POTABLE WATER AND SANITARY SEWER ENGINEERING REPORT

For

ODIN PHARMACEUTICALS, LLC

Proposed Building Expansion

300 Franklin Square Drive
Block 502.02, Lot 39.05
Franklin Township
Somerset County, New Jersey

Prepared by:

DYNAMIC ENGINEERING

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- CAPACITY CIRCULAR PIPE FLOWING HALF FULL

I) INTRODUCTION

This report has been prepared to define and analyze the potable water and sanitary sewer conditions that would occur as a result of the redevelopment of Block 502.02, Lot 39.05, as shown on Franklin Township Tax Map Sheet No. 89, in the Township of Franklin, Somerset County, New Jersey. The project site is located at the western corner of the intersection of Davidson Avenue and Franklin Square Drive.

Under existing conditions, the subject parcel currently consists of a two-story mixed use office, warehouse and manufacturing facility with associated driveways, lighting, landscaping and other associated site amenities.

The proposed project consists of expanding the existing masonry building and updating the associated driveway, parking areas, landscaping and other related site improvements. Please note, that a previous building addition was reviewed and approved by the Township of Franklin. The applicant has added a 12,000 SF, two (2) story, building addition since the revised plans were approved by the Township in 2019.

II) PROPOSED SANITARY SEWER DESIGN

a) PROPOSED SANITARY SEWER SYSTEM

Sanitary sewer service for the proposed project will be provided by the existing sanitary sewer main located within Franklin Square Drive. The existing six (6") inch service will be removed and replaced with a proposed six (6") inch lateral connecting to the proposed building addition. A separate six (6") inch lateral is proposed to service the non-domestic process waste use within the facility.

b) EXISTING SEWAGE FLOW CALCULATION

Sanitary sewage flow estimation for the domestic effluent has been calculated utilizing the NJDEP 7:14A-23.3 standard for sewage flow generated by office buildings and warehouse space. Considering the above, existing domestic sewage flows are estimated as follows:

Average Daily Flow in Gallons Per Day (GPD)

Existing Office Building: 0.100 GPD per SF
                                      0.100 GPD X 28,334 SF = 2,833.4 GPD
                            +
Existing Warehouse Space: 25 GPD per Employee

<div align="center">25 GPD X 15 Employees = 375 GPD</div>

<div align="right">=   <u>3,208.4 GPD Total Demand*</u></div>

*The existing facility is not currently producing non-domestic effluent.

c) **PROPOSED SEWAGE FLOW CALCULATION**

Sanitary sewage flow estimation has been calculated utilizing the NJDEP 7:14A-23.3 standard for sewage flow generated by the proposed building. Considering the above, proposed sewage flows are estimated as follows:

> Average Daily Flow in Gallons Per Day (GPD)

Proposed Office Building:	0.100 GPD per SF 0.100 GPD X 12,160 SF = 1,216 GPD
+	
Proposed Warehouse Space:	25 GPD per Employee 25 GPD x 70 Employees = 1,750 GPD
+	
Proposed Manufacturing Space:	10,000 GPD Process Wastewater*
=	<u>12,966 GPD Total Demand</u>

*Process wastewater estimate is based upon the projected industrial wastewater proposed by the manufacturing use.

d) **SANITARY SEWER PIPE 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	ADF*	2 X ADF
6"	5.60%	0.010	559,327 GPD	12,966 GPD	25,932 GPD
6"	1.48%	0.010	287,543 GPD	12,966 GPD	25,932 GPD

*The total proposed sewage flow will be split between the two proposed six (6") inch laterals. To be conservative, the total demand was utilized for each lateral to confirm capacity.

III) PROPOSED POTABLE WATER DESIGN

a) PROPOSED WATER SYSTEM

Potable water service for the proposed project will be provided by the existing water main located within Franklin Square Drive. A proposed six (6") inch lateral connection will service the proposed overall building.

b) EXISTING WATER FLOW CALCULATION

Domestic water flow estimation has been calculated utilizing the NJDEP 7:10-12.6 standard for domestic water demand generated by office buildings and industrial facilities. Considering the above, existing water flows are estimated as follows:

Average Daily Flow in Gallons Per Day (GPD)

Existing Store, Office Building:		0.125 GPD per SF
		0.125 GPD X 28,334 SF = 3,541.8 GPD
	+	
Existing Industrial Facility Space:		25 GPD per Employee
		25 GPD x 15 Employees = 375 GPD
	=	3,916.8 GPD Total Demand*

*The existing facility is not currently producing non-domestic effluent.

c) PROPOSED WATER FLOW CALCULATIONS

Domestic water flow estimation has been calculated utilizing the NJDEP 7:10-12.6 standard for domestic water demand generated by the proposed building. Considering the above, proposed water flows are estimated as follows:

Average Daily Flow in Gallons Per Day (GPD)

Proposed Store, Office Building:		0.125 GPD per SF
		0.125 GPD X 12,160 SF = 1,520 GPD
	+	
Proposed Industrial Facility Space:		25 GPD per Employee
		25 GPD x 70 Employees = 1,750 GPD
	+	10,000 GPD Process Wastewater*
	=	13,270 GPD Total Demand

*Process wastewater estimate is based upon the projected industrial demand proposed by the manufacturing use.

IV) PROPOSED FIRE SUPPRESSION FACILITIES

The proposed facilities have an estimated fire sprinkler demand of 1,000 GPM. Actual required fire flows are to be provided upon field testing of the existing infrastructure.

DYNAMIC ENGINEERING

Capacity of Circular Pipe Flowing 1/2 Full

Project: Odin Pharmaceuticals	Computed By: DG
Job #: 2137-99-001	Checked By: MB
Location: Franklin Township, NJ	Date: 12/5/2022

PIPE DESCRIPTION	SLOPE (%)	SIZE (IN)	MANNING'S COEFFICIENT (n)	VELOCITY (FT/S)	CAPACITY (CFS)	CAPACITY (GPD)	CAPACITY (MGD)
6" PVC North	5.60	6.00	0.01	8.81	0.87	559,327	0.56
6" PVC South	1.48	6.00	0.01	4.53	0.44	287,543	0.29

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:

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

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