WATER AND SANITARY SEWER ENGINEER'S REPORT

For

B9 Schoolhouse Owner, LLC

Proposed Warehouses

Block 514, Lots 1, 2, 3 & 60
96-104 Schoolhouse Road
Township of Franklin
Somerset County, New Jersey

Prepared by:

DYNAMIC ENGINEERING

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DEC# 3566-99-005

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I. INTRODUCTION

The project area is comprised of Block 514, Lots 1, 2, 3 & 60 in the Township of Franklin, Somerset County, New Jersey. The overall site currently consists of two (2) residential dwellings with associated site amenities along with open space and wooded areas. The proposed project consists of the construction of two industrial warehouses (171,375 SF and 73,600 SF) with 2,000 SF of mezzanine office area in each. Additional site improvements include constructing new driveways, parking areas, landscaping, lighting and other related site improvements.

II. PROPOSED DOMESTIC WATER SYSTEM

An individual connection will be made to the existing water main within Schoolhouse Road to provide 2" domestic water service and 10" fire service to both of the proposed buildings.

a) PROPOSED WATER DEMANDS

In accordance with N.J.A.C. 7:10-12.6(2) 2 – Table 1, the NJDEP Standard for Domestic Water Demand is:

Warehouse – 25 gallons per day (GPD) per employee
Office – 0.125 gallons per day (GPD) per square foot

Estimated domestic water demand can be calculated as follows:

Proposed Warehouse A	
62 Employees x 25 GPD/Employee	= 1,550.00 GPD
2,000 SF (Office) x 0.125 GPD/SF	= 250.00 GPD
Total Proposed Domestic Water Demand (Warehouse A)	= 1,800.00 GPD
Proposed Warehouse B	
27 Employees x 25 GPD/Employee	= 675.00 GPD
2,000 SF (Office) x 0.125 GPD/SF	= 250.00 GPD
Proposed Domestic Water Demand (Warehouse B)	= 700.00 GPD
Proposed Domestic Water Demand (Total)	**= 2,500.00 GPD**

According to NJDEP regulations, the applicant would be required to obtain a Bureau of Safe Drinking Water (BSDW) Permit for an increase in average daily water demand flow of 12,000 GPD. Therefore, since the development only proposes a flow of 2,500.00 GPD, a BSDW Permit is not required.

III. PROPOSED SANITARY SEWER SYSTEM

Sanitary sewer service will be provided for both proposed buildings via 6" SDR-35 PVC laterals that connect to a proposed sanitary pump station. The proposed sanitary pump station will discharge to a proposed 1.25" force main that will connect to an existing manhole within Schoolhouse Road.

a) PROPOSED SANITARY SEWER DEMANDS

In accordance with N.J.A.C. 7:14A-23.3(a), the sanitary sewer demands for the proposed uses are estimated as follows:

Warehouse – 25 gallons per day (GPD) per employee
Office – 0.100 gallons per day (GPD) per square foot

Estimated sanitary sewer demand can be calculated as follows:

Proposed Warehouse A	
62 Employees x 25 GPD/Employee	= 1,550.00 GPD
2,000.00 SF (Office) x 0.100 GPD/SF	= 200.00 GPD
Proposed Sanitary Sewer Demand (Warehouse A)	= 1,750.00 GPD
Proposed Warehouse B	
27 Employees x 25 GPD/Employee	= 675.00 GPD
2,000.00 SF (Office) x 0.100 GPD/SF	= 200.00 GPD
Proposed Sanitary Sewer Demand (Warehouse B)	= 875.00 GPD
Proposed Sanitary Sewer Demand (Total)	**= 2,625.00 GPD**

According to NJDEP regulations, the applicant would be required to obtain a Treatment Works Approval (TWA) Permit for an increase in average sanitary sewer demand flow of 8,000 GPD or a modification/extension to the existing main. Therefore, since the development proposes a flow of 2,625.00 GPD and does not propose modifications or extensions to the existing sewer main, a TWA Permit is not required.

b) PROPOSED SANITARY SEWER DESIGN

Per NJDEP regulations, the criteria for establishing the size of sanitary sewer gravity pipes is to convey two times the average flow with the pipe flowing half full. Utilizing Manning's equation with a roughness coefficient of 0.010 for a PVC pipe, the following is the minimum capacity of the proposed gravity sewer.

Pipe Size	Slope	Roughness (n)	Capacity at ½ Full	2 X ADF
6"	1.04%	0.010	241,040 GPD	3,500 GPD
6"	1.04%	0.010	241,040 GPD	1,750 GPD

The proposed sanitary sewer design, including the two 6" PVC laterals at 1.04%, can efficiently convey two times the proposed average daily flow while flowing half full while using less than 1.45% of the line's total capacity.

APPENDIX

CAPACITY OF CIRCULAR PIPE FLOWING ½ FULL

DYNAMIC ENGINEERING

Capacity of Circular Pipe Flowing 1/2 Full

Project: Proposed Warehouses
Job #: 3566-99-005
Location: Township of Franklin, Somerset County, NJ

Computed By: MP
Checked By: DT
Date: 4/14/2022

PIPE DESCRIPTION	SLOPE (%)	SIZE (IN)	MANNING'S COEFFICIENT (n)	VELOCITY (FT/S)	CAPACITY (CFS)	CAPACITY (GPD)	CAPACITY (MGD)
Prop. 6" SDR-35 PVC	1.040%	6	0.010	3.80	0.37	241,040	0.24
Prop. 6" SDR-35 PVC	1.040%	6	0.010	3.80	0.37	241,040	0.24

Variables Defined

Q=Capacity of Pipe (CFS)
V=Velocity in Pipe Section (FT/S)
R=Hydraulic Radius of Pipe Section
S=Slope of Pipe Section (FT/FT)
D=Diameter of Pipe (FT)
d=Depth of Flow in Pipe (FT)
n=Manning's Coefficient
Wp=Wetted Perimeter (FT)

Typical Values for Manning's Coefficient (n)

n(RCP)=	0.013	
n(HDPE-Smooth Interior)=	0.012	*Varies with Manufacturer
n(DIP)=	0.013	
n(PVC)=	0.010	
n(CMP)=	0.024	

Equations used:

Q=VA
V=(1.49/n)*R^(2/3)*S^(1/2)
Q=(1.49/n)*R^(2/3)*S^(1/2)*A

Utilizing Appendix 16.A from the Civil Engineering Reference Manual-Seventh Edition, by Micheal Lindeburg, Copyright 1999
The following equations were utilized to calculate the Hydraulic Radius and Area of a Circular Pipe Section flowing 1/2 full

$A=(\pi*D^2/4)*0.5=0.3927*D^2$
$R=A/Wp=0.3927*D^2/((2*\pi*D/2)*0.5)=0.25*D$

Therefore:

$Q=(1.49/n)*(0.25*D)^(2/3)*S^(1/2)*(0.3927*D^2)$
$V=(1.49/n)*(0.25*D)^(2/3)*S^(1/2)$

Unit Conversion Equations

1 Cubic Foot=7.4805 Gallons
1 Day = 86,400 Seconds

Therefore:

$$\frac{\text{Cubic Foot}}{\text{Second}} \times \frac{86{,}400 \text{ Seconds}}{1 \text{ Day}} \times \frac{7.4805 \text{ Gallons}}{1 \text{ Cubic Foot}} = \frac{\text{Gallon}}{\text{Day}}$$

$$\frac{\text{Gallon}}{\text{Day}} \times \frac{1 \text{ Million Gallons}}{1{,}000{,}000 \text{ Gallons}} = \frac{\text{Million Gallons}}{\text{Day}}$$