TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC

SECTION 12

FLOOD HAZARD AREA VERIFICATION ENGINEER'S REPORT

COMPRESSION STATION 206

NORTHEAST SUPPLY ENHANCEMENT PROJECT

JANUARY 2020

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NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
FLOOD HAZARD AREA VERIFICATION
ENGINEER'S REPORT

Prepared for:

NORTHEAST SUPPLY ENHANCEMENT PROJECT
COMPRESSOR STATION 206 – HIGGINS FARM ACCESS ROAD
TOWNSHIP OF FRANKLIN, SOMERSET COUNTY
BLOCK 5.02, LOT 25

Prepared for:

Prepared By:

Paulus, Sokolowski and Sartor, LLC
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Certificate of Authorization No. 24GA28032700

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Professional Engineer
N.J. License No. 41319

PS&S Job # 05731-0003
January 2020

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Plan References:

"NJDEP Land Use Permit Plans for the Northeast Supply Enhancement Project Compressor Station 206 – Higgins Farm Access Road", prepared by PS&S, LLC, dated January 15, 2020

1. INTRODUCTION

The Applicant, Williams Transcontinental Gas Pipe Line Company, LLC is seeking Flood Hazard Area, Floodplain verification and riparian zone verification on the site known as Block 5.02, Lot 25. Riparian Zone Verification is also required on adjoining Block 5.02 Lot 26.01 for access in the Township of Franklin, Somerset County, New Jersey.

The proposed project includes construction of a new compressor station to service the upgraded gas pipeline associated with the Northeast Supply Enhancement Project. The work includes the installation of a new compressor station, office/shop/warehouse, drum storage building, access roadway, stormwater conveyance system and detention basin and associated site improvements.

The existing Block 5.02, Lot 25 is undeveloped and predominately covered by woods. The tract is bordered by Carters Brook to the northeast and surrounded by rural residential lots. A portion of the subject site falls within Flood Hazard Area (FHA) and Riparian Zone associated with the Carters Brook.

Proposed easements to construct an access road to the compressor station runs through the tract known as Block 5.02, Lot 26.01. Based on the FEMA Flood Insurance Rate Map (Panel No. 34023C0261F, 34023C0263F and 34035C0265E), Carter's Brook extends onto Lot 26.01. There were no streams located within the surveyed area of Lot 26.01 or within publicly available GIS data. The portion of Carter's Brook in the northern part of Block 5.02, Lot 25 downstream of Lot 26.01 has a contributory drainage area less than 50 acres, so any segment of Carter's Brook that lies within the Lot 26.01 property boundary would also have a contributory drainage area of less than 50 acres and therefore there is no flood hazard area associated with this segment of the stream.

A 100-foot wide "Transcontinental Gas Pipe Line Easement" runs along the south-easterly corner of the property and 50-foot wide Sun Pipe Line easement runs along the northerly and easterly lot lines.

2. METHODOLOGY

According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (No. 34023C0261F, 34023C0263F and 34035C0265E) for Somerset County, dated November 4, 2016 (found in Appendix A of this report), the portion of the Carters Brook, which influences the project underlies within zone (A) where no base flood elevation has been provided. Therefore, the 100-year floodplain associated with the Carters Brook in this report has been delineated using NJDEP Method 5 (Flood Hazard Area determined by approximation) according to N.J.A.C. 7:13-3.5. The methodology for determining the FHA and demonstrating compliance with the FHA regulations is described in Section 3.0.

3. FLOOD HAZARD AREA ELEVATION DETERMINATION

As discussed in Section 2 of this report, the portion of the Carters Brook within the subject tract has not been studied by NJDEP or Flood Insurance Rate Maps. As such, Method 5 has been utilized to determine the flood hazard area.

The flood hazard area elevation was calculated based on N.J.A.C. 7:13 Appendix 1-Approximating the Flood Hazard Area Design Flood Elevation. According to Appendix 1 "How To Use Method 5 (Approximation)" bullet point 5, the approximate flood hazard area design flood elevation will be the higher of either the depth from Table 1 (Approximate Flood Depth Above Average Streambed Elevation) measured above the average streambed or the depth from Table 2 (Depth of Flood Over Roadway). The project is located within WMA-10 (Watershed Management Area) based on Figure 5 in N.J.A.C. 13 Appendix 1 (New Jersey Watersheds, Watershed Management Areas and Water Regions) and New Jersey – GeoWeb found in Appendix A of this report. The contributing drainage area has been determined to be 285 acres based on the corresponding USGS mapping for Franklin Township, Somerset County, NJ. The drainage area map is provided in Appendix A of this report. Using Table 1 form N.J.A.C. 7:13 Appendix A, a WMA 10 with a contributing drainage area of 285 acres produces **an approximate flood depth of 9 feet**. Sections were taken along Carter's Brook based on surveyed top of bank elevations and average streambed centerline elevations based upon LIDAR topography. This flood depth is measured from the average streambed of the stream.

The drainage area to the point where Carter's Brook crosses Lincoln Highway (State Highway 27) downstream of the project site is 0.79 square miles. The elevation of the low point in the road as determined to be 221 based on USGS mapping and Google Earth. According to Table 2, the NJFHADF elevation produces an approximate flood depth of 1.5 feet above the low point of the road, elevation 222.5, which is well below the lowest elevation on the project site of 239. Since Table 1 produces a higher NJFHADF elevation on the project site, **the revised flood elevation is 9 feet flood depth above the stream**.

Based on the determined flood hazard area elevation, none of the proposed improvements associated with the installation of the compressor station lie within the 100-year floodplain or Riparian Zone of Carters Brook.

APPENDIX A

USGS Map

Tax Map

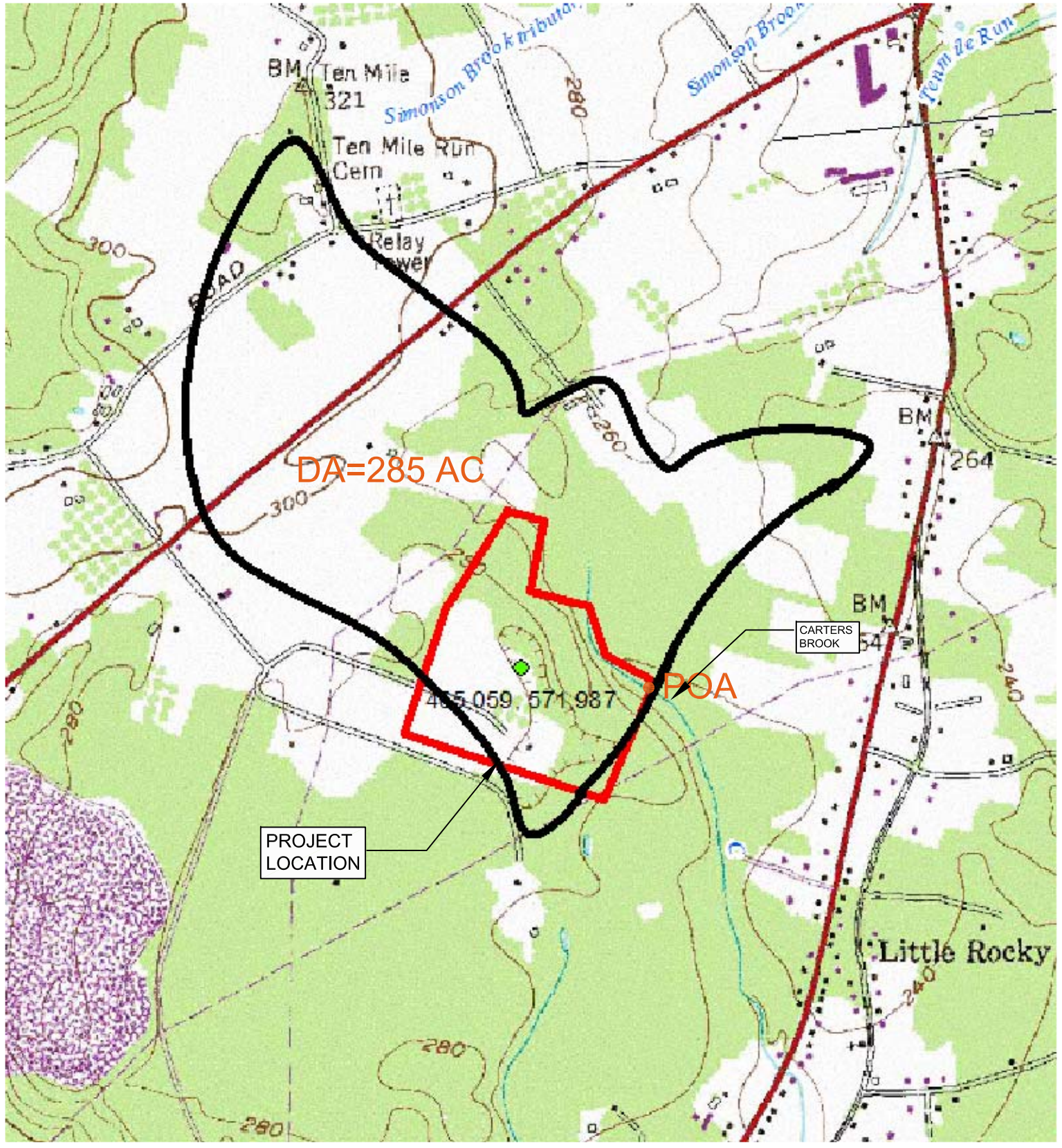
FEMA Flood Map

StreamStats (U.S. Department of the Interior U.S. Geological Survey)
Drainage Area Map

Approximate Depths Above Average Streambed Elevation (Table 1)

Depth of Flood Over Roadway (Table 2)

Watershed Management Area Map



USGS QUADRANGLE MAP
MONMOUTH JUNCTION, NJ 2016

NORTH

NOTES:

1. THE PURPOSE OF THIS PLAN IS TO DEPICT THE TRIBUTARY DRAINAGE AREA TO CARTER'S BROOK AT BLOCK 5.02, LOT 25 IN SUPPORT OF AN APPLICATION TO NJDEP FOR FLOODPLAIN VERIFICATION BY APPROXIMATION.
2. DRAINAGE AREA = 285 AC.

GRAPHIC SCALE

1000 0 500 1000 2000

(IN FEET)
1 inch = 1000 ft.

REV. / ISSUE	DATE	DESCRIPTION

PAULUS, SOKOLOWSKI AND SARTOR, LLC.

1433 ROUTE 34
SUITE A4
WALL, NEW JERSEY 07727
PHONE: (848) 206-2626

CERTIFICATE OF AUTHORIZATION NO. 24GA28032700

PROJECT

NORTHEAST SUPPLY ENHANCEMENT PROJECT
COMPRESSOR STATION 206

BLOCK 5.02 LOT 25, FRANKLIN TWP, NJ

SHEET TITLE

CARTER'S BROOK DRAINAGE AREA MAP

PROJ. NO.:	05731.0003
DATE:	JUNE 2018
DRAWN BY:	JPS
CHECKED BY:	WS
SCALE:	AS NOTED
FIGURE NO.	1

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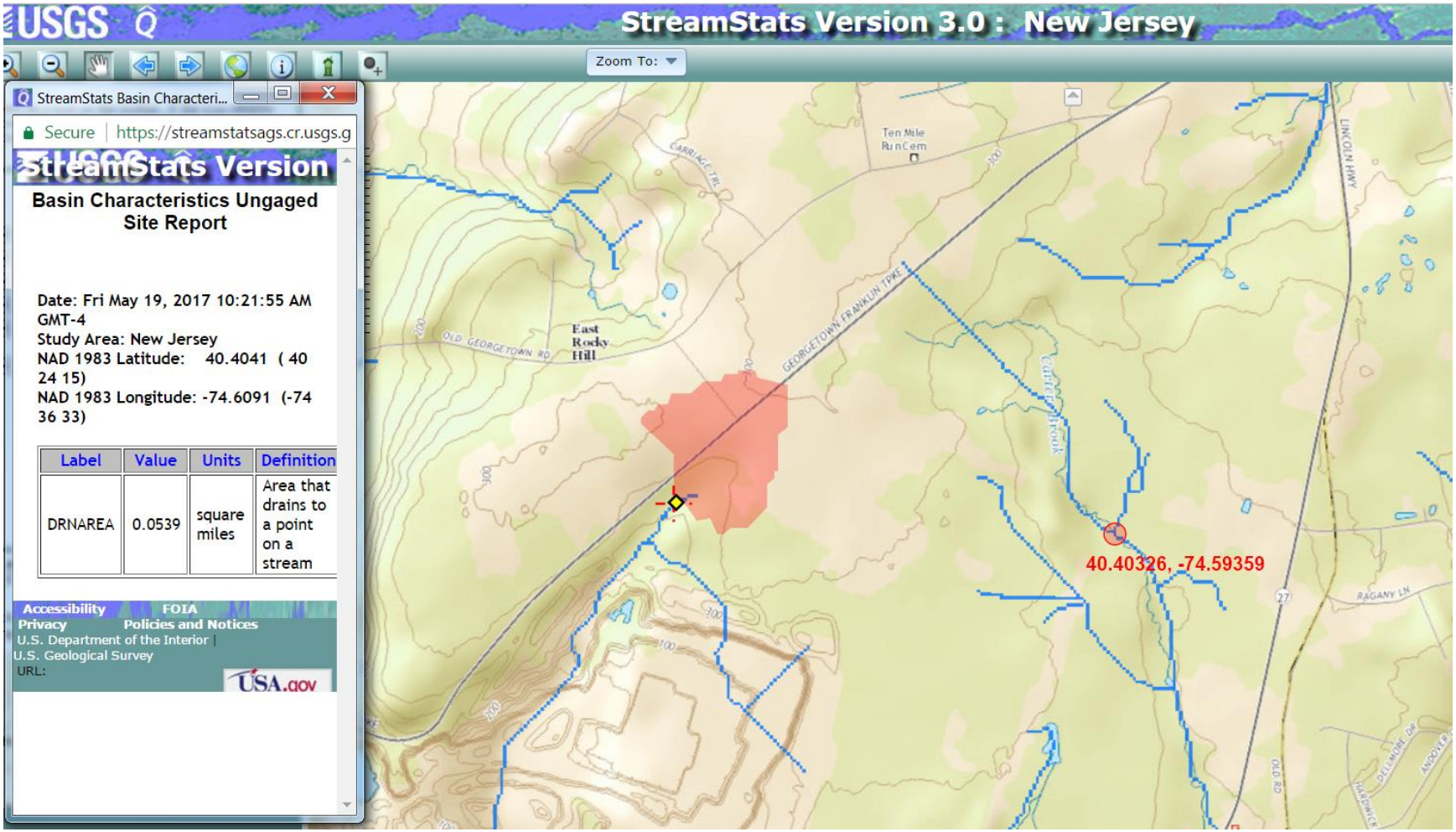
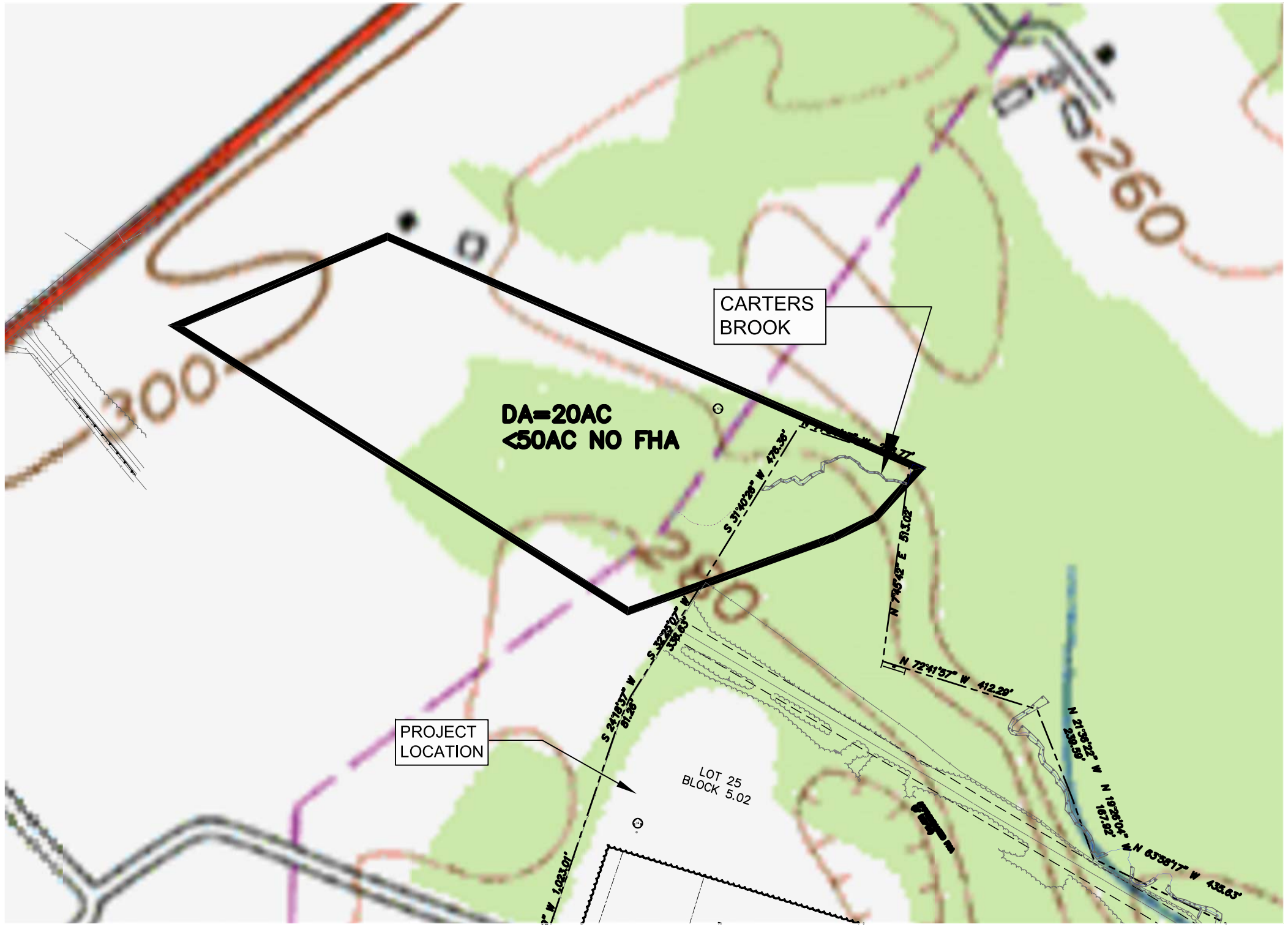
XREFS: ExTopo_CS 206 IMAGE: drainage area from NJDEP.png ; HIGHTSTOWN2.tif ; MONMOUTH JUNCTION.tif ; PRINCETON.tif ; ROCKY HILL.tif ;

Drainage area of four fingers of the unknown tributary to Delaware & Raritan Canal-Tributary located near the proposed access driveway, where it ties into Georgetown-Franklin Turnpike (Route 518).

DA=34 AC



CROSSING "A" DRAINAGE AREA



USGS QUADRANGLE MAP
MONMOUTH JUNCTION, NJ 2016

NOTES:

1. THE PURPOSE OF THIS PLAN IS TO DEPICT THE TRIBUTARY DRAINAGE AREA TO CARTER'S BROOK AT BLOCK 5.02, LOT 25 IN SUPPORT OF AN APPLICATION TO NJDEP FOR FLOODPLAIN VERIFICATION BY APPROXIMATION.
2. DRAINAGE AREA = 20 AC.

GRAPHIC SCALE

200 0 100 200 400

(IN FEET)
1 inch = 200 ft.

NORTH

REV. / ISSUE	DATE	DESCRIPTION

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COMPRESSOR STATION 206

BLOCK 5.02 LOT 25, FRANKLIN TWP, NJ

SHEET TITLE

CARTER'S BROOK DRAINAGE AREA MAP

PROJ. NO.:	05731.0003
DATE:	JUNE 2018
DRAWN BY:	JPS
CHECKED BY:	WS
SCALE:	AS NOTED
FIGURE NO.	1A

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StreamStats Report

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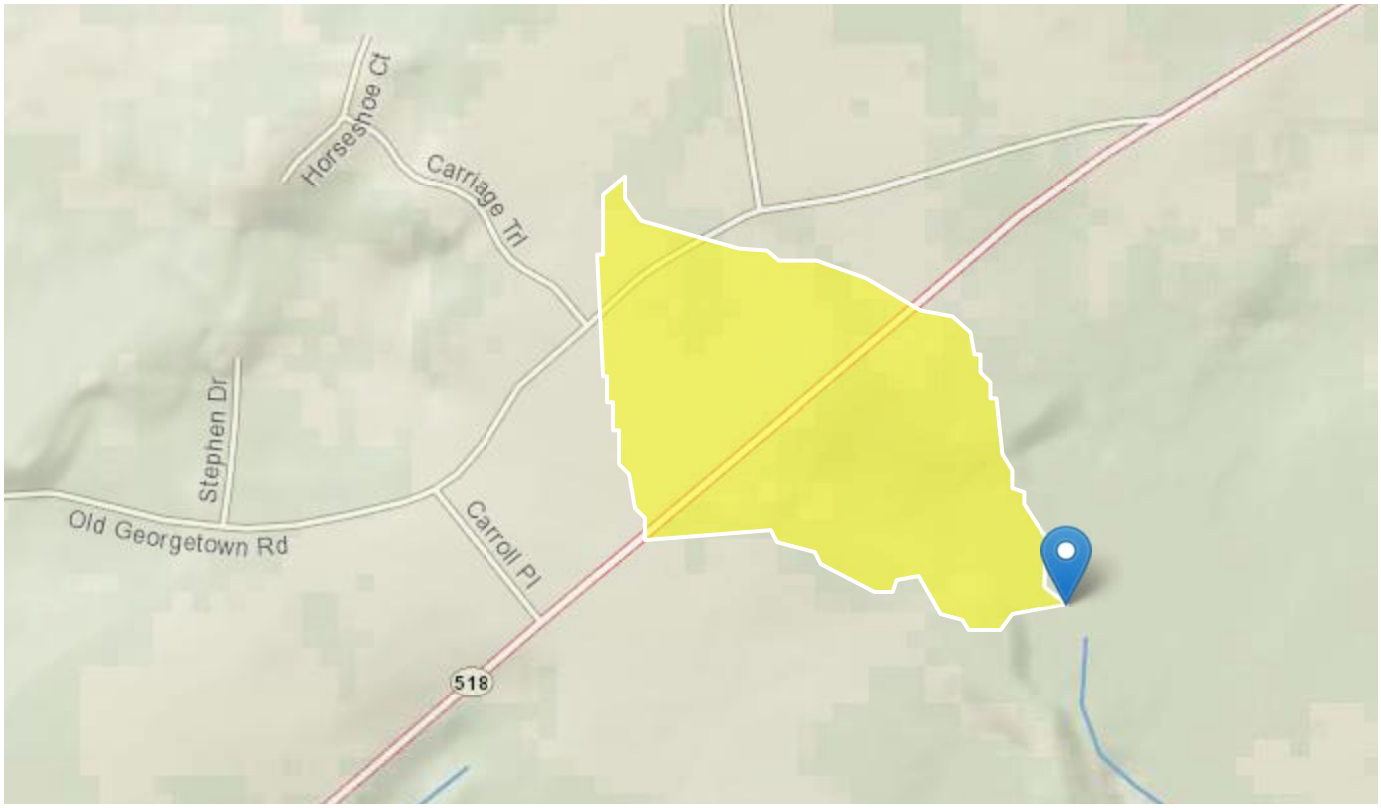
Clicked Point (Latitude, Longitude): 40.40664, -74.59575
Time: 2017-08-15 14:03:39 -0400



Carter's Brook Upstream

Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	0.15	square miles
STORAGE	Percentage of area of storage (lakes ponds reservoirs wetlands)	28.4	percent
CSL10_85	Change in elevation divided by length between points 10 and 85 percent of distance along main channel to basin divide - main channel method not known	108	feet per mi
POPDENS	Basin Population Density	350	persons per square mile

Peak-Flow Statistics Parameters [Peak Unglaciated Piedmont Region 2009 5167]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.15	square miles	0.25	779
STORAGE	Percent Storage	28.4	percent	0.23	32
CSL10_85	Stream Slope 10 and 85 Method	108	feet per mi	4.31	191
POPDENS	Basin Population Density	350	persons per square mile	83	11084

Peak-Flow Statistics Disclaimers [Peak Unglaciated Piedmont Region 2009 5167]

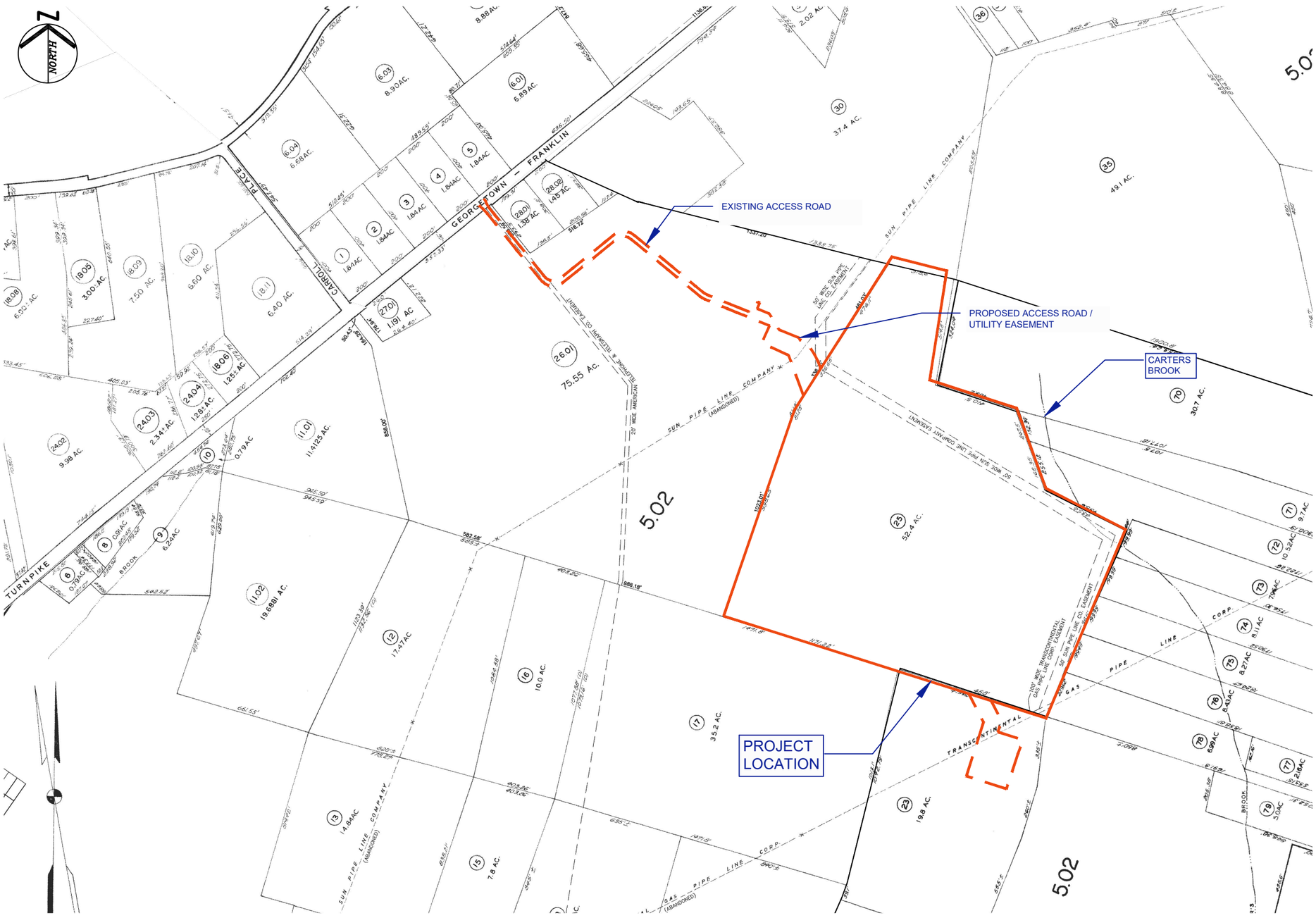
One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

Peak-Flow Statistics Flow Report [Peak Unglaciated Piedmont Region 2009 5167]

Statistic	Value	Unit
2 Year Peak Flood	51.5	ft^3/s
5 Year Peak Flood	84	ft^3/s
10 Year Peak Flood	108	ft^3/s
25 Year Peak Flood	141	ft^3/s
50 Year Peak Flood	165	ft^3/s
100 Year Peak Flood	193	ft^3/s
500 Year Peak Flood	257	ft^3/s

Peak-Flow Statistics Citations

Watson, K.M.,and Schopp, R.D.,2009, Methodology for estimation of flood magnitude and frequency for New Jersey streams, U.S. Geological Survey Scientific Investigations Report 2009-5167, 51 p. (http://pubs.usgs.gov/sir/2009/5167/)



SOURCES: PARCELS OF FRANKLIN TOWNSHIP, SOMERSET COUNTY, NJ
TAX MAP # 5, 6, 7, 8, & 13

GRAPHIC SCALE

500 0 250 500 1000

(IN FEET)

1 inch = 500 ft.

REV. / ISSUE	DATE	DESCRIPTION

PAULUS, SOKOLOWSKI AND SARTOR, LLC.

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PROJECT

NORTHEAST SUPPLY ENHANCEMENT PROJECT
COMPRESSOR STATION 206

BLOCK 5.02 LOT 25, FRANKLIN TWP, NJ

SHEET TITLE

TAX MAP
BLOCK 5.02, LOT 25
FRANKLIN TOWNSHIP
SOMERSET COUNTY, NJ

PROJ. NO.:	05731.0003
DATE:	DECEMBER 2019
DRAWN BY:	IK
CHECKED BY:	WS
SCALE:	AS NOTED
FIGURE NO.	2

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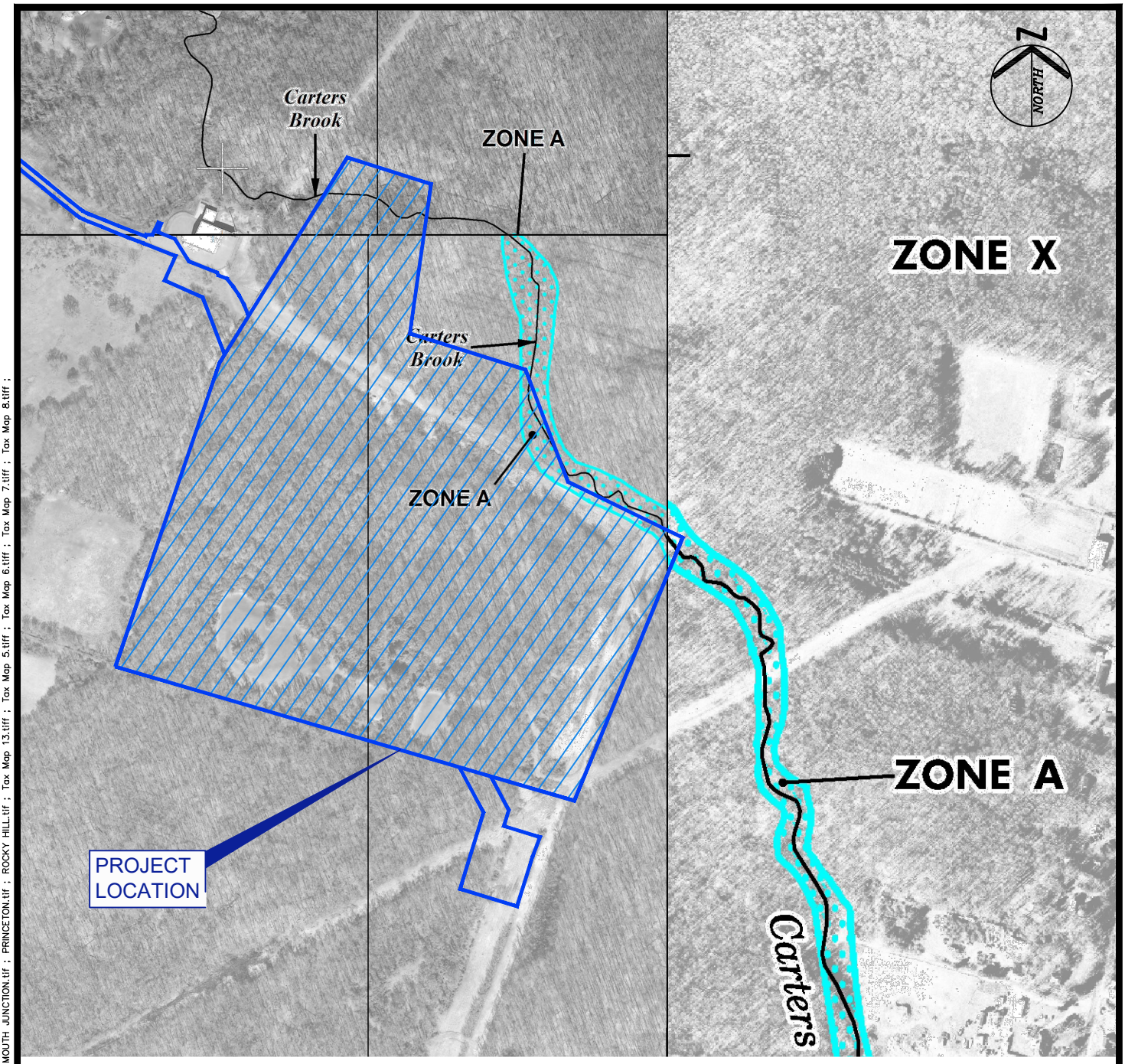

SOURCES: FIRM # 34023C0261F, 34023C0263F, & 34035C0265E.

GRAPHIC SCALE

500 0 250 500 1000

(IN FEET)

1 inch = 500 ft.

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PROJECT TITLE

NORTHEAST ENHANCEMENT PROJECT COMPRESSOR STATION 206

BLOCK 5.02 LOT 25, FRANKLIN TWP, NJ

SHEET TITLE

FLOOD INSURANCE RATE MAP SOMERSET COUNTY, NJ

PROJ. NO.:	05731.0003	DRN. BY:	IK	SCALE:	1"=500'
DATE:	12/20/19	CK'D BY:	WS	FIGURE NO.:	3

FILE NAME: P:\05731\0003\BOD_Reference\C-Civil\USGS\FEMA Map_lot 25.dwg LAST EDIT: 12/12/2019 – 09:11:05 AM LOGIN: jschooling@
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WMA[1] ↓	CONTRIBUTORY DRAINAGE AREA[2] Shaded box indicates area in acres. Unshaded box indicates area in square miles. FOR DRAINAGE AREAS UP TO → THE FLOOD DEPTH IS SHOWN↓													
1		80	195	495	1.9	4.8	12.1	30.0						
2		80	195	495	1.9	4.8	12.1	30.0						
3			80	150	290	550	1.7	3.2	6.1	11.8	22.6	30.0		
4		70	130	235	430	1.2	2.3	4.1	7.6	13.9	25.4	30.0		
5		95	255	1.0	2.8	7.3	19.2	30.0						
6				85	280	1.4	4.7	15.3	30.0					
7							115	245	510	1.7	3.5	7.4	15.6	30.0
8			60	115	210	395	1.2	2.2	4.0	7.5	14.1	26.3	30.0	
9		80	130	200	310	485	1.2	1.8	2.9	4.5	7.0	11	17.1	26.7	30.0
10	70	110	165	255	390	605	1.5	2.2	3.4	5.3	8.2	12.6	19.4	30.0	
11		80	145	265	490	1.4	2.6	4.8	8.8	16.1	30.0			
12				115	280	1.1	2.6	6.2	15.0	30.0				
13		85	210	530	2.1	5.1	12.7	30.0						
14		85	210	530	2.1	5.1	12.7	30.0						
15		85	210	530	2.1	5.1	12.7	30.0						
16		85	210	530	2.1	5.1	12.7	30.0						
17		85	210	530	2.1	5.1	12.7	30.0						
18	75	125	205	350	590	1.6	2.6	4.4	7.5	12.6	21.3	30.0		
19	60	115	225	440	1.3	2.6	5.1	9.9	19.2	30.0				
20	60	115	225	440	1.3	2.6	5.1	9.9	19.2	30.0				
DEPTH[3] (feet) →	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19

EXAMPLE

TABLE 1
APPROXIMATE FLOOD DEPTHS ABOVE AVERAGE STREAMBED ELEVATION
(SEE N.J.A.C.-7:13-3.5)

EXAMPLE: Going from left to right in any row, each number represents the upper drainage area limit for the flood depth shown at the bottom of the column. For example, in the row for WMA 10, a water with a drainage area of 70 acres or less has a flood depth of 5 feet. Similarly, any water draining between 70 and 110 acres has a flood depth of 6 feet. In the example illustrated with arrows above, any water with a drainage area of between 19.4 and 30.0 square miles in WMA 10 has a flood depth of 18 feet.

NOTES
1. The numbers in this column denote the Watershed Management Areas shown in Figure 5.
2. Flood depths shall be measured above the average streambed elevation as described elsewhere in this Appendix and as shown in Figure 3 below.

TABLE 2: DEPTH OF FLOOD OVER ROADWAY

FOR A CONTRIBUTORY DRAINAGE AREA OF NO MORE THAN:	200 ACRES	1 MI^2	3 MI^2	10 MI^2	30 MI^2
THE DEPTH OF FLOODING OVER THE LOW POINT OF THE ROADWAY IS:	1.0 FEET	1.5 FEET	2.0 FEET	2.5 FEET	3.0 FEET

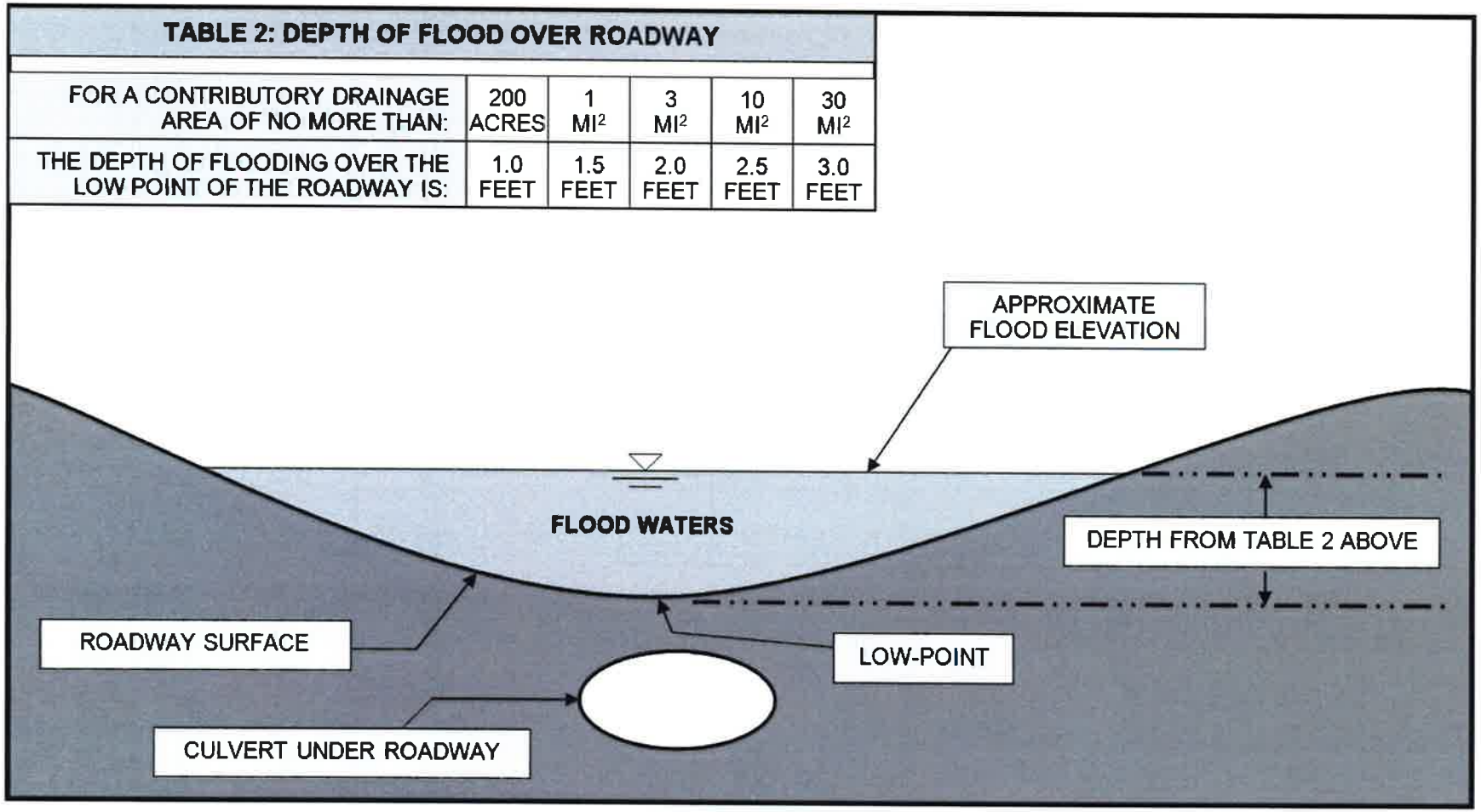

FIGURE 1
PROFILE OF A ROADWAY OVERTOPPED BY FLOOD WATERS
NOT DRAWN TO SCALE