# Appendix H – Sanitary Sewer Computations

# PROJECTED FLOW RATES

**OPTION #1:**

***Per the NYS DEC "Design Standards for Wastewater Treatment Works", 1998 Manual:***

| Type of Facility | Flow Rate per Person (gal/day) | Flow Rate per Unit (gal/day) | Allowable Decrease for Water Saving Devices | Resulting Flow Rate per Unit (gal/day) |
|---|---|---|---|---|
| *Condominiums* | | | | |
| 2-Bedroom Units | | 300 | 20.00% | 240 |
| | | | | |
| *Townhomes* | | | | |
| 3-Bedroom Units | | 400 | 20.00% | 320 |
| | | | | |
| *Apartments* | | | | |
| 1-Bedroom Units | | 150 | 20.00% | 120 |
| 2-Bedroom Units | | 300 | 20.00% | 240 |

**Site Flows:**

| Building I.D. | Number of Buildings | Number of Units | Daily Flow Rate (gpd/unit) | Sub-Total Flows (gpd) |
|---|---|---|---|---|
| *Area A:* | | | | |
| No Buildings | | | | |
| | | | | |
| *Area B:* | | | | |
| Apartments | | | | |
| 1-Bedroom Apartment Units | | 25 | 120 | 3,000.00 |
| 2-Bedroom Apartment Units | | 25 | 240 | 6,000.00 |
| Townhomes | | | | |
| 3-Beroom Units | | 36 | 320 | 11,520.00 |
| | | | | |
| *Area C:* | | | | |
| Townhomes | | | | |
| 3-Bedroom Units | | 42 | 320 | 13,440.00 |
| | | | | |
| *Area D:* | | | | |
| Condominiums | | | | |
| 2-Bedroom Units | | 88 | 240 | 21,120.00 |
| | | | | |

**Total Site Flows = 55,080.00 gpd**

# PROJECTED FLOW RATES

**OPTION #2:**

***Per the "Recommended Standards for Wastewater Facilities" (a.k.a. the "Ten State Standards"); 2004 Edition:***

| Type of Facility | Flow Rate per Capita (gal/day) | Projected Capita per Unit | | Resulting Flow Rate per Unit (gal/day) |
|---|---|---|---|---|
| *Condominiums* | | | | |
| 2-Bedroom Units | 100 | 2 | | 200 |
| | | | | |
| *Townhomes* | | | | |
| 3-Bedroom Units | 100 | 3.6 | | 360 |
| | | | | |
| *Apartments* | | | | |
| 1-Bedroom Units | 100 | 1 | | 100 |
| 2-Bedroom Units | 100 | 2 | | 200 |

**Site Flows:**

| Building I.D. | Number of Buildings | Number of Units | Daily Flow Rate (gpd/unit) | Sub-Total Flows (gpd) |
|---|---|---|---|---|
| *Area A:* | | | | |
| No Buildings | | | | |
| | | | | |
| *Area B:* | | | | |
| Apartments | | | | |
| 1-Bedroom Apartment Units | | 25 | 100 | 2,500.00 |
| 2-Bedroom Apartment Units | | 25 | 200 | 5,000.00 |
| Townhomes | | | | |
| 3-Beroom Units | | 36 | 360 | 12,960.00 |
| | | | | |
| *Area C:* | | | | |
| Townhomes | | | | |
| 3-Bedroom Units | | 42 | 360 | 15,120.00 |
| | | | | |
| *Area D:* | | | | |
| Condominiums | | | | |
| 2-Bedroom Units | | 88 | 200 | 17,600.00 |
| | | | | |

**Total Site Flows = 53,180.00 gpd**

# PROJECTED FLOW RATES

**OPTION #3:**

***Per the NYS Department Of Health's Appendix 75-A:***

| Type of Facility | Flow Rate per Person (gal/day) | Flow Rate per Unit (gal/day) | | |
|---|---|---|---|---|
| *Condominiums* | | | | |
| 2-Bedroom Units | | 220 | | |
| | | | | |
| *Townhomes* | | | | |
| 3-Bedroom Units | | 330 | | |
| | | | | |
| *Apartments* | | | | |
| 1-Bedroom Units | | 110 | | |
| 2-Bedroom Units | | 220 | | |

**Site Flows:**

| Building I.D. | Number of Buildings | Number of Units | Daily Flow Rate (gpd/unit) | Sub-Total Flows (gpd) |
|---|---|---|---|---|
| *Area A:* | | | | |
| No Buildings | | | | |
| | | | | |
| *Area B:* | | | | |
| Apartments | | | | |
| 1-Bedroom Apartment Units | | 25 | 110 | 2,750.00 |
| 2-Bedroom Apartment Units | | 25 | 220 | 5,500.00 |
| Townhomes | | | | |
| 3-Bedroom Units | | 36 | 330 | 11,880.00 |
| | | | | |
| *Area C:* | | | | |
| Townhomes | | | | |
| 3-Bedroom Units | | 42 | 330 | 13,860.00 |
| | | | | |
| *Area D:* | | | | |
| Condominiums | | | | |
| 2-Bedroom Units | | 88 | 220 | 19,360.00 |
| | | | | |

**Total Site Flows = 53,350.00 gpd**

# PROJECTED FLOW RATES

| | | | |
|---|---|---|---|
| Projected Daily Flows when applying the NYS DEC "Design Standards for Wastewater Treatment Works" Flow Rates | = | 55,080.00 | gpd |
| Projected Daily Flows when applying the "Recommended Standards for Wastewater Facilities" (a.k.a. the "Ten State Standards") Flow Rates | = | 53,180.00 | gpd |
| Projected Daily Flows when applying the NYS Department Of Health's "Individual Residential Wastewater Treatment Systems Design Handbook (a.k.a. Appendix 75-A)" Flow Rates | = | 53,350.00 | gpd |

**PROJECTED SANITARY SEWER FLOW RATES:**

| | | | |
|---|---|---|---|
| **Average Daily Flow Rate** | = | **55,080.00** | **gpd** |
| **Max. Daily Flow Rate (using a Peaking Factor of 2.5)** | = | **137,700.00** | **gpd** |

**PROJECTED POTABLE WATER FLOW RATES:**

| | | | |
|---|---|---|---|
| Average Daily Flow Rate | = | 55,080.00 | gpd |
| Irrigation Demand (+ 10%) | = | 5,508.00 | gpd |
| **Total Average Daily Demand** | = | **60,588.00** | **gpd** |
| **Max. Daily Flow Rate (using a Peaking Factor of 2.5)** | = | **151,470.00** | **gpd** |
| **Peak Hourly Demand (using a Peaking Factor of 4)*** | = | **224.40** | **gpm*** |

** This value is based on an 18 hrs/day assumption*

ingalls & associates, LLP

JOB NAME: Duncan Meadows - Sanitary Sewer
SHEET: 1 OF ~~1~~ 2 (1-21-09)
CALCULATED BY: SDP DATE: 4-4-08
CHECKED BY: DATE:
SCALE: N.T.S.

Portion of Project connecting to McChesney Ave.:

Flows from site = 15,840 gpd = 2,117.5 cf/day = 88 cf/hr = 1.47 cf/min = 0.02 cf/sec
Ex Flows to Ex Pump station + Highland's flows = 104,000 gpd = 13,894.27 cf/day = 578.93 cf/hr = 0.16 cf/sec
TOTAL = 0.18 cfs
Most Restrictive section of Sewer (to connection w/ McChesney Ave Ext.)
= 8" PVC main @ slope = 0.43%
Per Manning's Formula; $Q_{full}$ = 1.03 cfs.
Since 0.18 cfs < 1.03 cfs ⇒ ok.

REV'D 1-21-09 - SEE SHT 2

Portion of Project connecting to McChesney Ave Ext.:

Flows from site = 27,810 gpd = 3,717.66 cf/day = 154.90 cf/hr = 2.58 cf/min = 0.04 cf/sec.
Ex Flows + Flows from Highland = 104,000 gpd = 13,894.27 cf/day = 578.93 cf/hr = 9.65 cf/min = 0.16 cf/sec.
(at pump station)
TOTAL flows = 0.20 cf/sec
Most Restrictive section of Sewer (to connection w/ Flows from
= 8" PVC main @ slope = 3.64%
Per Mannings Formula; $Q_{full}$ = 3.0 cfs.
Since 0.2 cf/sec < 3.0 cfs ⇒ O.K.

REV'D 1-21-09 - SEE SHT 2

Portion of Project connecting to McChesney Ave Ext after Brunswick Assoc. (Sequoia Apt's):
and prior to joining McChesney Ave's flows:

Flows from Site = 27,810 gpd = 0.04 cf/sec.
Ex Flows + Flows from Highland = 104,000 gpd = 0.16 cf/sec
(at pump station)
TOTAL = 0.20 cf/sec.
Most Restrictive section of Sewer = 10" PVC @ slope = 0.72%
Per Mannings formula; $Q_{full}$ = 2.42 cfs
Since 0.2 cf/sec < 2.42 cfs ⇒ O.K.

REV'D 1-21-09 - SEE SHT 2

ingalls & associates, LLP

JOB NAME: Duncan Meadows - Sanitary Sewer
SHEET: 2 OF 2
CALCULATED BY: SDP DATE: 1-21-09
CHECKED BY: DATE:
SCALE: N.T.S

Revise calculations for Sanitary Sewer along McChesney Ave. Ext. due to existing infiltration and inflow issues and revised flow rates:

Portion of Project connecting to McChesney Ave Ext prior to Brunswick Assoc.'s connection and joining McChesney Ave's flows:

Flows from site = 33,960 gpd = 4,537.01 cf/day = 0.05 cf/sec
Ex flows to Pump Station = 50,000 gpd = 6,679.94 cf/day = 0.08 cf/sec.
Ex. I & I issues = 50 gpm = 6.68 cf/min = 0.11 cf/sec
Flows from Highland Creek (use pump rate) = 180 gpm = 24.05 cf/m = 0.40 cf/sec.
TOTAL = 0.64 cf/sec

Since 0.64 cf/sec < 3.0 cfs ⇒ o.k.

Portion of Project connecting to McChesney Ave. Ext. After Brunswick Assoc. and prior to joining McChesney Ave's flows:

flows from site = 33,960 gpd = 0.05 cf/sec.
Ex flows to Pump Station = 50,000 gpd = 0.08 cf/sec.
Ex. I & I issues = 50 gpm = 6.68 cf/min = 0.11 cf/sec.
Flows from Highland Creek (use pump rate) = 180 gpm = 0.40 cf/sec
TOTAL = 0.64 cf/sec

Since 0.64 cf/sec < 2.42 cfs ⇒ o.k.

Revise calculations for Sanitary Sewer along McChesney Ave. due to rev'd flow rates:

Flows from site = 21,120 gpd = 2,821.60 cf/day = 117.57 cf/hr = 1.96 cf/min = 0.03 cf/sec
Ex. flows to pump station = 50,000 gpd = 0.08 cf/sec
Flows from Highland Creek (use pump rate) = 180 gpm = = 0.40 cf/sec
TOTAL = 0.51 cf/sec.

Since 0.51 cf/sec < 1.03 cf/sec ⇒ o.k.