July 23, 2020

STORMWATER MANAGEMENT REPORT

PRELIMINARY AND FINAL SITE PLAN

BLOCK 6 * LOT 837
CITY OF ELIZABETH, UNION COUNTY
NEW JERSEY

Prepared by:
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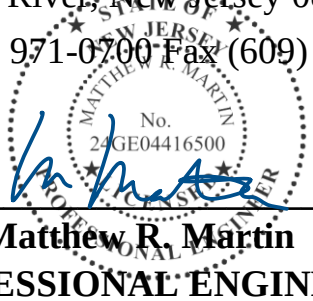

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I. INTRODUCTION

The site is located on 643 Pearl St, City of Elizabeth, Union County, New Jersey, known as Block 6, Lot 837. The 0.36-acre site is currently occupied by a 2-story building with parking in the rear for Trinitas Regional Medical Center. A church is located to the west of the site and a park to the east. It is proposed that the parking lot on site will be expanded with required landscaping and drainage facilities. The project is depicted in detail on the Preliminary Final Site Plans prepared by Scope Engineering, Inc. This report outlines the methodologies and proposed management of the increased runoff created as a result of the proposed development.

II. EXISTING HYDROLOGY

The entire site, along with a small area of off-site grass areas that by-bass through it, has a combined drainage area of approximately 0.26 acres. The site has two drainage areas. The northern part of the site consists of 0.17 acres and flows towards the Elizabeth River. The southern part of the site consists of 0.09 acres and flows towards the county stormwater system.

Typical of the soils in the area, determined using USDA Web Soil Survey, the site consists of Hatboro-Codorus complex. Infiltration rates of Hydrologic Group B soils range from 0.15-0.30 in/hr and for Hydrologic Group D range from 0.00-0.015 in/hr.

Name	Symbol	Hydrologic Soil Group	Typical Depth to SHWT
Hatboro-Codorus complex	HcuAt	B/D	n/a

III. PROPOSED STORMWATER MANAGEMENT PLAN

As shown on the site plan, the proposed Stormwater Management Plan is to consist of a conventional storm sewer system that collects runoff to an infiltration system of stone entrenched perforated storm pipe to provide required volume reduction. This system will provide the storage needed for attenuation of flows created by the parking lot expansion as per reduction requirements given in the Trinitas Medical Center site plan review letter provided by the township engineer (Victor E. Vinegra) dated July 10, 2020 for the 2 and 10-year storms.

In the event the primary outlet were to become clogged, the parking lot is designed such that the Elizabeth River would provide overland relief to adjoining properties and the county drainage system.

A. Pre-Development Drainage Area

The pre-development drainage area consists of 0.26 acres of commercial property with two (2) drainage areas consisting of 0.17 acres draining to the north of the site and 0.09 acres draining to the south of the site. Only the north area is being impacted by development. A time of concentration of 0.53 hours was calculated per N.J.A.C. 5:21 Figure 7.1. A C=0.70 was used to represent 0.093 acres of pervious and 0.082 acres of impervious surfaces.

B. Post-Development Drainage Area

The same area and time of concentration were used in the post-development calculations as the pre-development. A C=0.95 was used to account for the increased impervious area of the post-developed conditions.

C. METHODOLOGY

The on-site storm sewer collection system was designed to reduce runoff from the 2-year storm by 50% and runoff from the 10-year storm by 25% by infiltration and attenuation. Attenuation is accomplished primarily by collection and storage in the underground infiltration system utilizing a 36-inch HDPE perforated pipe embedded in 4 feet by 4 feet of stone with a void ratio of 35% connected to two (2) Type-E catch basins.

Runoff

Per Elizabeth Ordinance Section 5.A.1.b. the Rational Method was performed to calculate pre- and post-development runoff values.

Runoff Rate										
	Pre-Development					Post-Development				
Storm	Acres	tc	C	i (in/hr)	Q (cfs)	Acres	tc	C	i (in/hr)	Q
2-year	0.17	0.56	0.7	2.4	0.2856	0.17	0.56	0.95	2.4	0.3876
10-year	0.17	0.56	0.7	3.3	0.3927	0.17	0.56	0.95	3.3	0.533

Runoff Volume								
	Pre-Development				Post-Development			
	Duration of storm (sec)	Q	Runoff Volume (CF)	Runoff Volume (acre-ft)	Duration of storm (sec)	Q	Runoff Volume (CF)	Runoff Volume (acre-ft)
2-yr	1800	0.29	514.8	0.012	1800	0.39	702	0.016
10-yr	1800	0.39	707.4	0.016	1800	0.53	954	0.022

Storage Volume

36" HDPE Pipe
4'x4' Trench (e=0.35)
(2) 2.5'x4'x6' Type-E Catch Basins
The system consists of a total run of pipe 50 LF in length.

Area of pipe 36" pipe = 7.1 ft^2
Storage Volume of pipe = 353.25 ft^3

Area of trench = (16 ft^2-7.1 ft^2) 0.35 + 7.1 = 10.22 ft^2
Storage Volume of trench = 800 ft^3

Area of Catch Basin is 3.5' x 4' x 6' = 84 ft^3 x 2 = 168 ft^3

Total Storage Volume = 668 ft^3 = 0.016 acre-ft

D. SUMMARY

Discharge Volume						
Reduction Requirements	Pre-development Runoff Volume (acre-ft)	Maximum Allowable Discharge (acre-ft)	Post-Development Volume (acre-ft)	Total Storage Volume (acre-ft)	Post-Development Discharge (acre-ft)	
50% 2-yr	0.012	0.006	0.016	0.016	0.001	**OK**
25% 10-yr	0.016	0.012	0.022	0.016	0.006	**OK**

The proposed stormwater management system design adequately reduces runoff due to development of the site as described in this report for the 2 and 10-year storm events. The stormwater discharge from the site will ultimately be collected in the same county system as in predevelopment without adverse impact on the receiving system.