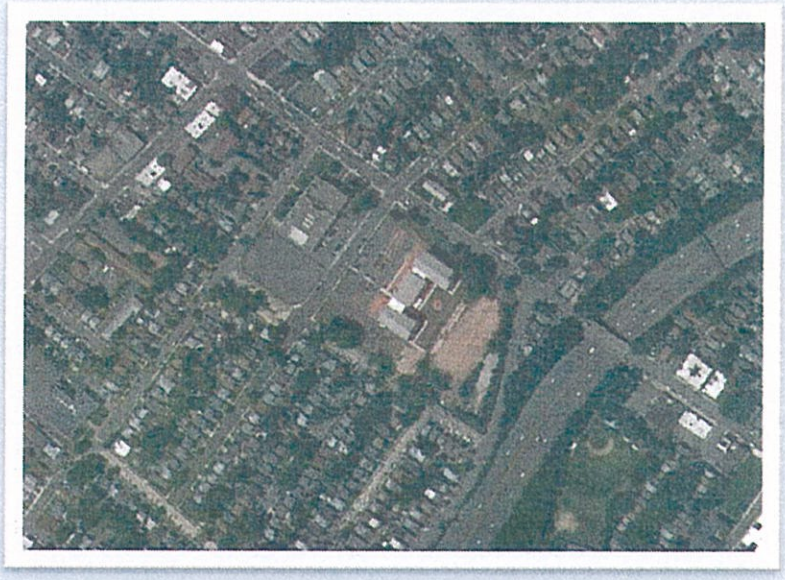
Hilltop Residential Development

832 Chancellor Avenue
Irvington, NJ 07111

Hilltop Storm Water & Sanitary Calculations

October 30, 2020



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1.0 MASTER PLAN STORMWATER DETENTION CALCULATIONS

STORM WATER DETENTION CALCULATIONS

PROJECT Hilltop Residential Development - Master Plan

LOCATION 832 Chancellor Avenue

BY John C. Ferrante No. 24720

(Print Signature) N.J. License #

Signature

1. HYDROLOGY

Storm of Record - 6" Total Rainfall
- 3.2". Per Hour Intensity
Rational Formula - Q = CIA

2. PRE-DEVELOPMENT Q (Based on Former Irvington General Hospital)

Type	SF	"C"	X	% =	C
Buildings	25,439.04	0.90		=	22,895.1
Pavement	180,904.70	0.05		=	153,769.0
Lawn Area	30,052.00	0.20		=	6,010.4
Plant Area	28,200.00	0.10		=	2,820
Other					
TOTAL S.F.	264,596.74	"C" total: 185,494		Weighted "C"	0.700

Q = (0.700) (3.2) (264,596.74 / 43,560) = 14.2 C.F.S

3. POST DEVELOPMENT Q

Type	SF	"C"	X	% =	C
Buildings	126,661	0.90		=	113,994.5
Pavement	79,435	0.05		=	67,519.75
Lawn Area	58,500	0.20		=	11,700
Plant Area	0	0.10		=	0
Other					
TOTAL S.F.	264,596.00	"C" total: 193,214.25		Weighted "C"	0.730

Q = (0.730) (3.2) (264,596.00 / 43,560) = 14.2 C.F.S.

4. REQUIRED DETENTION

Post C - Pre C = Detention C

(0.730) - (0.700) = 0.03

Volume = Det. C X Area X In of Rain $\frac{6"}{12"}$

= (0.03) 264,596.00 (0.50) = 3,969 C.F.

5. STORAGE FACILITIES AND/OR PERCOLATION DETERMINATION

VOLUME PROVIDED 9,646 Cu Ft (Stormwater tank)
for total Stormwater Detention of 9,646 Cu Ft

2.0 SANITARY SEWER SYSTEM IMPACT ASSESSMENT – PHASE II BUILDING B

SANITARY SEWER SYSTEM

DEVELOPMENTAL IMPACT ASSESSMENT

PROJECT Hilltop Residential Development - Master Plan

LOCATION 832 Chancellor Avenue

BY John C. Ferrante No. 24720

(PRINT SIGNATURE) N.J. LICENSE #

SIGNATURE

1. NARRATIVE (Briefly describe project)

Construction of Master Plan facilities, including 3 residential apartment buildings, townhomes, a restaurant, parking facilities, and green spaces. Reference Drawing #18.
*Total Sanitary Sewer discharge will be split between existing sewers on Krotik and Chancellor

2. RECEIVING SANITARY SEWER SYSTEM

A. PLAN

Manhole #1 — Connection Point — Manhole #2

Rim 185.00
Invert 178.61

Rim 178.05
Invert 169.73

B. CAPACITY ANALYSIS (Q & V)

Pipe Diameter 8"
Slope (S) 0.07
Pipe End Area (a) 0.349

Pipe Const.
Friction Coeff. (n) 0.013
Hydraulic Radius (R) 0.167

$Q = a \times \frac{1.486}{n} \times R^{2/3} \times S^{1/2}$

$3.20 = \frac{8"}{12"} \times \frac{1.486}{0.013} \times (1.067) \times (0.07)$

Q = 3.20 CFS (Theoretical Capacity)

$V = \frac{1.486}{n} \times R^{2/3} \times S^{1/2}$

V = 9.17 FPS

C. Average observed daily flow in manhole below connection point.
35% Depth of Flow Q = .25(3.20) 0.8 CFS

3. DISCHARGE ANALYSIS FROM PROJECT AT CONNECTION POINT

Phase I Building A = 21,075 GPD
Phase II Building B = 14,475 GPD

(1 CFS = 448 GPM)

35,550 GPD 0.055 CFS

2,000 GPD REQUIRES NJ DEP SEWER EXTENSION PERMIT

4. SUMMARY & CONCLUSION

A. SUMMARY

Theoretical Capacity of Receiving System at Connection Point 3.20 CFS
Average Observed Flow 0.80 CFS
Discharge from Project 0.055 CFS

B. CONCLUSION

Average observed flow plus computed discharge from project will bring the receiving sanitary sewer system at the connection point to 25% percent of its theoretical capacity.

$\frac{0.80 + 0.055}{3.40} = \frac{0.852}{3.40} = 25.2\ \%$

NOTE: Use of Manning Formula nomograph permitted.

Cite Reference

3.0 SANITARY SEWER SYSTEM IMPACT ASSESSMENT – PHASE II BUILDING A, B, C, D, E, F

Phase I Building A
Phase II Building B
Phase II Building C
Phase II Building D
Phase II Building E
Phase II Building F

SANITARY SEWER SYSTEM

DEVELOPMENTAL IMPACT ASSESSMENT

PROJECT Hilltop Residential Development - Master Plan

LOCATION 832 Chancellor Ave

BY John C. Ferrante (PRINT SIGNATURE) No. 24720 N.J. LICENSE #

SIGNATURE

1. NARRATIVE (Briefly describe project)

Construction of Master Plan Facilities, including 3 residential apartment buildings, townhomes, a restaurant, parking facilities and green spaces. Reference Drawing #18.
*Total Sanitary Sewer discharge will be split between existing sewers on Krotik and Chancellor

2. RECEIVING SANITARY SEWER SYSTEM

A. PLAN

Manhole #1 — Connection Point — Manhole #2

Rim 153.80
Invert 145.80

Rim 139.53
Invert 131.33

B. CAPACITY ANALYSIS (Q & V)

Pipe Diameter 8" Clay
Slope (S) 0.079
Pipe End Area (a) 0.349

Pipe Const. _____
Friction Coeff. (n) 0.013
Hydraulic Radius (R) 0.167

$Q = a \times \frac{1.486}{n} \times R^{2/3} \times S^{1/2}$

Q = 3.40 CFS (Theoretical Capacity)

$V = \frac{1.486}{n} \times R^{2/3} \times S^{1/2}$

Q = 0.349 x 114.31 x 0.3029 x 0.281
Q = 3.40

V = 9.74 FPS

C. Average observed daily flow in manhole below connection point.
35% Depth of Flow Q = .25(3.40) 0.85 CFS

3. DISCHARGE ANALYSIS FROM PROJECT AT CONNECTION POINT

Building A = 21,075 GPD
Building B = 14,475 GPD
Building C = 15,600 GPD
Building D = 15,900 GPD
Building E = 39,825 GPD
Building F = 4,050 GPD
Restaurant = 8,000 GPD

(1 CFS = 448 GPM)

118,925 GPD

0.184 CFS

2,000 GPD REQUIRES NJ DEP SEWER EXTENSION PERMIT

4. SUMMARY & CONCLUSION

A. SUMMARY

Theoretical Capacity of Receiving System at Connection Point 3.40 CFS
Average Observed Flow 0.85 CFS
Discharge from Project 0.184 CFS

B. CONCLUSION

Average observed flow plus computed discharge from project will bring the receiving sanitary sewer system at the connection point to 28 % percent of its theoretical capacity.

$\frac{0.85 + 0.184}{3.40} = \frac{1.01}{3.40} = 30.4\ \%$

NOTE: Use of Manning Formula nomograph permitted.
Cite Reference _____

Table 1: Building Areas		
Phase I Building A	25,003	sq ft
Phase II Building B	20,500	sq ft
Phase II Building C	20,600	sq ft
Phase II Building D	21,135	sq ft
Phase II Building E	25,153	sq ft
Phase II Building F	10,670	sq ft
Restaurant	3,600	sq ft
Total:	**126,661**	sq ft

Table 2: Site Areas (Sq. Ft)		
Total Buildings	126,661	Table 1
Pavement & Walkways	79,435	Masterplan Drawing
Lawn Area	58,500	Masterplan Drawing
Plant Area	0	-
Total:	**264,596** sq ft	
Building Coverage	47,9 %	
Lot Coverage	77,9 %	

Table 3: Number of Units					
	Studio	1 Bed	2 Bed	3 Bed	Total
Phase I Building A	-	65	45	4	114
Phase II Building B	4	91	1	-	96
Phase II Building C	4	56	24	4	88
Phase II Building D	4	48	36	-	88
Phase II Building E	-	153	63	9	225
Phase II Building F	-	-	18	-	18
Subtotals:	12	413	187	17	**629**

Table 4: Parking		
Phase I Building A	43	Provided
Phase II Building B	98	Provided
Phase II Building C	101	Provided
Phase II Building D	104	Provided
Phase II Building E	316	Provided
Phase II Building F	18	Provided
Total:	**680**	spaces

Table 5: Master Plan Comparison – 2013, 2019 & 2020			
	2013	2019	2020
Total Building Footprint Area	93,061	113,260	126,661
Total Building Area	872,711	694,091	853,222
FAR	3.268	3.388	3.22
Total # of Units	770	719	629
Total # of Parking Spaces	770	560	680
Parking Ratio	1	0.78	1.08

Table 6: Sanitary Flow								
		Flow Rates	Studio 150 GPD	1 Bedroom 150 GPD	2 Bedroom 225 GPD	3 Bedroom 300 GPD	Subtotals	
Phase I	Building A	Units	-	65	45	4	21,075	GPD
		Flow	-	9,750	10,125	1,200		
Phase II	Building B	Units	4	91	1	-	14,475	GPD
		Flow	600	13,650	225	-		
	Building C	Units	4	56	24	4	15,600	GPD
		Flow	600	8,400	5,400	1,200		
	Building D	Units	4	48	36	-	15,900	GPD
		Flow	600	7,200	8,100	-		
	Building E	Units	-	153	63	9	39,825	GPD
		Flow	-	22,950	14,175	2,700		
	Building F	Units	-	-	18	-	4,050	GPD
		Flow	-	-	4,050	-		
	Restaurant	Flow	8,000				8,000	GPD
Total Flowrate:							**118,925**	**GPD**
							0.184	**CFS**