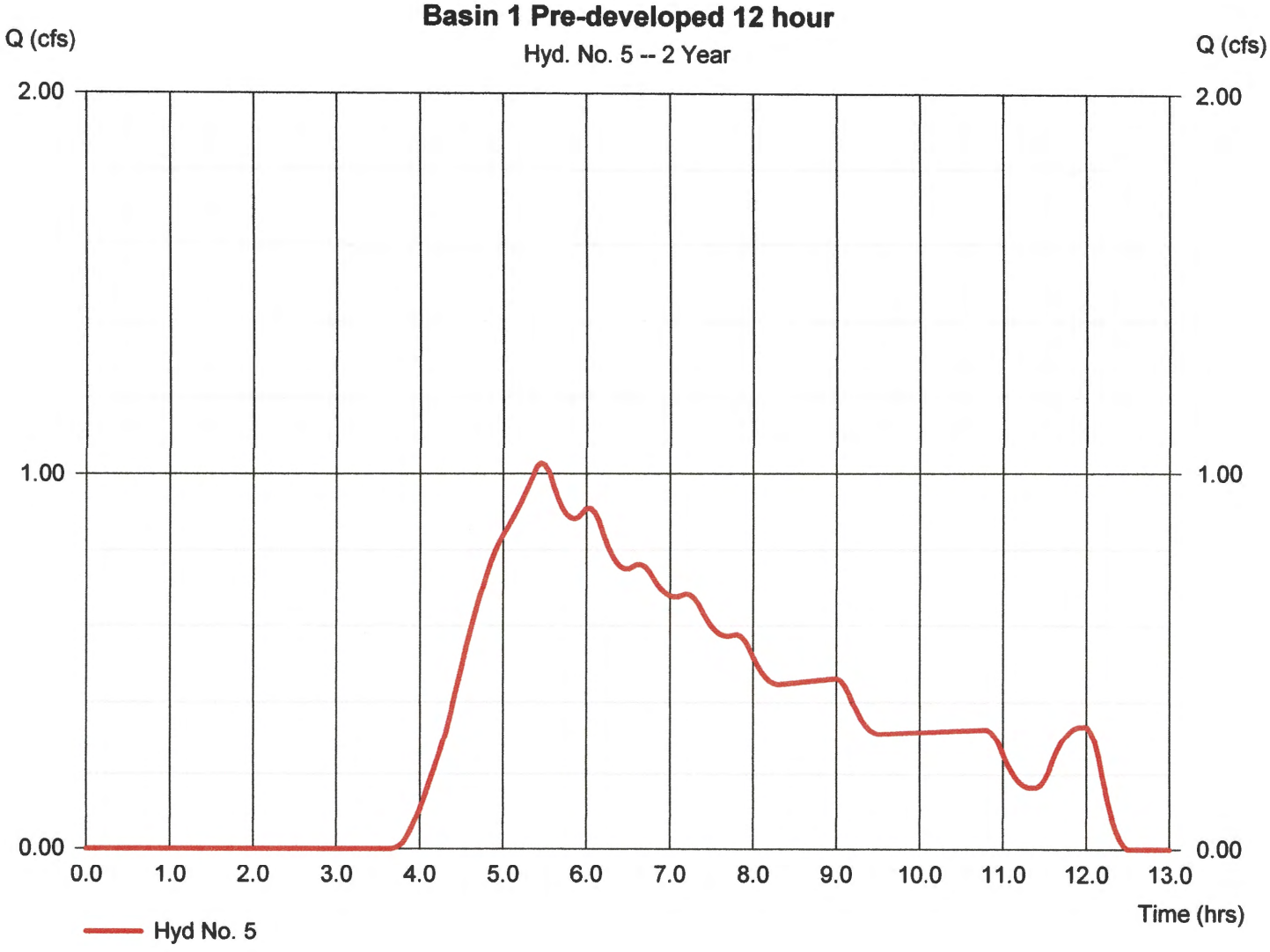
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020 — Wednesday, 07 / 6 / 2022

Hyd. No. 5

Basin 1 Pre-developed 12 hour

Hydrograph type	= SCS Runoff	Peak discharge	= 1.028 cfs
Storm frequency	= 2 yrs	Time to peak	= 5.45 hrs
Time interval	= 3 min	Hyd. volume	= 15,356 cuft
Drainage area	= 7.420 ac	Curve number	= 74
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 16.00 min
Total precip.	= 2.40 in	Distribution	= Huff-2nd
Storm duration	= 12.00 hrs	Shape factor	= 484



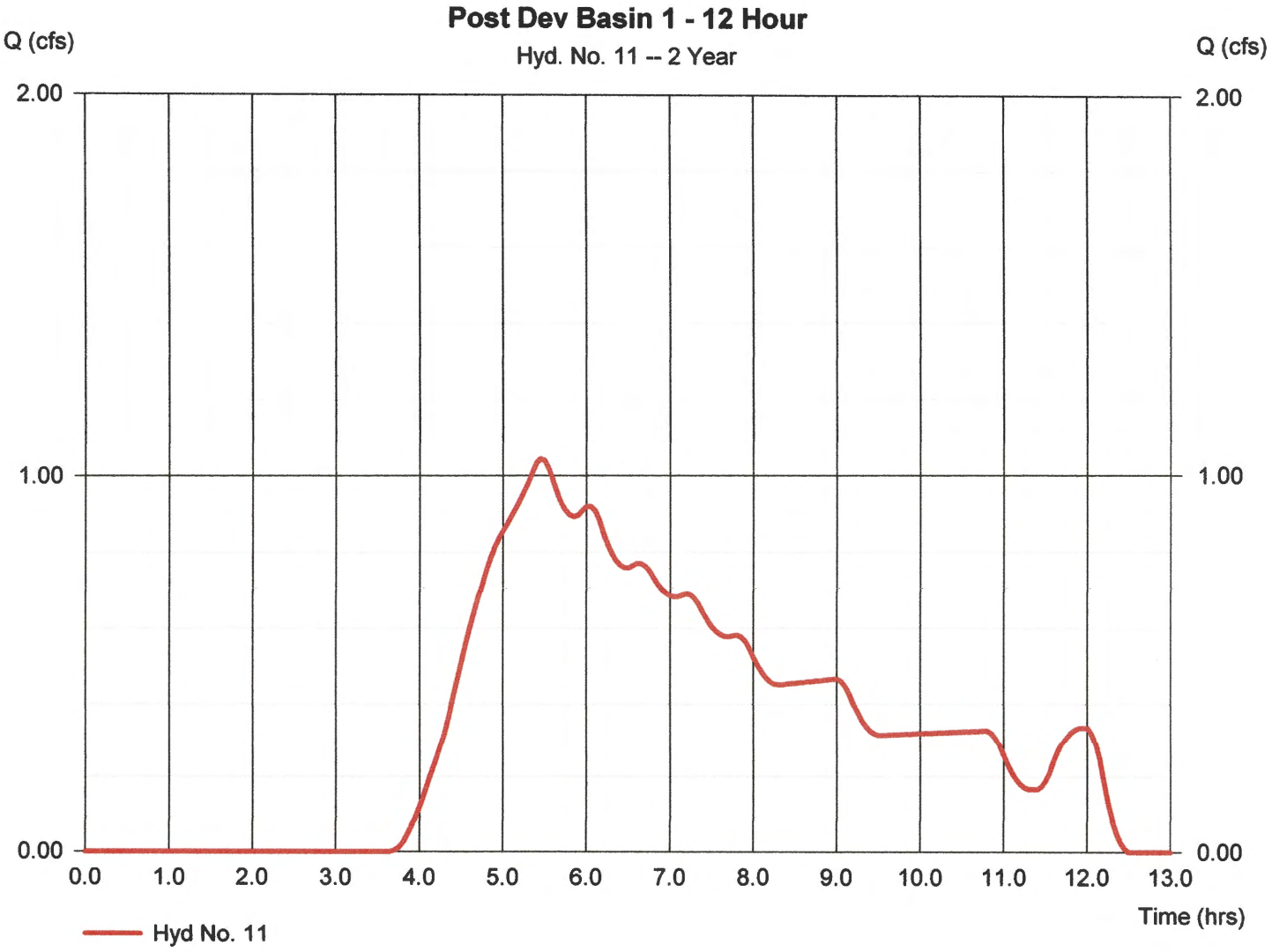
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020 — Wednesday, 07 / 6 / 2022

Hyd. No. 11

Post Dev Basin 1 - 12 Hour

Hydrograph type	= SCS Runoff	Peak discharge	= 1.045 cfs
Storm frequency	= 2 yrs	Time to peak	= 5.45 hrs
Time interval	= 3 min	Hyd. volume	= 15,575 cuft
Drainage area	= 7.420 ac	Curve number	= 74.2
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 16.00 min
Total precip.	= 2.40 in	Distribution	= Huff-2nd
Storm duration	= 12.00 hrs	Shape factor	= 484



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	3.663	3	33	9,179	-----	-----	-----	Basin 1 Pre-developed 1 hour
2	SCS Runoff	3.720	3	45	15,295	-----	-----	-----	Basin 1 Pre-developed 2 hour
3	SCS Runoff	2.605	3	54	15,339	-----	-----	-----	Basin 1 Pre-developed 3 hour
4	SCS Runoff	2.575	3	93	27,361	-----	-----	-----	Basin 1 Pre-developed 6 hour
5	SCS Runoff	2.468	3	327	36,370	-----	-----	-----	Basin 1 Pre-developed 12 hour
6	SCS Runoff	2.052	3	936	45,977	-----	-----	-----	Basin 1 Pre-developed 24 hour
7	SCS Runoff	3.738	3	33	9,349	-----	-----	-----	Post Dev Basin1 - 1 hour
8	SCS Runoff	3.779	3	45	15,503	-----	-----	-----	Post Dev Basin 1 - 2 Hour
9	SCS Runoff	3.378	3	54	19,367	-----	-----	-----	Post Dev Basin 1 - 3 Hour
10	SCS Runoff	2.606	3	93	27,665	-----	-----	-----	Post Dev Basin 1 - 6 Hour
11	SCS Runoff	2.491	3	327	36,720	-----	-----	-----	Post Dev Basin 1 - 12 Hour
12	SCS Runoff	2.066	3	936	46,372	-----	-----	-----	Post Dev Basin 1 - 24 Hour

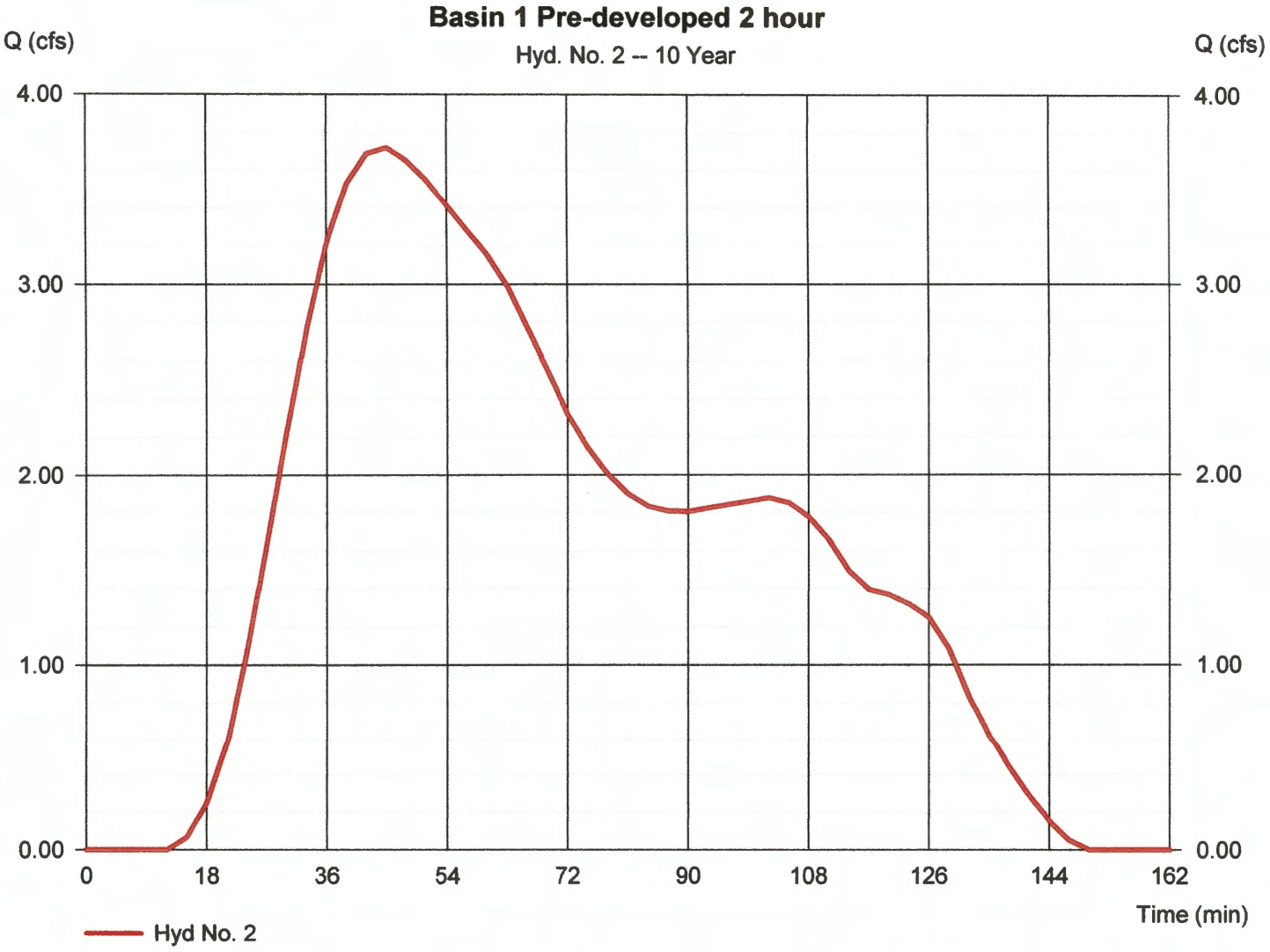
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020 — Wednesday, 07 / 6 / 2022

Hyd. No. 2

Basin 1 Pre-developed 2 hour

Hydrograph type	= SCS Runoff	Peak discharge	= 3.720 cfs
Storm frequency	= 10 yrs	Time to peak	= 45 min
Time interval	= 3 min	Hyd. volume	= 15,295 cuft
Drainage area	= 7.420 ac	Curve number	= 74
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 16.00 min
Total precip.	= 2.40 in	Distribution	= Huff-1st
Storm duration	= 2.00 hrs	Shape factor	= 484



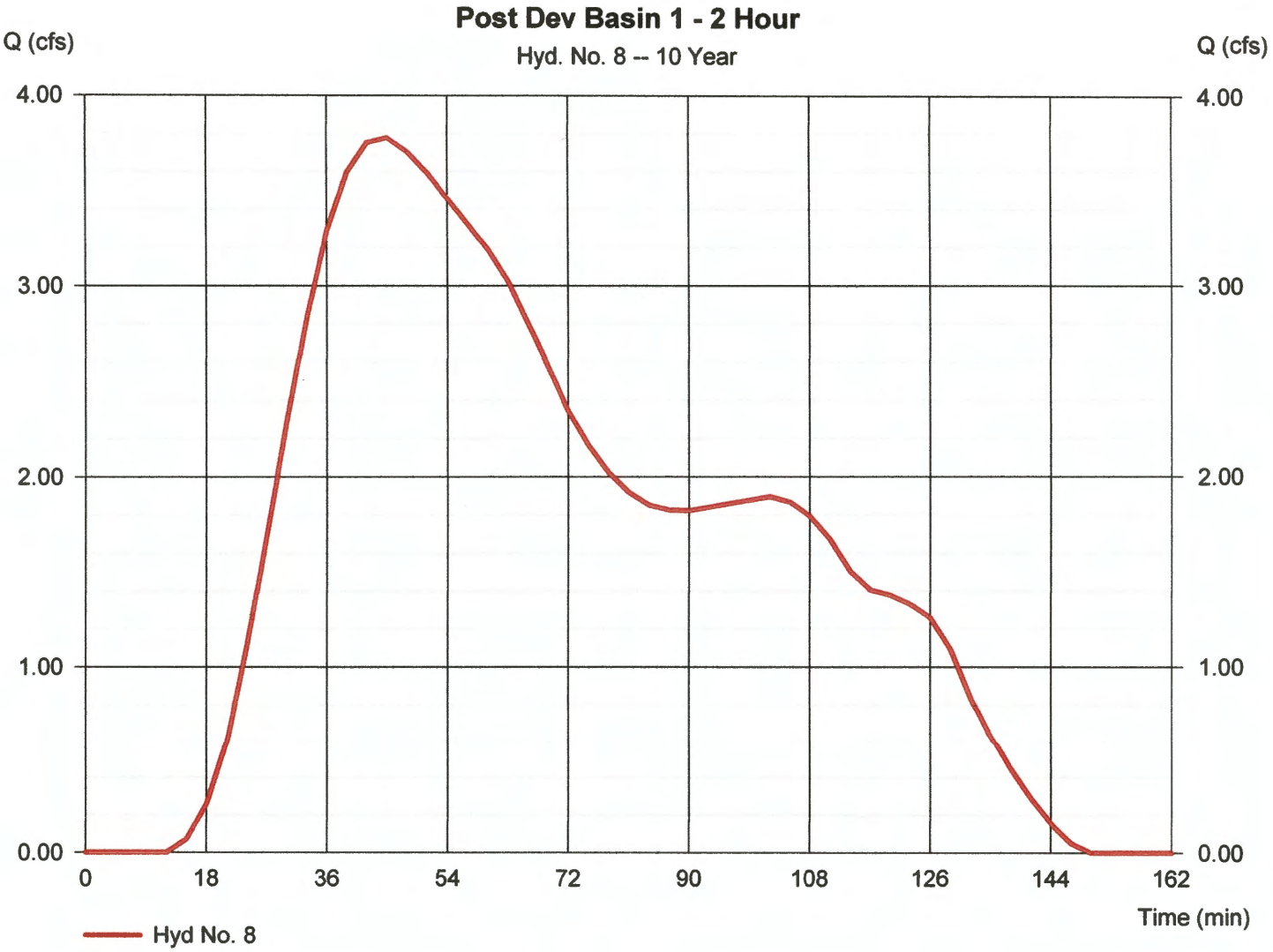
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020 — Wednesday, 07 / 6 / 2022

Hyd. No. 8

Post Dev Basin 1 - 2 Hour

Hydrograph type	= SCS Runoff	Peak discharge	= 3.779 cfs
Storm frequency	= 10 yrs	Time to peak	= 45 min
Time interval	= 3 min	Hyd. volume	= 15,503 cuft
Drainage area	= 7.420 ac	Curve number	= 74.2
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 16.00 min
Total precip.	= 2.40 in	Distribution	= Huff-1st
Storm duration	= 2.00 hrs	Shape factor	= 484



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	9.523	3	30	22,685	-----	-----	-----	Basin 1 Pre-developed 1 hour
2	SCS Runoff	8.906	3	39	34,272	-----	-----	-----	Basin 1 Pre-developed 2 hour
3	SCS Runoff	6.236	3	51	34,416	-----	-----	-----	Basin 1 Pre-developed 3 hour
4	SCS Runoff	5.239	3	90	54,782	-----	-----	-----	Basin 1 Pre-developed 6 hour
5	SCS Runoff	4.615	3	324	69,233	-----	-----	-----	Basin 1 Pre-developed 12 hour
6	SCS Runoff	3.701	3	936	88,464	-----	-----	-----	Basin 1 Pre-developed 24 hour
7	SCS Runoff	9.646	3	30	22,954	-----	-----	-----	Post Dev Basin1 - 1 hour
8	SCS Runoff	9.009	3	39	34,628	-----	-----	-----	Post Dev Basin 1 - 2 Hour
9	SCS Runoff	7.701	3	51	42,037	-----	-----	-----	Post Dev Basin 1 - 3 Hour
10	SCS Runoff	5.280	3	90	55,210	-----	-----	-----	Post Dev Basin 1 - 6 Hour
11	SCS Runoff	4.644	3	324	69,714	-----	-----	-----	Post Dev Basin 1 - 12 Hour
12	SCS Runoff	3.717	3	936	89,002	-----	-----	-----	Post Dev Basin 1 - 24 Hour

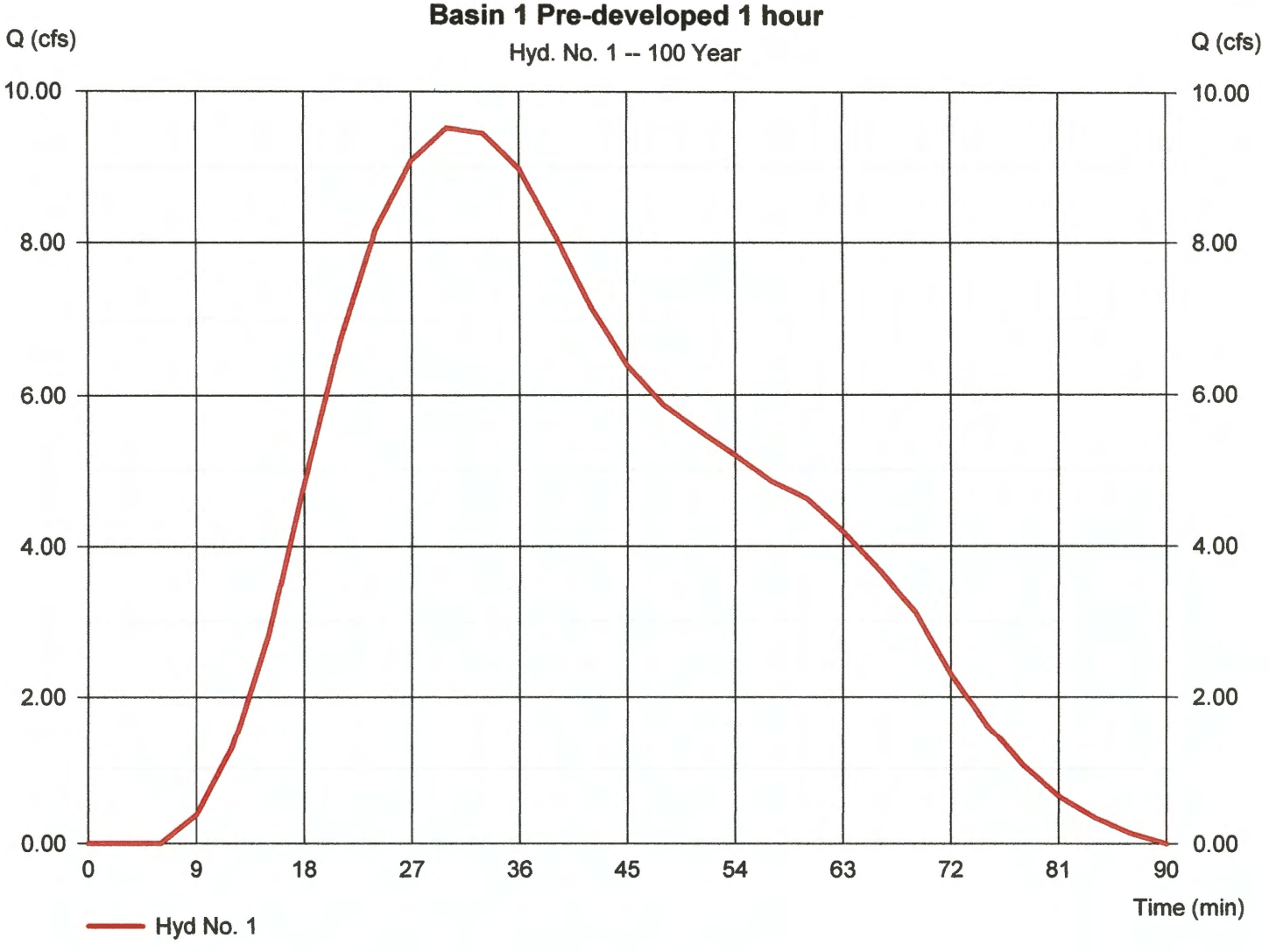
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020 — Wednesday, 07 / 6 / 2022

Hyd. No. 1

Basin 1 Pre-developed 1 hour

Hydrograph type	= SCS Runoff	Peak discharge	= 9.523 cfs
Storm frequency	= 100 yrs	Time to peak	= 30 min
Time interval	= 3 min	Hyd. volume	= 22,685 cuft
Drainage area	= 7.420 ac	Curve number	= 74
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 16.00 min
Total precip.	= 2.88 in	Distribution	= Huff-1st
Storm duration	= 1.00 hrs	Shape factor	= 484



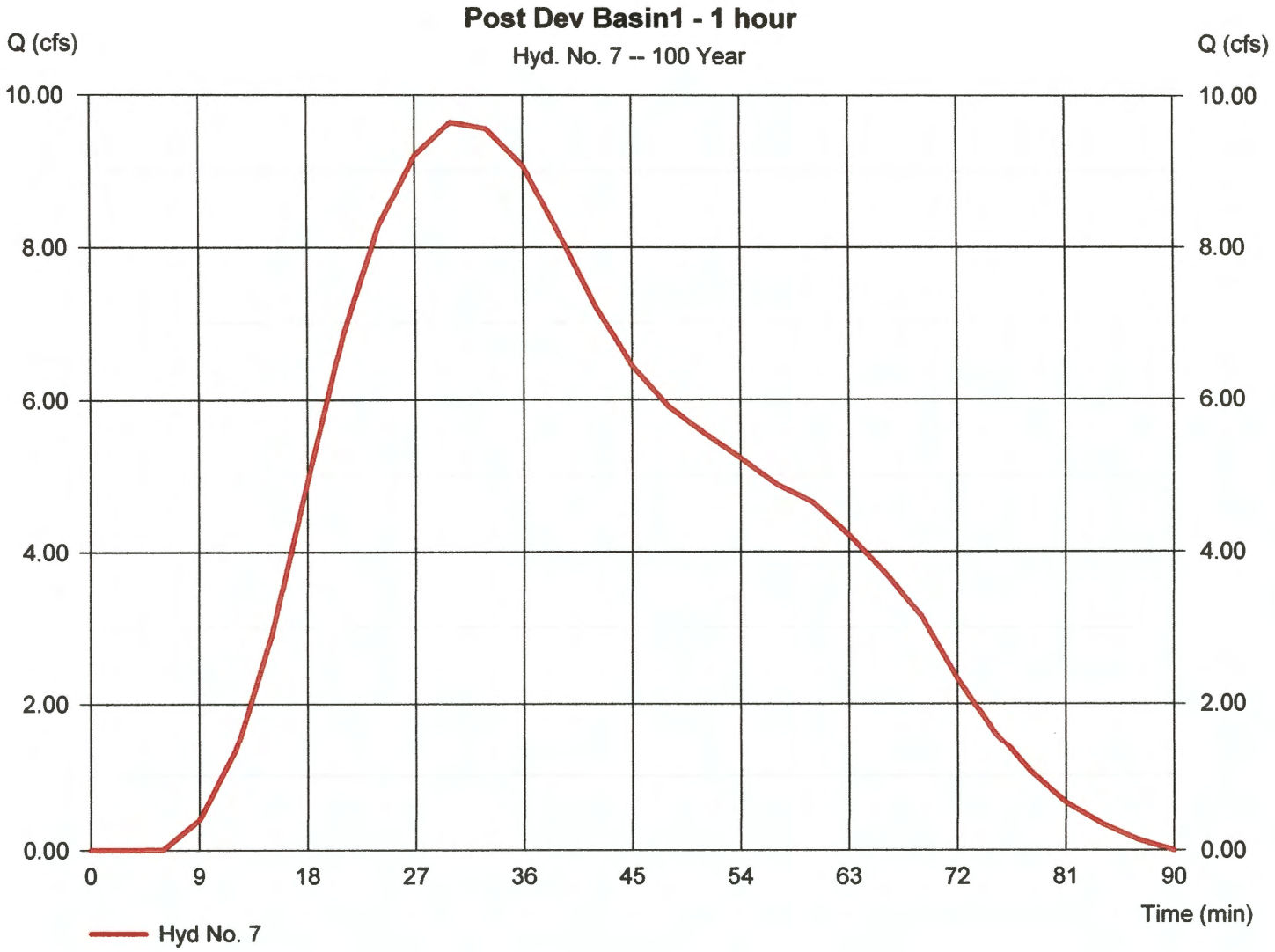
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020 — Wednesday, 07 / 6 / 2022

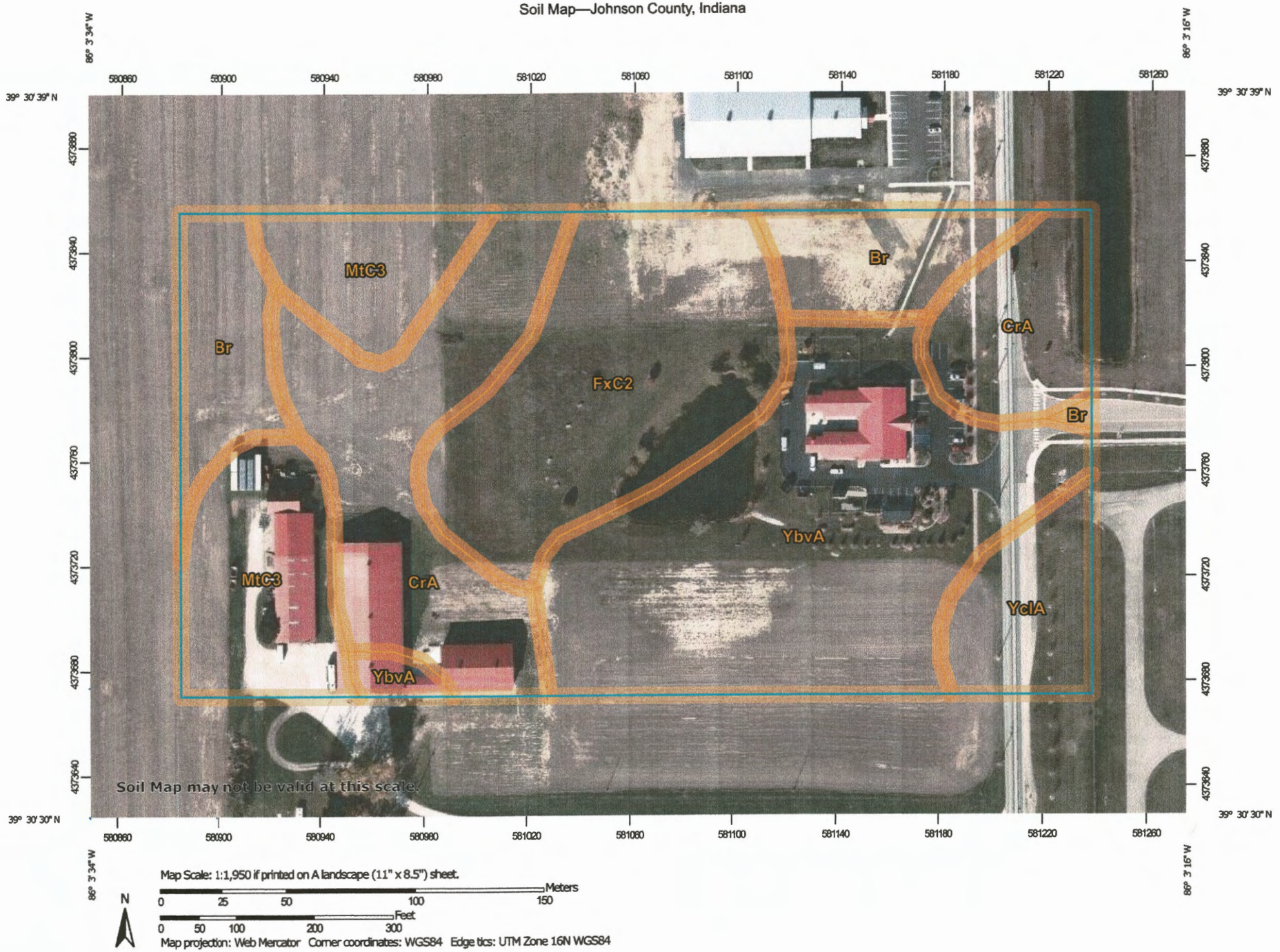
Hyd. No. 7

Post Dev Basin1 - 1 hour

Hydrograph type	= SCS Runoff	Peak discharge	= 9.646 cfs
Storm frequency	= 100 yrs	Time to peak	= 30 min
Time interval	= 3 min	Hyd. volume	= 22,954 cuft
Drainage area	= 7.420 ac	Curve number	= 74.2
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 16.00 min
Total precip.	= 2.88 in	Distribution	= Huff-1st
Storm duration	= 1.00 hrs	Shape factor	= 484



Soil Map—Johnson County, Indiana



Map Scale: 1:1,950 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 25 50 100 150

Feet: 0 50 100 200 300

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 Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: Johnson County, Indiana
Survey Area Data: Version 29, Sep 8, 2021

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

Date(s) aerial images were photographed: Oct 22, 2020—Nov 12, 2020

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.

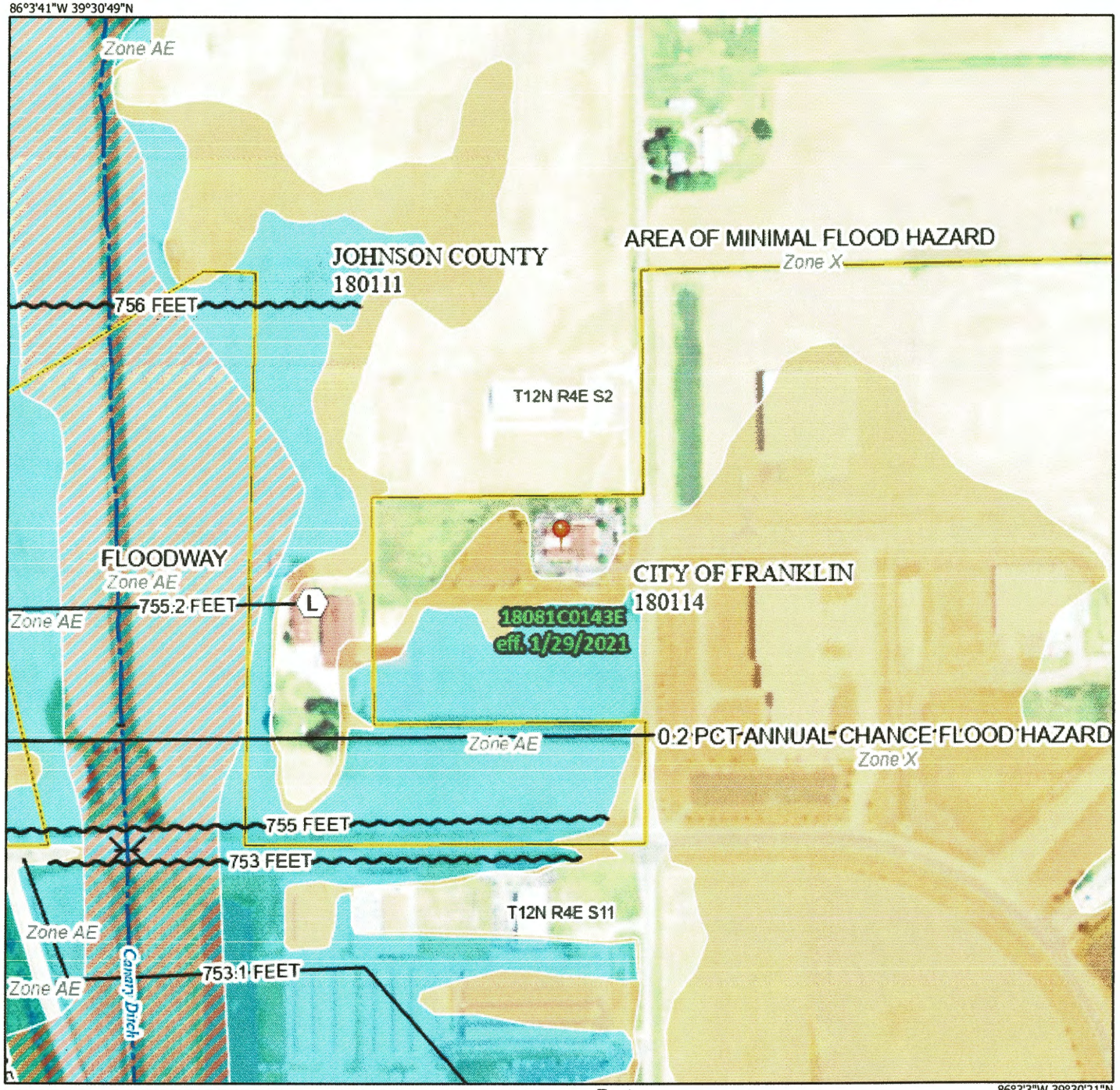
15

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Br	Brookston silty clay loam, 0 to 2 percent slopes	1.7	10.7%
CrA	Crosby silt loam, fine-loamy subsoil, 0 to 2 percent slopes	3.5	21.6%
FxC2	Fox complex, 6 to 12 percent slopes, eroded	3.0	18.7%
MtC3	Miami clay loam, 6 to 12 percent slopes, severely eroded	2.3	13.9%
YbvA	Brookston silty clay loam-Urban land complex, 0 to 2 percent slopes	4.8	29.6%
YclA	Crosby silt loam, fine-loamy subsoil-Urban land complex, 0 to 2 percent slopes	0.9	5.4%
Totals for Area of Interest		**16.2**	**100.0%**

National Flood Hazard Layer FIRMette

FEMA



Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

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

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

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

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

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

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

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

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

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

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 7/6/2022 at 8:40 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

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