Water and Sanitary Sewer Engineer's Report

For

BPS Development Company, LLC

Proposed Assisted Living & Memory Care Facility

Hartwick Drive & Village Drive
Block 28003, Lot 211
Township of Montgomery, Somerset County, NJ

Prepared by:

DYNAMIC ENGINEERING

1904 Main Street
Lake Como, NJ 07719
(732) 974-0198

Jeffrey S. Haberman, PE, PP
NJ Professional Engineer License #53560

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I. INTRODUCTION

The subject project is identified as Block 28003, Lot 211, in the Township of Montgomery, Somerset County, New Jersey. The subject site is currently undeveloped, and consists mainly of gravel and open space with a small portion of the property consisting of wooded area. The scope of the study includes the proposed development of the parcel with one new assisted living and memory care facility with accompanying lighting, landscaping, grading, walkways, driveways, utilities, parking, and associated items.

II. PROPOSED WATER SYSTEM

The proposed domestic and fire water services for the building will be provided via lateral connections to the existing water main within the Hartwick Drive Right of Way. A hotbox enclosure will be provided in accordance with NJAW requirements. The proposed water demands have been calculated based on the requirements of NJAC 7:10-12.6, Water Volume Requirements as follows:

a) DOMESTIC 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:

Health Care Facility (Other than a Hospital) – 75 gallons per day (GPD) per person

Estimated domestic water demand can be calculated as follows:

Existing:

Not Applicable

Proposed:

Proposed Assisted Living Facility:

100 Beds/Residents x 75 GPD / Person	= 7,500.00 GPD
Total Proposed Domestic Water Demand	= 7,500.00 GPD
Net Increase in Domestic Water Demand	**= 7,500.00 GPD**

b) PROPOSED FIRE PROTECTION

The project will consist of a fire suppression system that shall be designed in accordance with the International Fire Code. Fire protection for the proposed building will be provided by the proposed fire water service connection. A Fire Sprinkler Contractor has not yet been determined; however, the proposed fire services shall be designed to provide sufficient water capacity for the proposed sprinkler system within the building. Calculations will be provided upon application for building permits by the sprinkler designer.

III. PROPOSED SANITARY SEWER SYSTEM

Sanitary sewer service will be provided through a proposed 6" SDR-35 PVC lateral, which will connect to the existing 8" sanitary main within Hartwick Drive. A Grease Interceptor will be utilized for the sewer waste associated with the kitchen and will be separated from the domestic waste pre-interceptor.

a) SANITARY SEWER DEMANDS

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

Assisted Living Facility – 100 gallons per day (GPD) per bed

Average Daily Flow

Existing:

Not Applicable

Proposed:

Proposed Assisted Living Facility:

100 Beds x 100 GPD/ Person	= 10,000.00 GPD
Total Proposed Sanitary Sewer Demand	= 10,000.00 GPD
Net Increase in Sanitary Sewer Demand	**= 10,000.00 GPD**

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 lateral.

Pipe Size	Minimum Slope	Roughness (n)	Capacity at ½ Full	2 X ADF
6"	1.04%	0.010	241,040 GPD	20,000 GPD

The proposed sanitary sewer design can efficiently convey two times the proposed average daily flow at minimum required pipe slope while flowing half full while utilizing approximately 8.3% of the line's total capacity.

IV. CONCLUSION

In summary, this report has been prepared to describe the water and sanitary sewer designs for the proposed development as seen within the accompanying site plan drawings for the proposed Assisted Living and Memory Care Facility for BPS Development Company, LLC. It is the intention of this report that 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. 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 Assisted Living Facility
Job #: 3641-99-001
Location: Borough of South Plainfield, Middlesex County, NJ

Computed By: KDW
Checked By: AMF
Date: 9/21/2021

PIPE DESCRIPTION	SLOPE (%)	SIZE (IN)	MANNING'S COEFFICIENT (n)	VELOCITY (FT/S)	CAPACITY (CFS)	CAPACITY (GPD)	CAPACITY (MGD)
Prop. 6" 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:

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

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