

Stormwater Management Report

Lazy Dog - Princeton

(JN: 23045)

3357 Brunswick Pike
Lawrence Township, NJ

December 10, 2024

Prepared for:

Lazy Dog Restaurants

3337 Susan St, Ste 100
Costa Mesa, CA 92626
714.596.9960

Prepared by:

Proof Civil

Jason DeYoung, PE
1531 Market Street
Denver, CO 80202
303.325.5709

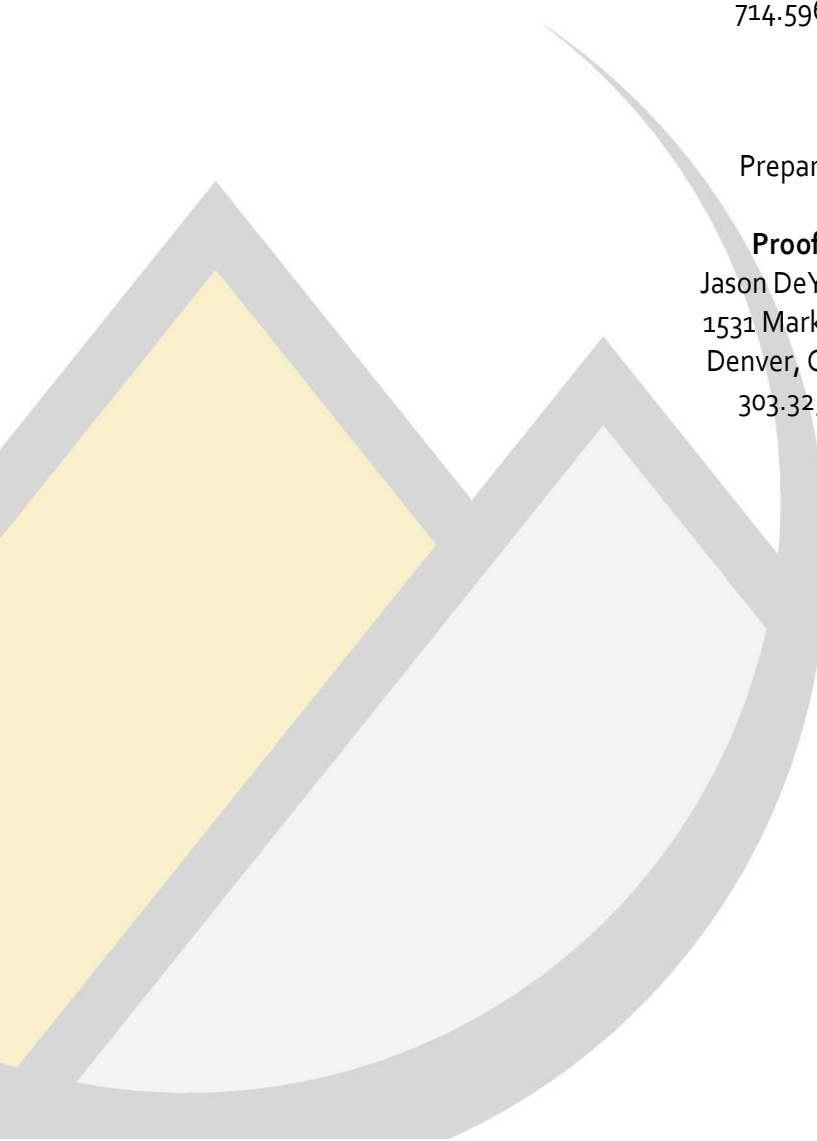


Table of Contents

Table of Contents	2
I. Introduction	3
II. General Location and Description	3
A. Project Location	3
B. Project Description.....	3
III. Drainage Conditions.....	3
C. Existing Conditions.....	3
D. Proposed Conditions	3
IV. Drainage Criteria	4
A. Hydrology	4
B. Stormwater Management Methodology	4
C. Water Quantity	4
V. Conclusion	5
VI. Appendices	6

I. Introduction

This stormwater management report for Lazy Dog - Princeton **Lazy Dog - Princeton** will address the on-site stormwater conveyance and treatment for the development in accordance with criteria set forth by applicable governing agencies.

II. General Location and Description

A. Project Location

The proposed Lazy Dog development site is at 3357 Brunswick Pike in Lawrence Township, New Jersey. The lot is identified as Block 5201, Lot 39 and is within the Mercer Mall shopping plaza. The building is connected to an existing commercial building to the north, with parking areas to the east, south and west. Brunswick Ave runs to the southeast of the proposed site.

B. Project Description

The Lazy Dog Restaurant development involves the renovation of an existing 8,500 square foot restaurant building along with the addition of a patio area, repurposed landscape, and reconfigured ADA accessible parking. The limits of project disturbance consist of approximately 0.39 acres and the total area analyzed for stormwater impacts is comprised of 0.67 acres. The development will introduce a total of 119 square feet of new impervious area when compared to the existing condition.

The proposed development is considered a major development with respect to the New Jersey Department of Environmental Protection's Administrative code, due to the Lazy Dog project in addition to other construction projects within the area over since 2004. The proposed drainage design has been analyzed to account for the area within the 0.67 acres of disturbance in accordance with Lawrence Township Storm Water Control Ordinance.

Methods described within the NJAC 7:8-5.6 Stormwater Runoff Quantity Standards were used for the drainage design of the disturbed limits of the site. The post-construction runoff hydrographs shall not exceed the pre-construction hydrograph rates for the 2, 10 and 100-year storm events at any point in time.

III. Drainage Conditions

C. Existing Conditions

The existing site features an 8,500 square foot vacant building that is connected to the building to the north. There is a drive alley to the west for deliveries and parking to the east and south. The southeast corner of the building represents the high-point of the site and the site drains away to the southwest and northeast. Grades within the parking area are between 1-2% and there is an access in the southeast corner of the lot off of an access road which connects to Brunswick Turnpike.

D. Proposed Conditions

The proposed development includes the renovation of an existing 8,500 square foot restaurant and the creation of a patio space within the existing parking stalls to the east of the existing building.

Existing drainage patterns will be largely maintained in the proposed condition. Existing stormwater inlets will be maintained in place and proposed drainage basins will be directed to low points in a similar fashion to existing

equivalents. It is our professional opinion that the improvements associated with the proposed Lazy Dog Restaurant will not have detrimental effects to adjacent or downstream properties. Please see the attached calculations and maps for detailed information about basin areas, impervious areas, and site generated runoff flowrates.

IV. Drainage Criteria

A. Hydrology

In accordance with NJDEP Stormwater Management Rules, the pre and post-development conditions of the proposed Lazy Dog site were evaluated. The TR-55 Method from the USDA Soil Conservation Service (SCS) was used in order to model the pre and post-development site conditions. The site was modelled with sub-catchments for the pre and post-development conditions using a runoff hydrograph based on the tributary area, rainfall amount, hydrologic soil classification and land use classification, per the NJDEP Stormwater Management Regulations.

AutoCAD's Hydraflow hydrograph extension was used to model the Site Stormwater Management Analysis. The Rainfall depths were selected from the NJ 24-hour Rainfall Frequency Data from the Engineering Field Handbook. Since the proposed site is the western portion of the State, the NOAA Type C rainfall distribution was selected. Rainfall amounts for Mercer County are as follows:

- 2-Year Storm = 3.31"
- 10-Year Storm = 5.01"
- 100-Year Storm = 8.33"

To determine the soil types for the proposed site, a NRCS Soils Map was developed for the proposed site's limits of disturbance. The only soil type found within the limits was Sassafras sandy loam (SacA) which belongs to NRCS hydrologic soil group B.

Curve number (CN) were selected from the NRCS TR-55 Tables 2-2a and 202c, which were input into the Hydraflow hydrograph modelling software.

B. Stormwater Management Methodology

The proposed site has been modelled for the pre and post-development condition for the 2, 10 and 100-year storm events in accordance with NJAC 7:8-5.6 water quantity standards. The pre and post-development hydrograph results for the proposed site limits of disturbance are as follows:

	2-Year (cfs)	10-Year (cfs)	100-Year (cfs)
Pre-Development	0.464	0.709	1.132
Post-Development	0.487	0.729	1.148
Difference	+0.023	+0.020	+0.016

In all cases the post-development flows surpass the pre-development flows by less than 0.1 cfs making the additional runoff negligible.

C. Water Quantity

Stormwater management measures are required to be implemented if an additional quarter acre of Motor Vehicle Surface area is proposed in the post-construction condition according to NJAC 7:5-5.5a.

According to the NJAC, Motor Vehicle Surface is defined as any pervious or impervious surface that is intended to be used by "motor vehicles" and/or aircraft, and is directly exposed to precipitation including, but not limited to, driveways, parking areas, parking garages, roads, racetracks and runways.

Within the limits of disturbance, in the post-construction condition there is 4,567 square feet of Motor Vehicle Surface and an overall reduction from the pre-construction condition of 1,652 square feet. The site is in conformance with NJAC 7:8-5.5 due to the decrease in Motor Vehicle Surface area.

V. Conclusion

In the post-construction condition it was found that the minimal additional impervious surface added within the limits of disturbance causes a negligible increase in runoff to the existing drainage infrastructure which shall have no negative downstream impacts to the area. Pre and post-construction hydrographs have been provided in the reports appendix, along with a pre and post-construction surface maps. Based on the reduction in motor vehicle surface area, water quantity improvements are not required.

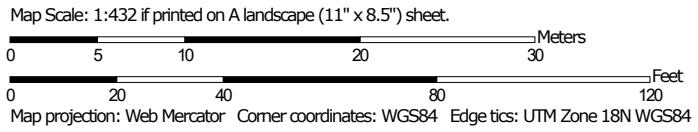
VI. Appendices

- Soils Map
- Soils Description
- Pre-Development Map
- Post-Development Map
- Pre-Construction Hydrographs (2, 10, 100-year)
- Post- Construction Hydrographs (2, 10, 100-year)

Soil Map—Mercer County, New Jersey




Soil Map may not be valid at this scale.



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 1:24,000.

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: Mercer County, New Jersey
 Survey Area Data: Version 20, Sep 3, 2024

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

Date(s) aerial images were photographed: Jun 4, 2022—Jul 22, 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.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
SacA	Sassafras sandy loam, 0 to 2 percent slopes, Northern Coastal Plain	0.4	100.0%
Totals for Area of Interest		0.4	100.0%

Mercer County, New Jersey

SacA—Sassafras sandy loam, 0 to 2 percent slopes, Northern Coastal Plain

Map Unit Setting

National map unit symbol: 2thx8

Elevation: 0 to 470 feet

Mean annual precipitation: 41 to 49 inches

Mean annual air temperature: 53 to 58 degrees F

Frost-free period: 190 to 250 days

Farmland classification: All areas are prime farmland

Map Unit Composition

Sassafras and similar soils: 80 percent

Minor components: 20 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sassafras

Setting

Landform: Fluvio marine terraces, flats

Landform position (three-dimensional): Riser, rise

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Loamy fluvio marine deposits

Typical profile

Ap - 0 to 12 inches: sandy loam

Bt1 - 12 to 18 inches: sandy loam

Bt2 - 18 to 28 inches: sandy clay loam

BC - 28 to 40 inches: loamy sand

C1 - 40 to 58 inches: sand

C2 - 58 to 80 inches: sand

Properties and qualities

Slope: 0 to 2 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Well drained

Capacity of the most limiting layer to transmit water

(Ksat): Moderately high to high (0.20 to 2.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Moderate (about 7.1 inches)

Interpretive groups

Land capability classification (irrigated): 1

Land capability classification (nonirrigated): 1

Hydrologic Soil Group: B

Ecological site: F149AY170MD - Well Drained Fine-Loamy Upland
Hydric soil rating: No

Minor Components

Fallsington, drained

Percent of map unit: 4 percent
Landform: Broad interstream divides, flats, swales, depressions
Landform position (two-dimensional): Summit, footslope
Landform position (three-dimensional): Talf, dip
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
Ecological site: F149AY090NJ - Coastal Plain Hardwood Swamp
Hydric soil rating: Yes

Woodstown

Percent of map unit: 4 percent
Landform: Flats, fluviomarine terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F149AY130NJ - Moist Loamy Upland
Hydric soil rating: No

Downer

Percent of map unit: 4 percent
Landform: Flats, fluviomarine terraces, knolls
Landform position (two-dimensional): Shoulder, summit
Landform position (three-dimensional): Interfluve, riser, rise
Down-slope shape: Linear, convex
Across-slope shape: Linear
Ecological site: F153DY160NJ - Well Drained Coarse-Loamy Upland
Hydric soil rating: No

Ingleside

Percent of map unit: 4 percent
Landform: Flats, fluviomarine terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F153DY160NJ - Well Drained Coarse-Loamy Upland
Hydric soil rating: No

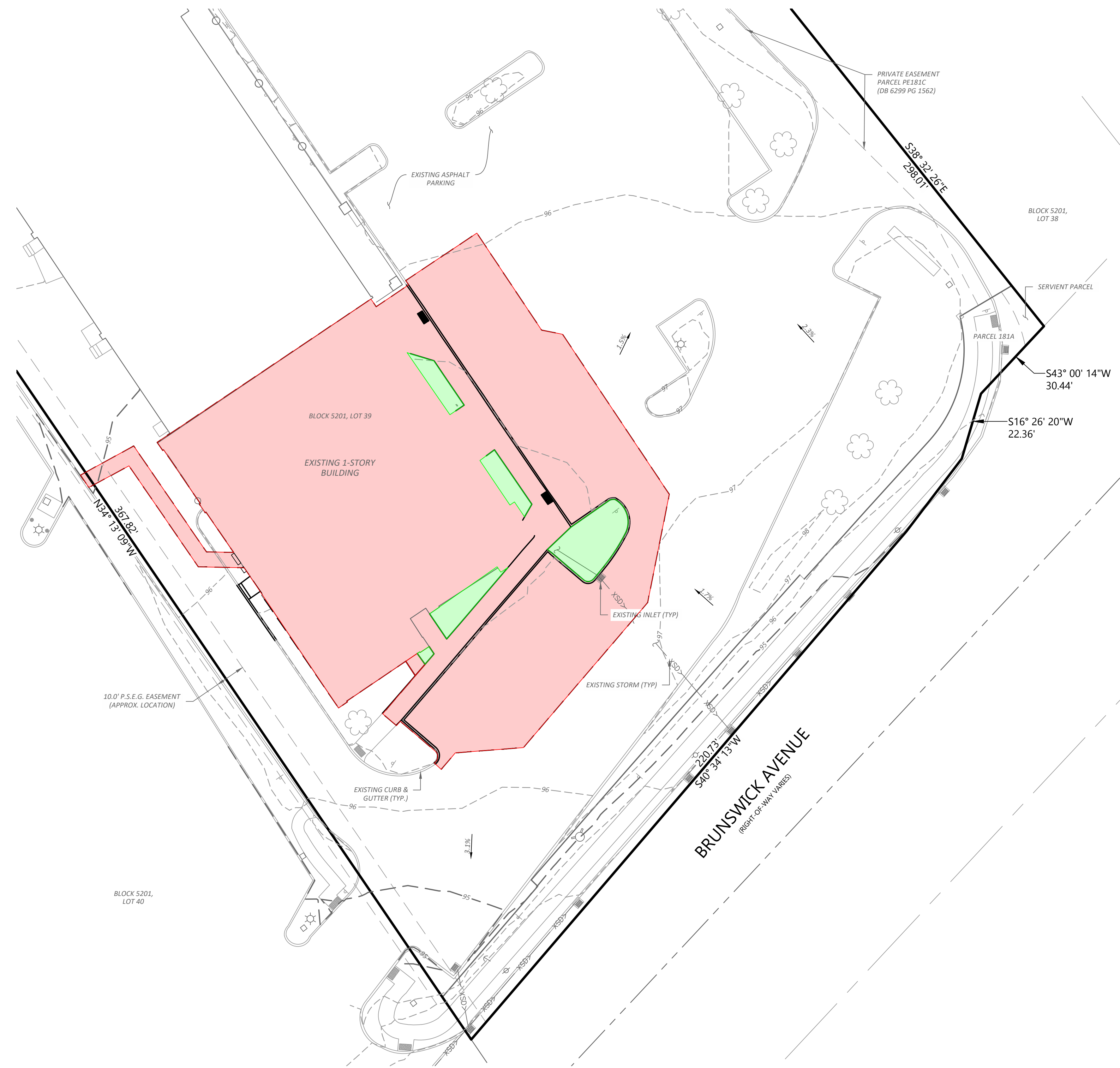
Aura

Percent of map unit: 4 percent
Landform: Fluviomarine terraces, low hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope, nose slope, riser
Down-slope shape: Linear
Across-slope shape: Linear

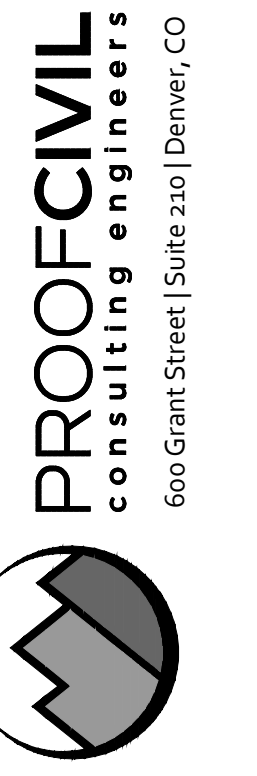
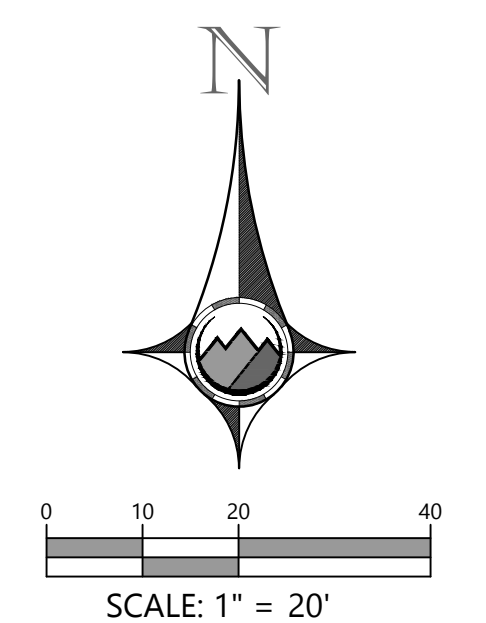
Ecological site: F153DY160NJ - Well Drained Coarse-Loamy
Upland
Hydric soil rating: No

Data Source Information

Soil Survey Area: Mercer County, New Jersey
Survey Area Data: Version 20, Sep 3, 2024



- LEGEND:**
- PROPERTY LINE
 - PROPOSED BUILDING
 - EXISTING BUILDING
 - PROPOSED EASEMENT
 - EXISTING EASEMENT
 - PROPOSED BASIN BOUNDARY
 - HISTORICAL BASIN BOUNDARY
 - PROPOSED 5' CONTOUR
 - PROPOSED 1' CONTOUR
 - EXISTING 5' CONTOUR
 - EXISTING 1' CONTOUR
 - PROPOSED STORM LINE W/F.E.S.
 - EXISTING STORM LINE W/F.E.S.
 - PROPOSED SAWCUT
 - PROPOSED STORM INLET
 - EXISTING STORM INLET
 - FLOW DIRECTION
 - OVERFLOW PATH
 - PROPOSED SPOT GRADE
 - EXISTING SPOT GRADE
 - SLOPE AND DIRECTION
 - HIGH POINT
 - LOW POINT
 - GRADE BREAK
 - PERVIOUS AREA (833 SF)
 - IMPERVIOUS AREA (16,612 SF)
 - LIMITS OF DISTURBANCE



SEAL:

FOR AND ON BEHALF OF PROOF CIVIL CO.

NO.	DATE	DESCRIPTION

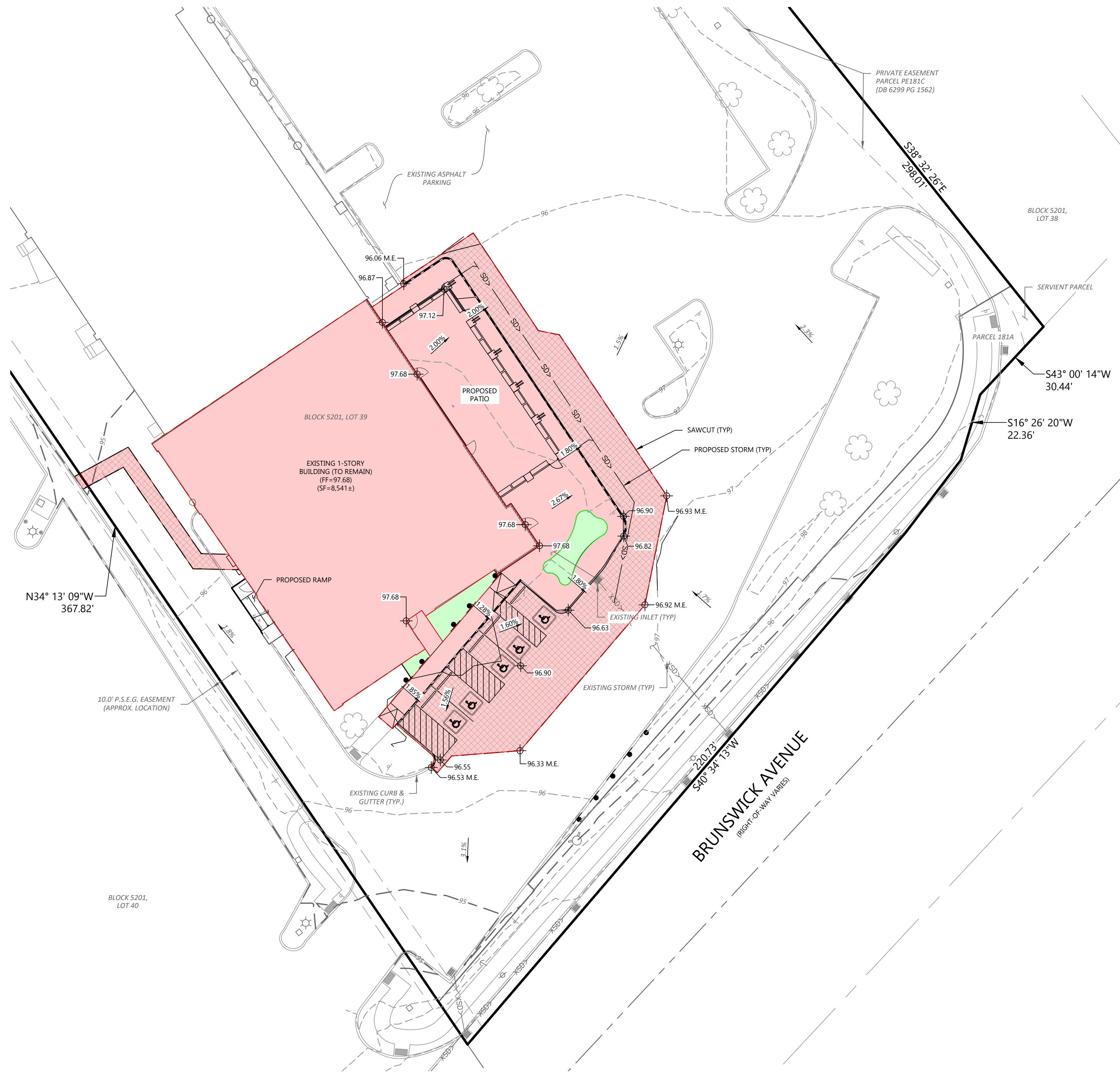
PROJ. NO.:	DATE:	DRAWN BY:	CHECKED BY:
23045	08/19/2024	ANM	JGD

LAWRENCE TOWNSHIP NEW JERSEY

PRE-DEVELOPMENT MAP
LAZY DOG - PRINCETON
 CONSTRUCTION DOCUMENTS

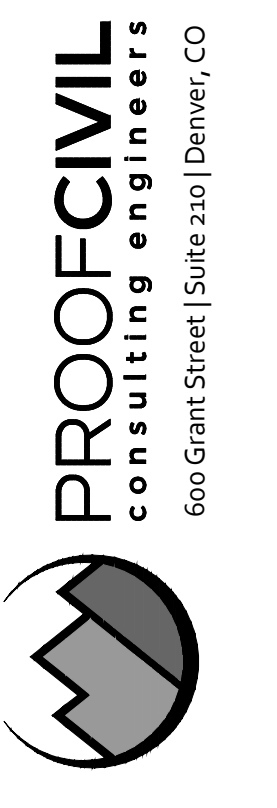
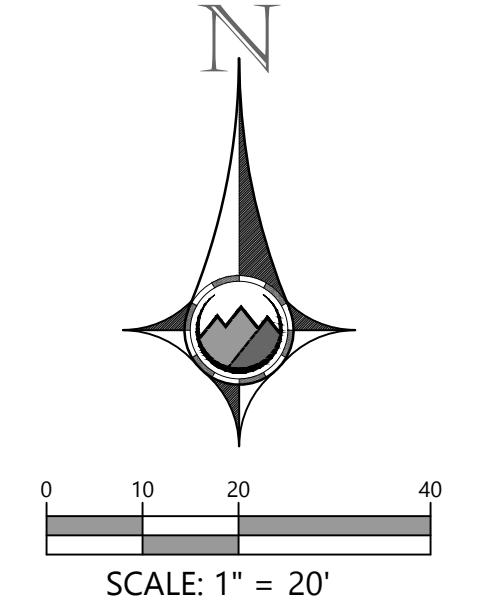
DRAWING NO.

SWM1
 1 OF 2



LEGEND:

- PROPERTY LINE
- ▨ PROPOSED BUILDING
- ▭ EXISTING BUILDING
- - - PROPOSED EASEMENT
- - - EXISTING EASEMENT
- ▬▬▬ PROPOSED BASIN BOUNDARY
- ▬▬▬ HISTORICAL BASIN BOUNDARY
- 5400 PROPOSED 5' CONTOUR
- 5401 PROPOSED 1' CONTOUR
- 5400 EXISTING 5' CONTOUR
- 5401 EXISTING 1' CONTOUR
- ▬▬▬ S07 PROPOSED STORM LINE W/F.E.S.
- ▬▬▬ XSD EXISTING STORM LINE W/F.E.S.
- - - PROPOSED SAWCUT
- ▤ PROPOSED STORM INLET
- ▤ EXISTING STORM INLET
- FLOW DIRECTION
- ↪ OVERFLOW PATH
- ±25.25 PROPOSED SPOT GRADE
- ±25.25 EXISTING SPOT GRADE
- 2.00% SLOPE AND DIRECTION
- HP HIGH POINT
- LP LOW POINT
- GB GRADE BREAK
- PERVIOUS AREA (410 SF)
- IMPERVIOUS AREA (17,040 SF)
- — — LIMITS OF DISTURBANCE



SEAL:
FOR AND ON BEHALF OF PROOF CIVIL CO.

NO.	DATE	REVISIONS	
		DESCRIPTION	DATE
23045	08/19/2024	ANM	JGD

PROJ. NO.: 23045
DATE: 08/19/2024
DRAWN BY: ANM
CHECKED BY: JGD

POST DEVELOPMENT MAP
LAZY DOG - PRINCETON
CONSTRUCTION DOCUMENTS
LAWRENCE TOWNSHIP NEW JERSEY

DRAWING NO.
SWM2
2 OF 2

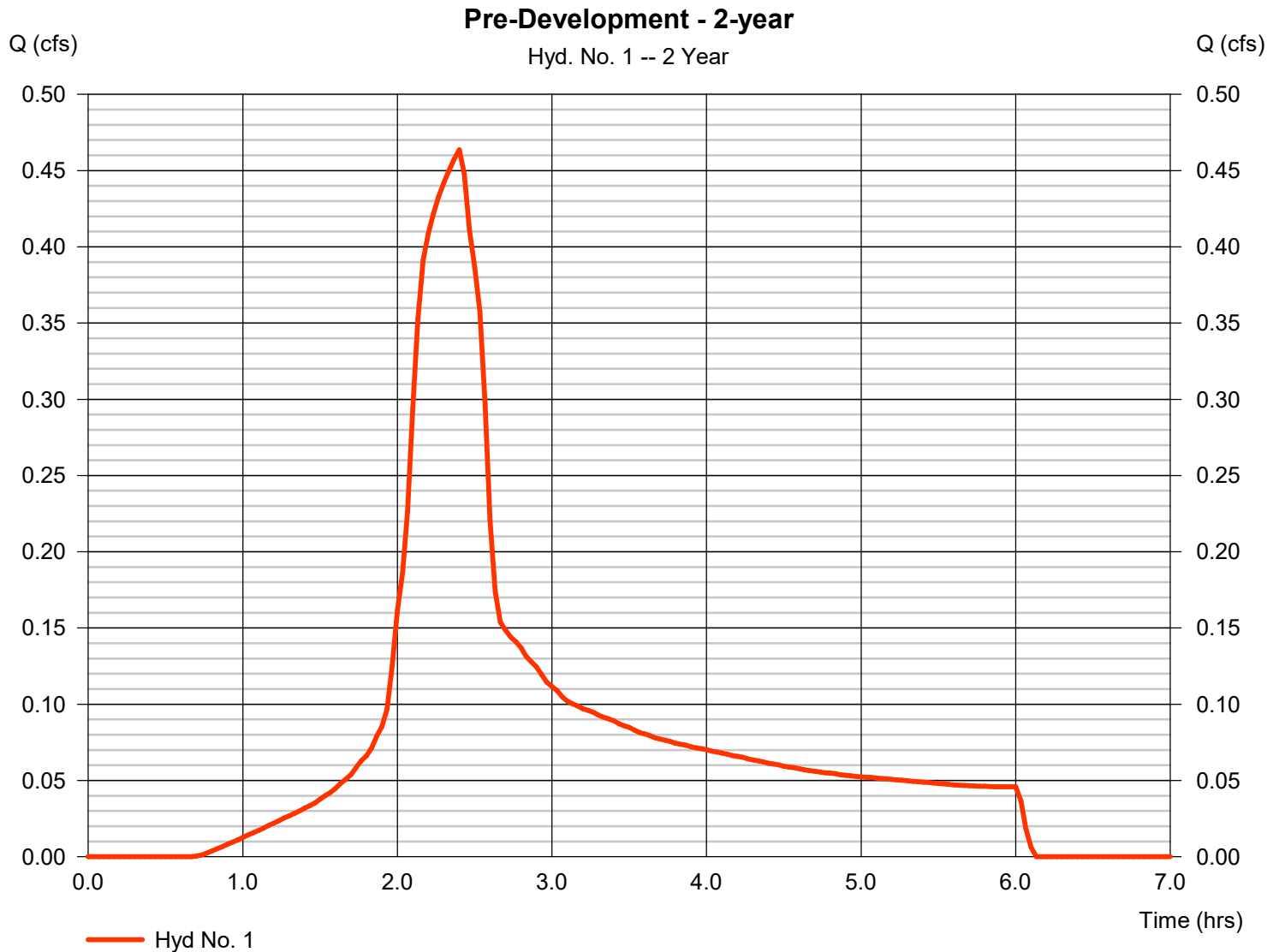
Hydrograph Report

Hyd. No. 1

Pre-Development - 2-year

Hydrograph type	= SCS Runoff	Peak discharge	= 0.464 cfs
Storm frequency	= 2 yrs	Time to peak	= 2.40 hrs
Time interval	= 2 min	Hyd. volume	= 1,880 cuft
Drainage area	= 0.400 ac	Curve number	= 96*
Basin Slope	= 1.5 %	Hydraulic length	= 165 ft
Tc method	= TR55	Time of conc. (Tc)	= 3.30 min
Total precip.	= 1.80 in	Distribution	= SCS 6-Hr
Storm duration	= 6.00 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(0.381 \times 98) + (0.019 \times 61)] / 0.400$



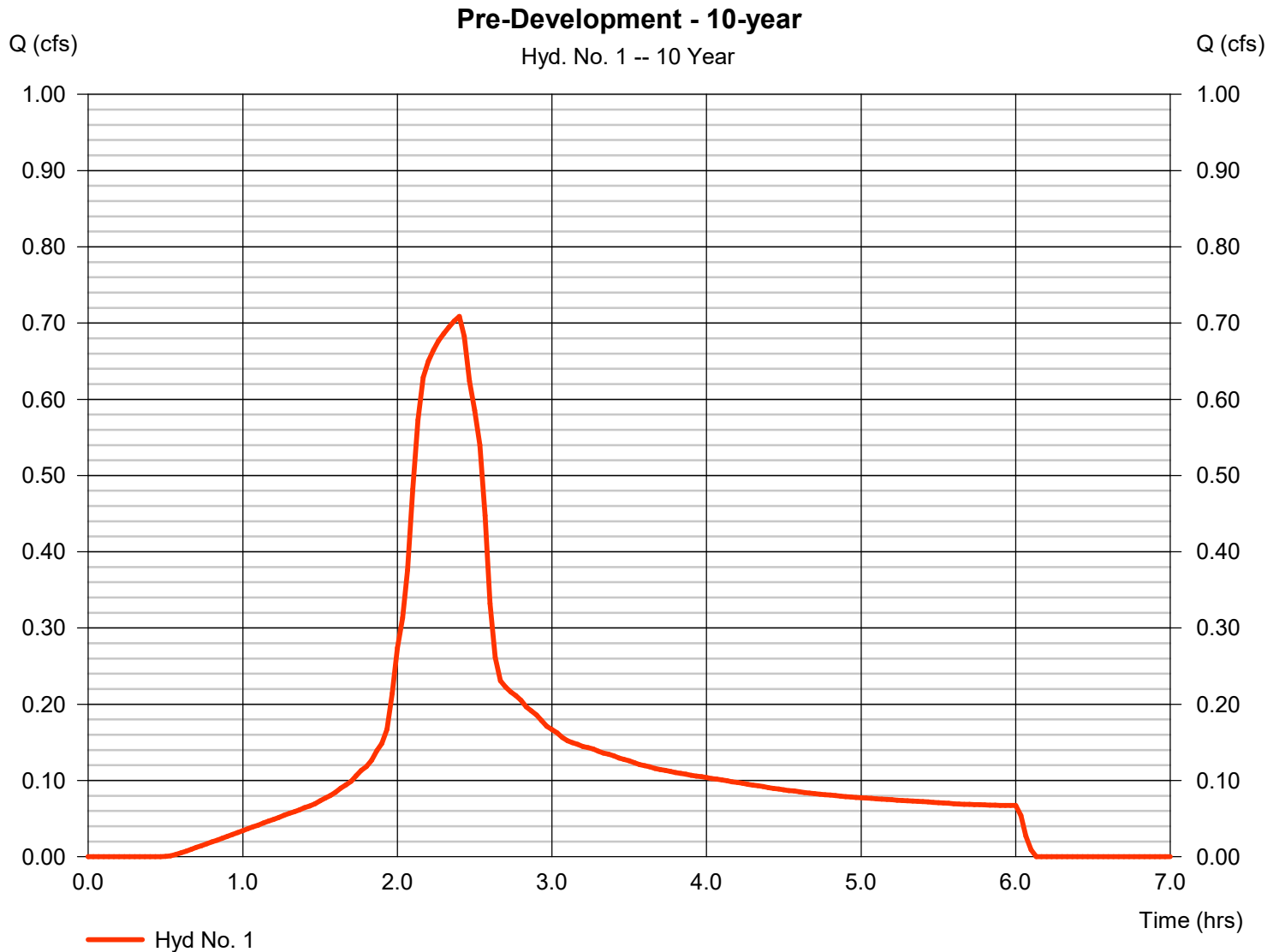
Hydrograph Report

Hyd. No. 1

Pre-Development - 10-year

Hydrograph type	= SCS Runoff	Peak discharge	= 0.709 cfs
Storm frequency	= 10 yrs	Time to peak	= 2.40 hrs
Time interval	= 2 min	Hyd. volume	= 2,939 cuft
Drainage area	= 0.400 ac	Curve number	= 96*
Basin Slope	= 1.5 %	Hydraulic length	= 165 ft
Tc method	= TR55	Time of conc. (Tc)	= 3.30 min
Total precip.	= 2.60 in	Distribution	= SCS 6-Hr
Storm duration	= 6.00 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(0.381 \times 98) + (0.019 \times 61)] / 0.400$



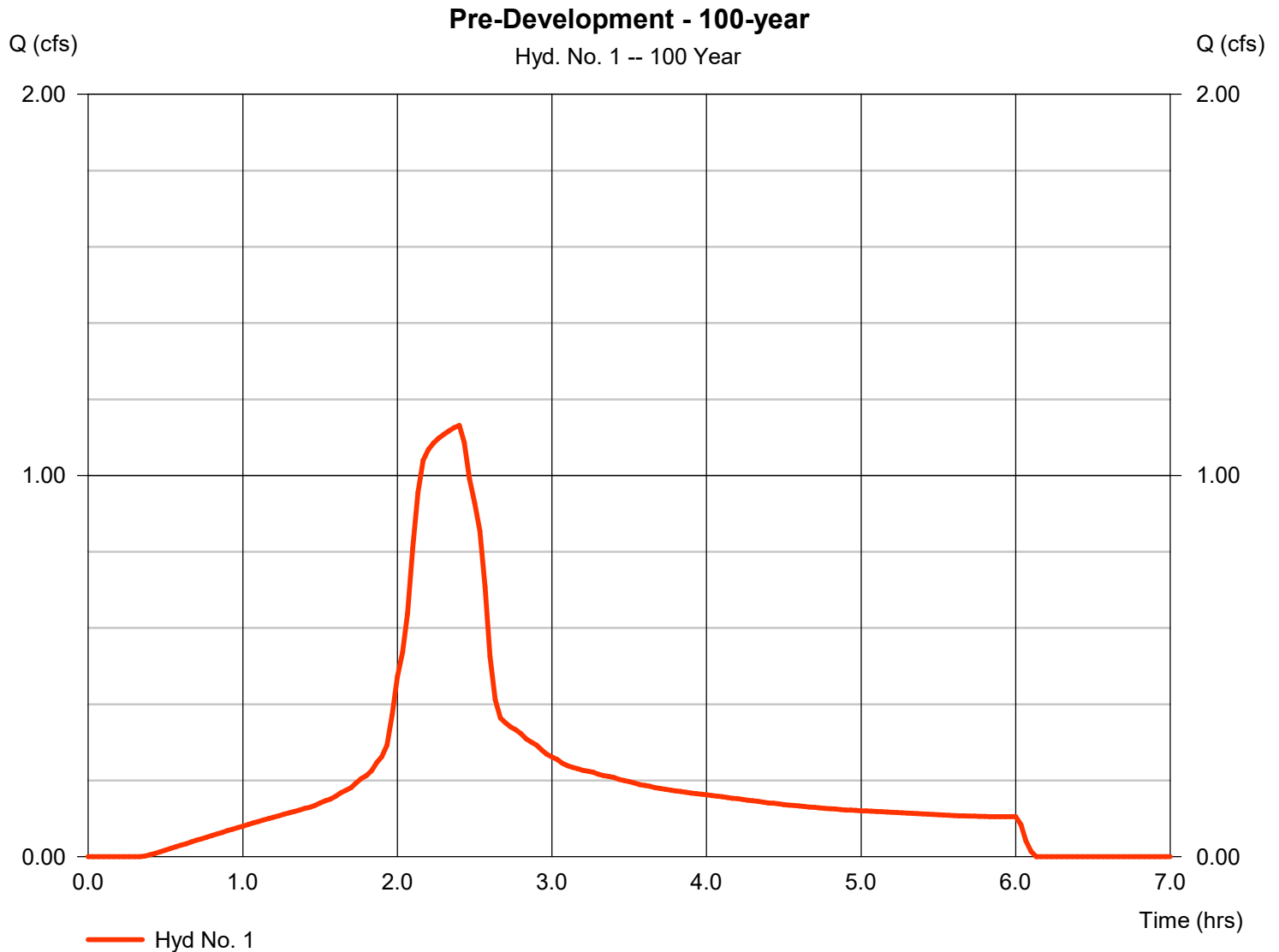
Hydrograph Report

Hyd. No. 1

Pre-Development - 100-year

Hydrograph type	= SCS Runoff	Peak discharge	= 1.132 cfs
Storm frequency	= 100 yrs	Time to peak	= 2.40 hrs
Time interval	= 2 min	Hyd. volume	= 4,819 cuft
Drainage area	= 0.400 ac	Curve number	= 96*
Basin Slope	= 1.5 %	Hydraulic length	= 165 ft
Tc method	= TR55	Time of conc. (Tc)	= 3.30 min
Total precip.	= 4.00 in	Distribution	= SCS 6-Hr
Storm duration	= 6.00 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(0.381 \times 98) + (0.019 \times 61)] / 0.400$



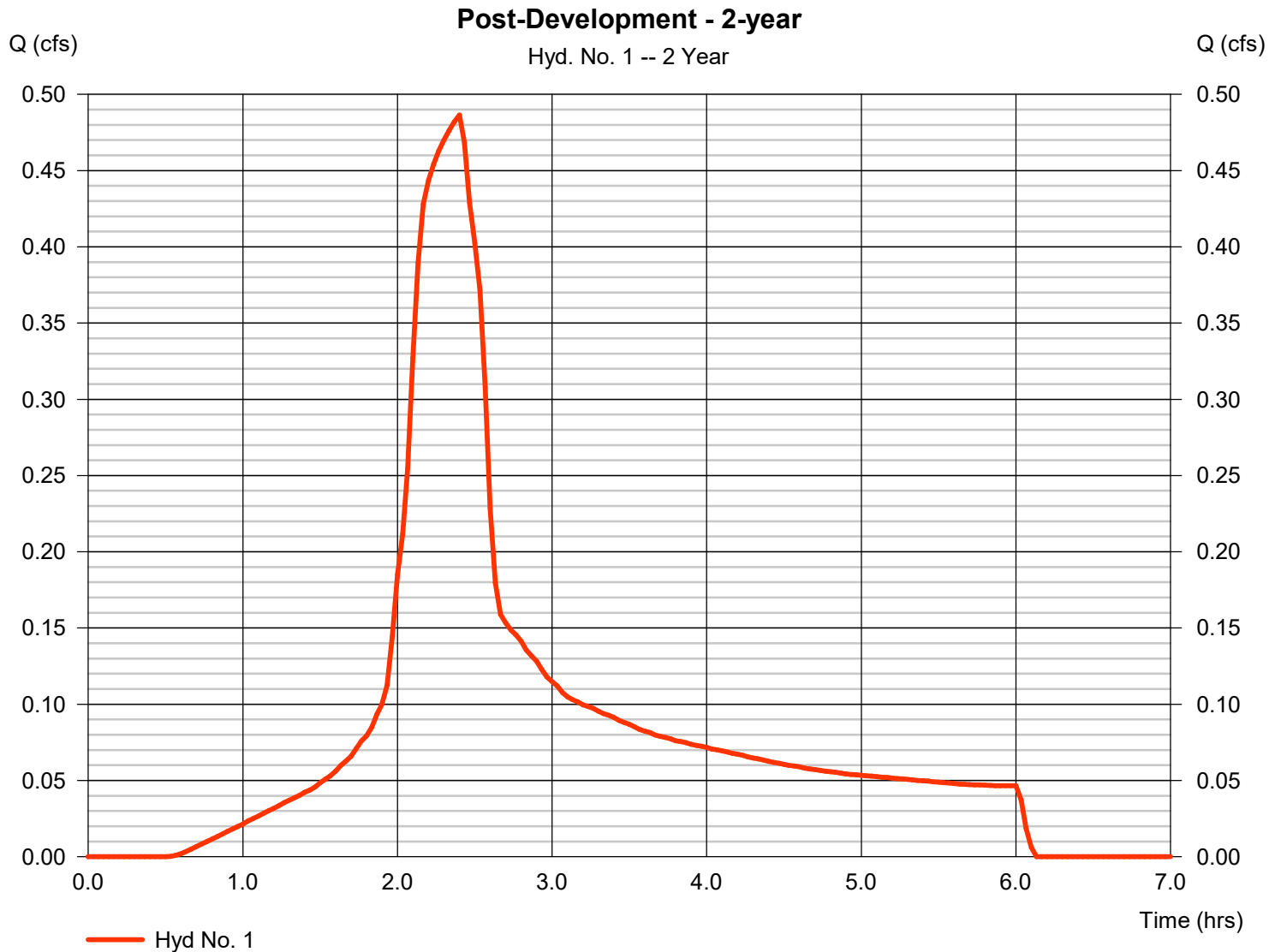
Hydrograph Report

Hyd. No. 1

Post-Development - 2-year

Hydrograph type	= SCS Runoff	Peak discharge	= 0.487 cfs
Storm frequency	= 2 yrs	Time to peak	= 2.40 hrs
Time interval	= 2 min	Hyd. volume	= 2,009 cuft
Drainage area	= 0.400 ac	Curve number	= 97*
Basin Slope	= 1.5 %	Hydraulic length	= 165 ft
Tc method	= TR55	Time of conc. (Tc)	= 3.30 min
Total precip.	= 1.80 in	Distribution	= SCS 6-Hr
Storm duration	= 6.00 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(0.391 \times 98) + (0.009 \times 61)] / 0.400$



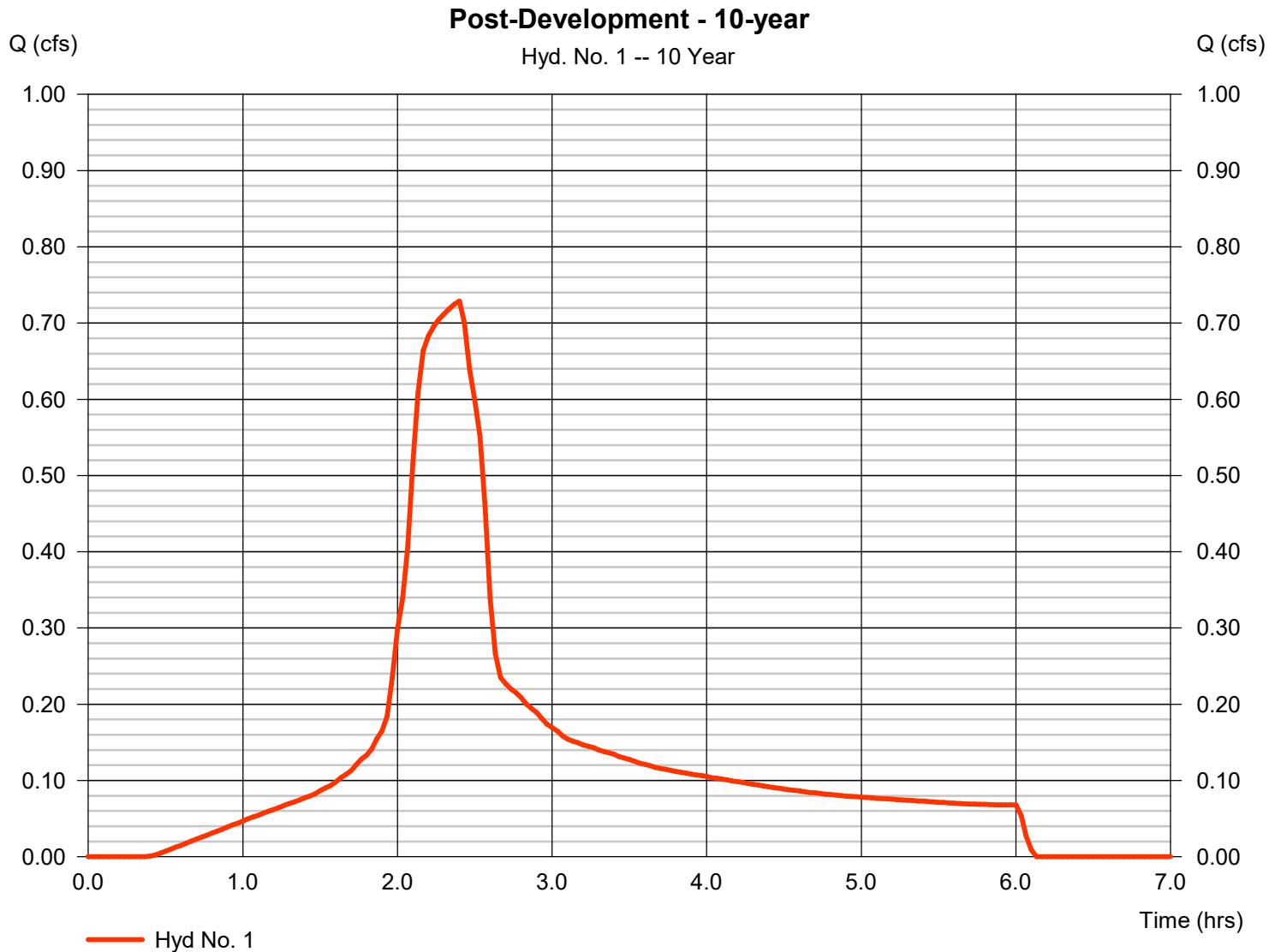
Hydrograph Report

Hyd. No. 1

Post-Development - 10-year

Hydrograph type	= SCS Runoff	Peak discharge	= 0.729 cfs
Storm frequency	= 10 yrs	Time to peak	= 2.40 hrs
Time interval	= 2 min	Hyd. volume	= 3,080 cuft
Drainage area	= 0.400 ac	Curve number	= 97*
Basin Slope	= 1.5 %	Hydraulic length	= 165 ft
Tc method	= TR55	Time of conc. (Tc)	= 3.30 min
Total precip.	= 2.60 in	Distribution	= SCS 6-Hr
Storm duration	= 6.00 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(0.391 \times 98) + (0.009 \times 61)] / 0.400$



Hydrograph Report

Hyd. No. 1

Post-Development - 100-year

Hydrograph type	= SCS Runoff	Peak discharge	= 1.148 cfs
Storm frequency	= 100 yrs	Time to peak	= 2.40 hrs
Time interval	= 2 min	Hyd. volume	= 4,970 cuft
Drainage area	= 0.400 ac	Curve number	= 97*
Basin Slope	= 1.5 %	Hydraulic length	= 165 ft
Tc method	= TR55	Time of conc. (Tc)	= 3.30 min
Total precip.	= 4.00 in	Distribution	= SCS 6-Hr
Storm duration	= 6.00 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(0.391 \times 98) + (0.009 \times 61)] / 0.400$

