

**REAR OF
1385 WASHINGTON AVENUE
STUDENT HOUSING PROJECT**

City of Albany
Albany County, N.Y.

**ENGINEER'S REPORT
ON SEWER SYSTEM CAPACITY**

APPLICANTS:
DMG Investments



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INTRODUCTION

Hershberg & Hershberg, Consulting Engineers and Land Surveyors, were retained by DMG Investments (hereinafter the "Applicant") as site engineer in conjunction with a proposal to build a dormitory building with a total of 319 +/- beds. This report is prepared to address the question of adequate sewer service to the site.

DESCRIPTION OF EXISTING SITE AND USE

The 2.16 acres, which constitute the lot on which this project will be located, is currently vacant. There is an 0.45 +/- acre Federal wetland (Waters of the United States) on the site. It is crossed by a sewer easement occupied by a sanitary sewer of the Albany Water Board.

DESCRIPTION OF INTENDED SITE DEVELOPMENT AND USE

Applicant proposes to subdivide the property and create a new lot of 2.16 +/- acres. Applicant proposes to build a 5 story building as a dormitory under the Unified Sustained Development Ordinance. The development would consist of 184 +/- units which are a mixture of studios, 1 bedroom, 2 bedroom, 3 bedroom and 4 bedroom. There would be a total of 319 +/- beds. Below grade parking would be created beneath the 5 story building which would accommodate 92 +/- parking spaces. An additional 6 +/- spaces will be provided in surface lots.

EXISTING SEWER COLLECTION SYSTEM

The site is currently served by the 21" VCP pipe located in an easement parallel to the original route of the Patroon Creek. Based upon a video tape inspection of this pipe commissioned by the Applicant, the pipe shows sections of bad misalignment. This is in likelihood due to the poorly consolidate fill beneath this

pipe. The Applicant proposes to replace this pipe with a new 21" PVC SDR26 pipe to an area where it can be founded on original ground.

SANITARY FLOW ESTIMATE

The *New York State Design Standards for Intermediate Sized Wastewater Treatment Systems* (March 5, 2014) includes the following information on design flows

The design flow rate is typically based on the flow rates determined using one of the following three methods:¹

- *Using the typical per-unit hydraulic loading rates provided in Table B-3
(Referred to as Method No. 1)*
- *Obtaining metered daily wastewater flow data from existing and similar facilities
(Referred to as Method No. 2)*
- *Obtaining metered daily water usage data from existing and similar facilities
(Referred to as Method No. 3)*

Based upon Method No. 3 data based on figures from facilities with similar sized units at 1475 Washington Avenue and 1385 Washington Avenue, the Average Daily Flow is 55 GPD/Bed as shown in Fig No. 1 below. For the 319 beds based upon 55 GPD per bed the Average Daily Flow is 17,545 GPD (12.18 GPM). This project sewer generation is shown below in Fig. No. 2. The peak flow of sanitary sewage would be 400% of the average or 48.74 GPM.

¹ *New York State Design Standards for Intermediate Sized Wastewater Treatment Systems* (March 5, 2014),Pg. B-15

Computation from Similar Uses on Washington Avenue

1385 Washington Avenue - 314 Beds

<u>Period</u>	<u>100 Cubic Feet</u>			<u>Days</u>	<u>Usage (GPD)</u>
	<u>Water Cost</u>	<u>Units</u>	<u>Equivalent Gallons</u>		
1/07/19 to 5/03/19	\$5,989.44	2,260	1,692,864	118	14,346
5/04/19 to 9/08/19	\$5,067.36	1,912	1,432,246	118	12,138
9/08/19 to 1/02/20	\$6,933.28	2,616	1,959,633	116	16,893
1/02/20 to 5/04/20	\$6,143.58	2,259	1,691,743	<u>124</u>	13,643
			Totals		<u>57,020</u>
			Average Daily Usage		<u>14,255</u>
			Average Daily Usage per bed		<u>45</u>

Computation from Similar Uses on Washington Avenue

1475 Washington Avenue - 292 Beds

<u>Period</u>	<u>100 Cubic Feet</u>			<u>Days</u>	<u>Usage (GPD)</u>
	<u>Water Cost</u>	<u>Units</u>	<u>Equivalent Gallons</u>		
1/09/17 to 5/04/17	\$5,364.03	2,024	1,516,098	117	12,958
5/05/17 to 9/8/17	\$5,673.75	2,141	1,603,637	125	12,829
9/8/17 to 1/08/18	\$6,327.90	2,388	1,788,527	122	14,660
1/08/18 to 5/08/18	\$8,001.09	3,019	2,261,440	122	18,536
5/09/18 to 9/04/18	\$7,510.71	2,834	2,122,838	121	17,544
9/05/18 to 1/7/19	\$7,067.49	2,667	1,997,566	124	16,109
1/07/19 to 5/03/19	\$6,318.56	2,384	1,785,887	118	15,135
5/04/19 to 9/03/19	\$7,216.16	2,723	2,039,586	121	16,856
9/03/19 to 1/02/20	\$8,268.80	3,120	2,337,106	121	19,315
1/02/20 to 5/04/19	\$8,121.69	2,986	2,236,451	<u>124</u>	18,036
			Totals		<u>69,342</u>
			Average Daily Usage		<u>17,335</u>
			Average Daily Usage per bed		<u>55</u>
Based on rates:	<u>\$2.72 per 100 CF</u>	<u>Eff 1/1/20</u>			
	<u>2.65 per 100 CF</u>	<u>Prior to 1/1/20</u>			

Fig. No. 1 – Average Daily Sewage flows from Water Use
1385 & 1475 Washington Avenue

SEWAGE GENERATION
Rear of 1385 Washington Avenue

<u>Use</u>	<u>Unit</u>	<u>Value</u>	<u>Sewage Generation Per Unit per day(GPD)</u>	<u>Daily Sewage Generation (GPD)</u>
Residential	Beds	319	55	17545
TOTAL ESTIMATED WATER USE				17545
NET ESTIMATED WATER USE				17545
Average Daily Sewer Generation Increase	in GPM	12.18		
Peak Sewer Generation Increase	in GPM	48.74		
Average Daily Sewer Generation Increase	in CFS	0.027		
Peak Sewer Generation Increase	in CFS	0.108		
1) Source: Averages of uses for 1385 and 1475 Washington Avenue				

Fig. No. 2 – Project Sewer Generation

DOWNSTREAM PIPE CAPACITY

The pipe which crosses the property has grades in various sections which vary from 0.13% to 0.26%. This pipe also carries flow from another student housing project at 1415 Washington Avenue currently under review. The peak flow added to this pipe from that project is 0.173 CFS. The peak flow from this site is 0.108 CFS. The combined peak flow is 0.281 CFS. The pipe capacity is shown below in Fig No. 5 as 4.976 CFS. The net increased combined peak flows is 5.6% of pipe capacity.

Fig. No. 4 – Sewer Atlas Sheet 108

PROJECT: Rear of 1385 Washington Avenue								
FILE NAME: 20200089 Pipe Calc								
THE FOLLOWING, IS THE CALCULATION FOR PIPES FLOWING FULL AS STATED IN THE CHEZY-MANNING FORMULA, WHERE:								
Qp = PROJECTED DISCHARGE								
Q MAX = DISCHARGE FOR PIPE FLOWING FULL IN C.F.S.								
n = COEFFICIENT OF ROUGHNESS								
A = CROSS SECTIONAL AREA OF FLOW IN SQUARE FEET								
R = HYDRAULIC RADIUS IN FT.								
S = SLOPE IN FT./FT.								
Vm = VELOCITY OF PIPE FLOWING FULL IN FT./SEC.								
D = PIPE DIAMETER IN INCHES								
Vp = PROJECTED VELOCITY IN FT./SEC.								
LOCATION	Q MAX	n	A	R	S	Vm	D	Vp
MH #2 to MH#3	4.9761	0.015	2.404	0.438	0.0013	2.1	21	11.8

Fig. No. 5 –Pipe Capacity

I-90 PUMP STATION CAPACITY

Based upon data provided by the City of Albany Department of Water & Water Supply shown below in Fig. No. 6 the Average Daily Flow for the I-90 Pump Station is 162.23 GPM or 233,611 GPD. In previous figures provided Albany County Sewer District (See Appendix No. 1) the Average Daily Flow to the I-90 Pump Station for 2015 is 225,800 GPD.



Fig. No. 6 – Chart from I-90 November 2019 to February 2020

In 2016, the force main from the I-90 pump station, which pumps sewage to the Patroon Creek Interceptor Sewer, was changed from a 6" pipe to a 10" pipe increasing flow capacity to 655 GPM. At the time, the level of use at peak flows has required pumps to operate for up to 20 hours a day leaving little protection against a pump outage which could lead to one pump becoming inadequate maintain flow. With an average daily flow of 233,611 GPD, the pumping time drops to 6 hours a day or 30% of operation time prior to the change. With the addition of 17,545 GPD from this project and 19,569 GPD from the proposed student housing at 1415 Washington Avenue the average pump operating time per day would 6.95 hours per day.

ENGINEER'S OPINION

It is the engineer's opinion that the construction of the proposed facilities can be accommodated by the existing collection sewers and by the I-90 Pump Station.

Prepared by



A handwritten signature in black ink, appearing to read "D. Hershberg", is written over a horizontal line.

Daniel R. Hershberg, P.E. & L.S.

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**APPENDIX 1
SANITARY SEWAGE FLOWS
IN I-90 PUMP STATION**

2013-2014

Provided by Albany County Sewer District

I-90 Daily Flows (From Totalizer Data)

	Jan 2013	Feb 2013	Mar 2013	Apr 2013	May 2013	Jun 2013	Jul 2013	Aug 2013	Sep 2013	Oct 2013	Nov 2013	Dec 2013
1	0.08	0.19	0.21	0.17	0.23	0.15	0.21	0.19	0.30	0.38	0.31	0.19
2	0.08	0.16	0.19	0.18	0.21	0.17	0.21	0.19	0.31	0.36	0.31	0.29
3	0.09	0.17	0.19	0.19	0.20	0.18	0.19	0.18	0.32	0.35	0.31	0.31
4	0.09	0.20	0.22	0.20	0.18	0.17	0.17	0.18	0.36	0.35	0.31	0.32
5	0.08	0.19	0.22	0.20	0.17	0.17	0.19	0.18	0.32	0.30	0.31	0.31
6	0.08	0.18	0.20	0.17	0.21	0.17	0.19	0.19	0.31	0.30	0.31	0.32
7	0.10	0.21	0.20	0.16	0.20	0.17	0.19	0.19	0.31	0.34	0.31	0.28
8	0.10	0.18	0.20	0.21	0.20	0.15	0.21	0.20	0.31	0.34	0.31	0.29
9	0.11	0.16	0.19	0.20	0.21	0.15	0.26	0.21	0.36	0.34	0.26	0.32
10	0.10	0.17	0.17	0.22	0.21	0.17	0.22	0.19	0.37	0.34	0.27	0.32
11	0.10	0.20	0.21	0.22	0.18	0.19	0.22	0.16	0.38	0.31	0.30	0.31
12	0.07	0.21	0.19	0.22	0.16	0.19	0.22	0.21	0.41	0.31	0.31	0.32
13	0.08	0.20	0.22	0.18	0.18	0.19	0.20	0.20	0.38	0.31	0.32	0.30
14	0.09	0.20	0.19	0.20	0.19	0.19	0.21	0.20	0.32	0.31	0.32	0.26
15	0.13	0.19	0.13	0.23	0.20	0.17	0.23	0.16	0.33	0.31	0.30	0.26
16	0.14	0.18	0.10	0.21	0.21	0.16	0.25	0.19	0.35	0.31	0.26	0.30
17	0.14	0.19	0.08	0.24	0.18	0.18	0.21	0.22	0.36	0.31	0.27	0.30
18	0.12	0.19	0.10	0.23	0.13	0.18	0.22	0.18	0.36	0.31	0.30	0.30
19	0.09	0.20	0.10	0.24	0.12	0.18	0.23	0.21	0.37	0.31	0.31	0.24
20	0.11	0.19	0.11	0.18	0.10	0.18	0.20	0.18	0.37	0.31	0.33	0.17
21	0.15	0.19	0.11	0.19		0.17	0.18	0.28	0.33	0.31	0.32	0.13
22	0.19	0.19	0.11	0.21	0.19	0.17	0.21	0.28	0.33	0.31	0.31	0.13
23	0.19	0.17	0.10	0.23	0.18	0.17	0.22	0.29	0.35	0.31	0.26	0.16
24	0.21	0.17	0.14	0.22	0.18	0.18	0.20	0.30	0.36	0.31	0.26	0.14
25	0.19	0.19	0.19	0.20	0.19	0.19	0.20	0.31	0.35	0.31	0.30	0.13
26	0.17	0.22	0.21	0.21	0.18	0.19	0.21	0.31	0.36	0.31	0.26	0.15
27	0.17	0.20	0.22	0.18	0.15	0.19	0.18	0.33	0.34	0.31	0.18	0.15
28	0.19	0.20	0.20	0.17	0.16	0.19	0.18	0.41	0.30	0.31	0.15	0.14
29	0.19		0.20	0.21	0.17	0.17	0.21	0.36	0.30	0.31	0.15	0.14
30	0.20		0.16	0.21	0.17	0.19	0.21	0.34	0.33	0.31	0.15	0.15
31	0.19		0.17		0.17		0.20	0.31		0.31		0.14
Avg	0.13	0.19	0.17	0.20	0.18	0.18	0.21	0.24	0.34	0.32	0.28	0.23
Max	0.21	0.22	0.22	0.24	0.23	0.19	0.26	0.41	0.41	0.38	0.33	0.32

	Jan 2014	Feb 2014	Mar 2014	Apr 2014	May 2014	Jun 2014	Jul 2014	Aug 2014	Sep 2014	Oct 2014
1	0.13	0.30	0.27	0.31	0.32	0.13	0.18	0.17	0.27	0.29
2	0.14	0.27	0.26	0.30	0.31	0.13	0.17	0.17	0.31	0.30
3	0.13	0.30	0.28	0.31	0.28	0.14	0.17	0.17	0.29	0.29
4	0.12	0.32	0.30	0.31	0.28	0.15	0.15	0.17	0.29	0.24
5	0.12	0.30	0.30	0.29	0.31	0.15	0.16	0.17	0.30	0.25
6	0.17	0.31	0.29	0.28	0.31	0.15	0.17	0.17	0.27	0.29
7	0.18	0.29	0.29	0.31	0.31	0.13	0.18	0.15	0.27	0.30
8	0.18	0.25	0.27	0.33	0.32	0.14	0.19	0.15	0.30	0.29
9	0.18	0.25	0.26	0.38	0.30	0.15	0.19	0.15	0.30	0.29
10	0.18	0.32	0.30	0.33	0.27	0.16	0.18	0.15	0.28	0.30
11	0.15	0.30	0.31	0.37	0.26	0.16	0.19	0.15	0.28	0.28
12	0.14	0.30	0.31	0.28	0.29	0.16	0.17	0.17	0.28	0.27
13	0.17	0.29	0.31	0.27	0.31	0.16	0.18	0.17	0.28	0.29
14	0.18	0.29	0.25	0.28	0.30	0.14	0.18	0.16	0.24	0.30
15	0.17	0.28	0.14	0.27	0.30	0.14	0.20	0.16	0.28	0.29
16	0.17	0.28	0.13	0.30	0.25	0.15	0.18	0.15	0.29	0.32
17	0.16	0.30	0.14	0.30	0.18	0.16	0.19	0.16	0.29	0.31
18	0.15	0.30	0.17	0.27	0.16	0.16	0.19	0.17	0.30	0.25
19	0.18	0.25	0.18	0.21	0.15	0.15	0.18	0.17	0.29	0.26
20	0.24	0.25	0.18	0.21	0.15	0.15	0.17	0.26	0.24	0.29
21	0.29	0.25	0.18	0.26	0.15	0.14	0.19	0.26	0.26	0.30
22	0.31	0.25	0.16	0.30	0.15	0.13	0.18	0.26	0.29	0.30
23	0.32	0.25	0.20	0.31	0.15	0.15	0.19	0.26	0.29	0.31
24	0.30	0.25	0.29	0.31	0.16	0.17	0.18	0.26	0.27	0.30
25	0.26	0.25	0.30	0.31	0.14	0.17	0.17	0.26	0.23	0.25
26	0.27	0.30	0.30	0.27	0.12	0.17	0.17	0.26	0.22	0.27
27	0.31	0.30	0.30	0.27	0.13	0.16	0.17	0.26	0.20	0.29
28	0.32	0.30	0.30	0.30	0.14	0.16	0.17	0.26	0.21	0.32
29	0.32		0.29	0.31	0.14	0.15	0.17	0.26	0.28	0.32
30	0.33		0.28	0.31	0.14	0.17	0.17	0.25	0.29	0.30
31	0.32		0.31		0.14		0.17	0.27		0.32
Avg	0.21	0.28	0.25	0.30	0.22	0.15	0.18	0.20	0.27	0.29
Max	0.33	0.32	0.31	0.38	0.32	0.17	0.20	0.27	0.31	0.32