WATER AND SANITARY SEWER ENGINEER'S REPORT

For

BH 31 SCHOOLHOUSE ROAD, LLC

Proposed Warehouse

Block 517.04, Lot 21.03
31 Schoolhouse Road
Township of Franklin
Somerset County, New Jersey

Prepared by:

DYNAMIC ENGINEERING

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DEC# 2906-99-003

TABLE OF CONTENTS

I.   INTRODUCTION

The project area is comprised of Block 517.04, Lot 21.03 in the Township of Franklin, Somerset County, New Jersey. The site currently consists of an existing office and warehouse with associated driveways, parking areas, open space areas and wooded areas. The proposed development includes the construction of a 90,000 SF warehouse facility and additional site improvements including lighting, landscaping, grading, walkways, driveways, utilities, parking and other related site improvements.

II.   PROPOSED DOMESTIC WATER SYSTEM

An individual connection will be made to the existing water main to provide service to the proposed building via the following:

Industrial Warehouse – A proposed 2" domestic water service line will connect to a proposed water meter pit prior to connecting to the existing water main located within Schoolhouse Road. In addition to the 2" domestic line, a proposed 10" fire service line will connect to the proposed water meter pit prior to connecting to the existing water main located within Schoolhouse Road. A fire loop is proposed around the proposed building.

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

Estimated domestic water demand can be calculated as follows:

Proposed Warehouse 33 Employees x 25 GPD/Employee	=	825.00 GPD
2,500 SF (Office) x 0.125 GPD/SF	=	312.50 GPD
Total Domestic Water Demand		**= 1,137.50 GPD**

According to NJDEP regulations, the applicant would be required to obtain a Bureau of Water System Engineering (BWSE) Permit for an increase in average daily water demand

flow of 12,000 GPD. Therefore, since the development only proposes a flow of 1,137.50 GPD, a BWSE Permit is not required.

III.   PROPOSED SANITARY SEWER SYSTEM

Sanitary sewer service will be provided through a 6" SDR-35 PVC lateral to the existing sanitary sewer cleanout that connects to the existing sanitary sewer main within Schoolhouse Road.

b) 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/day (GPD) per employee
> Office – 0.100 gallons/day (GPD) per square foot

Average Daily Flow – Proposed

33 Employees x 25 GPD/Employee	= 825.00 GPD
2,500 SF (Office) x 0.100 GPD/SF	= 250.00 GPD
Total Sanitary Sewer Demand	**= 1,075.00 GPD**

According to NJDEP regulations, the applicant would be required to obtain a Treatment Works Approval (TWA) Permit for a proposed average sanitary sewer demand flow of 8,000 GPD. Therefore, since the development proposes a flow of 1,075 GPD, 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 sewers.

Use	Pipe Size	Slope	Roughness (n)	Capacity at ½ Full	2 X ADF
Warehouse	6"	1.04%	0.010	241,040	2,150

The proposed sanitary sewer design, including the 6" PVC lateral at 1.04%, can efficiently convey two times the proposed average daily flow while flowing half full while only using 0.89% of the line's total capacity.

IV.   <u>CONCLUSION</u>

In summary, this report has been prepared to further expand on the water and sanitary sewer designs for the proposed development as seen within the Site Plan set. The water and sewer demands generated from this final build out will not exceed the approved demands and allocated flows based on the actual usages and will be reducing flow compared to existing conditions. It does not appear the proposed development will have a negative impact on the existing infrastructure.

APPENDIX

CAPACITY OF CIRCULAR PIPE FLOWING ½ FULL

DYNAMIC ENGINEERING

Capacity of Circular Pipe Flowing 1/2 Full

Project: Proposed Warehouse

Job #: 2906-99-003

Location: Township of Franklin, Somerset County, NJ

Computed By: AG

Checked By: DT

Date: 2/28/2022

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

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=(π*D^2/4)*0.5=0.3927*D^2
R=A/Wp=0.3927*D^2/((2*π*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:

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

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