

MEMORANDUM

DATE: JUNE 23, 2016

TO: JOSHUA WHITE

FROM: JUSTIN GAUTHIER / STEVE ZORGEL

RE: GREYSTONE VILLAGE (175 MAIN STREET) – TECHNICAL
MEMORANDUM FOR SITE SERVICING, STORMWATER
MANAGEMENT, NOISE, EROSION AND SEDIMENT CONTROL
BRIEF

CC: JOHN RIDDELL / ERIN O’CONNOR

ATTACHED: WATERMAIN DETAILED CALCULATIONS, DATED NOV. 2015
WATERMAIN DETAILED CALCULATIONS, DATED JUNE 2016
SANITARY SEWER DESIGN SHEET, DATED JUNE 21, 2016

This technical memo is in addition to the approved *Greystone Village, Site Servicing, Stormwater Management, Noise Erosion and Sediment Control Brief, prepared by Novatech, dated December 18, 2015, Ref. No. R-2015-194* & the technical memorandum *175 Main Street, Greystone Terraces: Site Servicing and Stormwater Management Memorandum, Prepared by Novatech, dated August 12, 2015*. The purpose of this memo is to evaluate the impact that ten (10) additional condo units will have on the proposed sanitary and watermain systems.

Sanitary System

Approved System

As per Section 4.0 and Table 4.1 in the report, the total proposed sanitary flow to outlet #1 is 22.75L/s + 1.52L/s infiltration. As per correspondence with the City of Ottawa, a 2% increase in flow (25.71L/s + 2.62L/s infiltration) to the existing interceptor trunk sewer is acceptable.

Additional units

As per Section 4.2 in the servicing report, the additional sanitary flow from the 10 additional condo units is determined by:

- Residential Average Sewage Flow = 350 L/capita/day
- Residential Peaking Factor = Harmon Equation
- Max Peaking Factor = 4.0
- Infiltration Allowance = 0.28 L/s/ha
- Population Density:
 - 2.1/unit (Apartment)

Population Flow = 10 units * 2.1persons/unit * 350L/person/day / 86,400s/day = 0.085L/s

Peak Flow = 0.085 * 4.0 (peaking factor) = 0.34L/s

The infiltration flow is based on area, which will remain the same, therefore only the population flow will need to be analyzed.

0.34L/s + 22.75L/s = 23.09L/s total sanitary flow < acceptable 25.71L/s (as per City correspondence)

Therefore the existing sanitary interceptor trunk sewer has adequate capacity to accommodate the additional ten (10) condo units.

The internal sanitary sewers within the Greystone Village were also analyzed using the 5 year storm design sheet and it has been confirmed that the internal sanitary sewers have adequate capacity to accommodate the additional condo units. Refer to the revised sanitary sewer design sheet, dated June 21, 2016 for details.

Watermain System

As per Section 5.0 of the servicing report, the additional residential demand for the 10 condo units is determined by:

- Residential Average Flow = 350 L/capita/day
- Population Density:
 - 2.1/unit (Apartment)

Average Day Demand Demand = 2.1 persons/unit * 10 units * 350L/capita/day / 86,400s/day
= 0.085L/s

Maximum Day Demand = 0.085L/s * 2.5 = 0.213L/s

Maximum Hourly Demand = 0.213 * 2.2 = 0.468L/s

These additional flows were added to Node 6 (as per Figure 12 in servicing report) during various operating conditions (avg. day, peak hour and fireflow conditions) to determine if the system has adequate capacity to service the development.

Average Day Demand/High Pressure Check

Under average day operating condition, refer to attached Average Day Demand / High Pressure Check sheets for detailed calculations. A summary of the results is provided below:

Condition	Report Results (Dec. 18, 2015)	June 21, 2016 Results (additional condo units)
High Pressure	80.16 psi (node 25)	80.16 psi (node 25)
Maximum Change (+/- psi)	Node 28 = 70.03 psi	Node 28 = 70.05 psi
Maximum Age	14.5 hours	14.5 hours

There is insignificant change in the pressures from the approved report and no change in the high pressure or maximum age. The pipe flows are consistent with the approved report and meet City of Ottawa requirements.

Peak Hour Demand

Under Peak Hour Demand operating condition, refer to attached Peak Hour Demand sheet for detailed calculations. A summary of the results is provided below.

Condition	Report Results (Dec. 18, 2015)	June 9, 2016 Results (additional condo units)
Peak Hour Demand (min. pressure)	55.97 psi (node10)	55.97 psi (node10)
Maximum Change (+/- psi)	Node 6 = 58.71 psi	Node 6 = 58.72 psi

There is insignificant change in the peak hour pressures and pipe flow from the approved report and still meets the City of Ottawa requirements.

Maximum Day + Fireflow

For the purposes of this technical memo, only nodes with the lowest pressures in the approved report and node 6, which is in close proximity to the condo buildings and where the additional units will impact.

Under Maximum Day + Fireflow operating conditions, refer to attached Maximum Day + Fireflow sheets for detailed calculations. A summary of the results is provided below.

Node	Demand (L/s)	Fireflow (L/s)	Report Results Minimum Pressure (psi) (Dec. 18, 2015)	June 9, 2016 Results Minimum Pressure (psi) (additional condo units)
Node 6	4.62	286.45	42.41 psi	
Node 6	4.83	286.45		42.40 psi
Node 18	0.00	296.11	23.78 psi	23.78 psi
Node 28	2.02	239.26	25.31 psi	25.30 psi

There is insignificant change in the pressures and pipe flow under fireflow conditions from the approved report and still meets the City of Ottawa requirements.

Conclusions

The sanitary and watermain systems have adequate capacity to accommodate the additional flow/demand with the addition of twelve condominium units.

We submit the following and request your review and approval in order to receive site plan approval.

Population and Consumption Rate Calculations

Node	Number of Single Units	Number of Townhouse Units	Number of Apartment Units	Number of School Residence	Number of Retirement Units	Commercial Area (ha)	Population	Consumption Rates (L/s)		
								Average Daily	Maximum Daily	Maximum Hourly
R1	0									
R2	0									
N1							0	0.00	0.00	0.00
N2	4						14	0.06	0.14	0.30
N3	6	9					45	0.18	0.45	1.00
N4	8	3					35	0.14	0.36	0.79
N5	4	6					30	0.12	0.30	0.66
N6		18	204				477	1.93	4.83	10.63
N7	2	8					28	0.12	0.29	0.63
N8		6					16	0.07	0.16	0.36
N9		21	102				271	1.10	2.74	6.04
N10				112			224	0.18	0.45	1.00
N11							0	0.00	0.00	0.00
N12		21					57	0.23	0.57	1.26
N13		9					24	0.10	0.25	0.54
N14		7	55				134	0.54	1.36	2.99
N15		7					19	0.08	0.19	0.42
N16		16					43	0.18	0.44	0.96
N17		12					32	0.13	0.33	0.72
N18							0	0.00	0.00	0.00
N19							0	0.00	0.00	0.00
N20		8					22	0.09	0.22	0.48
N21					150		210	0.85	2.13	4.68
N22		6	45				111	0.45	1.12	2.47
N23	4						14	0.06	0.14	0.30
N24	6						20	0.08	0.21	0.45
N25	4						14	0.06	0.14	0.30
N26			120			0.3394	252	1.02	2.55	5.61
N27							0	0.00	0.00	0.00
N28			95				200	0.81	2.02	4.44
N29				88			176	0.14	0.36	0.78
	38	157	621	200	150	0.3394	2467	8.81	21.91	48.14

Water Demand Parameters

Singles	3.4	persons/unit
Towns	2.7	persons/unit
Apartment Units (assume 2 bedroom)	2.1	persons/unit
Retirement Residence	1.4	persons/unit
School Residence*	2	persons/unit
School Residence Demand	70	L/student/day
Residential Demand	350	L/c/day
Residential Max Day	2.5	x Avg Day
Residential Peak Hour	2.2	x Max Day
Commercial Demand	28000	L/ha/day
Commercial Max Day	1.5	L/ha/day
Commercial Peak Hour	1.8	L/ha/day

Single Fire Flow	145.68	L/s
Row Townhouse Fire Flow	296.11	L/s
Row/Back to Back Townhouse Fire Flow	219.13	L/s
4 Storey Condo	207.88	L/s
6 Storey Condo Building Fire Flow	275.74	L/s
9 Storey Condo Building Fire Flow	286.45	L/s
Retirement Fire Flow	267.23	L/s
School Residence Fire Flow	249.76	L/s

	Phase 1 A and 1B
	Additional Condo Units (12 units)

AVERAGE DAY DEMAND / HIGH PRESSURE CHECK
Additional Condo Units

Junction Report

Node ID	Elevation m	Demand LPS	Total Head m	Pressure m	Pressure kPa	Pressure psi	Age hours
Resvr R1	114.50	-5.49	114.50	0.00	0.00	0.00	0.0
Resvr R2	114.50	-3.34	114.50	0.00	0.00	0.00	0.0
Junc N1	63.33	0.00	114.50	51.17	501.98	72.81	0.3
Junc N2	64.92	0.06	114.50	49.58	486.38	70.54	0.7
Junc N3	63.21	0.18	114.50	51.29	503.15	72.98	0.4
Junc N4	62.75	0.14	114.50	51.75	507.67	73.63	1.3
Junc N5	63.07	0.12	114.50	51.43	504.53	73.18	3.0
Junc N6	63.52	1.93	114.50	50.98	500.11	72.54	0.9
Junc N7	63.42	0.12	114.50	51.08	501.09	72.68	3.8
Junc N8	63.91	0.07	114.50	50.59	496.29	71.98	2.4
Junc N9	64.71	1.10	114.50	49.79	488.44	70.84	0.8
Junc N10	65.58	0.18	114.50	48.92	479.91	69.60	0.4
Junc N11	65.01	0.00	114.50	49.49	485.50	70.42	1.3
Junc N12	65.17	0.23	114.50	49.33	483.93	70.19	2.0
Junc N13	64.48	0.10	114.50	50.02	490.70	71.17	3.8
Junc N14	62.13	0.54	114.49	52.36	513.65	74.50	7.3
Junc N15	61.25	0.08	114.44	53.19	521.79	75.68	7.4
Junc N16	60.38	0.18	114.39	54.01	529.84	76.85	7.6
Junc N17	58.90	0.13	114.49	55.59	545.34	79.09	6.6
Junc N18	59.15	0.00	114.49	55.34	542.89	78.74	14.2
Junc N19	59.30	0.00	114.49	55.19	541.41	78.53	14.4
Junc N20	59.43	0.09	114.49	55.06	540.14	78.34	14.5
Junc N21	61.74	0.85	114.50	52.76	517.58	75.07	4.6
Junc N22	63.67	0.45	114.50	50.83	498.64	72.32	2.9
Junc N23	61.42	0.06	114.50	53.08	520.71	75.52	6.3
Junc N24	59.12	0.08	114.50	55.38	543.28	78.80	2.7
Junc N25	58.16	0.06	114.50	56.34	552.70	80.16	3.2
Junc N26	64.52	1.13	114.50	49.98	490.30	71.11	3.6
Junc N27	60.44	0.00	114.50	54.06	530.33	76.92	0.1
Junc N28	65.27	0.81	114.49	49.22	482.85	70.03	3.1
Junc N29	65.07	0.14	114.50	49.43	484.91	70.33	1.0

 Maximum Pressure in Oblates Subdivision
 Maximum Age

AVERAGE DAY DEMAND / HIGH PRESSURE CHECK
Additional Condo Units

Pipe Report

Link ID	Length m	Diameter mm	Roughness	Flow LPS	Velocity m/s	Headloss m/km	Friction Factor
Pipe P1	50.00	250	110	3.14	0.06	0.03	0.042
Pipe P2	38.00	50	100	-0.06	0.03	0.07	0.073
Pipe P3	17.00	250	110	3.08	0.06	0.03	0.042
Pipe P4	90.00	200	110	0.82	0.03	0.01	0.050
Pipe P5	66.00	200	110	0.68	0.02	0.01	0.052
Pipe P6	92.00	200	110	-0.11	0.00	0.00	0.066
Pipe P7	72.00	250	110	2.07	0.04	0.02	0.045
Pipe P8	70.00	200	110	0.67	0.02	0.01	0.051
Pipe P9	73.00	250	110	-0.03	0.00	0.00	0.000
Pipe P10	46.00	250	110	-0.81	0.02	0.00	0.051
Pipe P11	47.00	250	110	-1.26	0.03	0.01	0.048
Pipe P12	84.00	250	110	-1.30	0.03	0.01	0.048
Pipe P13	80.00	300	120	-4.04	0.06	0.02	0.035
Pipe P14	80.00	300	120	-4.22	0.06	0.02	0.035
Pipe P15	60.00	250	110	-1.64	0.03	0.01	0.046
Pipe P16	90.00	250	110	-1.64	0.03	0.01	0.047
Pipe P17	78.00	250	110	-0.60	0.01	0.00	0.054
Pipe P18	62.00	250	110	0.50	0.01	0.00	0.049
Pipe P19	51.00	50	100	0.26	0.13	1.05	0.059
Pipe P20	89.00	50	100	0.18	0.09	0.53	0.062
Pipe P21	81.00	250	110	0.30	0.01	0.00	0.047
Pipe P22	50.00	250	110	-0.09	0.00	0.00	0.000
Pipe P23	29.00	50	100	-0.09	0.05	0.15	0.069
Pipe P25	28.00	50	100	-0.09	0.05	0.15	0.069
Pipe P26	74.00	250	110	-0.52	0.01	0.00	0.056
Pipe P27	87.00	250	110	-1.37	0.03	0.01	0.047
Pipe P28	43.00	200	110	0.06	0.00	0.00	0.000
Pipe P29	43.00	200	110	0.14	0.00	0.00	0.086
Pipe P30	59.00	50	100	0.06	0.03	0.07	0.073
Pipe P31	35.00	400	120	1.27	0.01	0.00	0.041
Pipe P32	10.00	250	110	-3.14	0.06	0.04	0.042
Pipe P33	65.00	250	110	0.81	0.02	0.00	0.052
Pipe P34	86.00	400	120	1.13	0.01	0.00	0.042

MAXIMUM HOUR DEMAND
Additional Condo Units

Junction Report

Node ID	Elevation m	Demand LPS	Total Head m	Pressure m	Pressure kPa	Pressure psi
Resvr R1	105.00	-40.04	105.00	0.00	0.00	0.00
Resvr R2	104.80	-8.07	104.80	0.00	0.00	0.00
Junc N1	63.33	0.00	104.79	41.46	406.72	58.99
Junc N2	64.92	0.30	104.74	39.82	390.63	56.66
Junc N3	63.21	1.00	104.79	41.58	407.90	59.16
Junc N4	62.75	0.79	104.79	42.04	412.41	59.82
Junc N5	63.07	0.66	104.78	41.71	409.18	59.35
Junc N6	63.52	10.63	104.78	41.26	404.76	58.71
Junc N7	63.42	0.63	104.78	41.36	405.74	58.85
Junc N8	63.91	0.36	104.80	40.89	401.13	58.18
Junc N9	64.71	6.04	104.85	40.14	393.77	57.11
Junc N10	65.58	1.00	104.92	39.34	385.93	55.97
Junc N11	65.01	0.00	104.83	39.82	390.63	56.66
Junc N12	65.17	1.26	104.79	39.62	388.67	56.37
Junc N13	64.48	0.54	104.78	40.30	395.34	57.34
Junc N14	62.13	2.99	104.78	42.65	418.40	60.68
Junc N15	61.25	0.42	103.60	42.35	415.45	60.26
Junc N16	60.38	0.96	102.54	42.16	413.59	59.99
Junc N17	58.90	0.72	104.78	45.88	450.08	65.28
Junc N18	59.15	0.00	104.78	45.63	447.63	64.92
Junc N19	59.30	0.00	104.68	45.38	445.18	64.57
Junc N20	59.43	0.48	104.59	45.16	443.02	64.25
Junc N21	61.74	4.68	104.78	43.04	422.22	61.24
Junc N22	63.67	2.47	104.79	41.12	403.39	58.51
Junc N23	61.42	0.30	104.80	43.38	425.56	61.72
Junc N24	59.12	0.45	104.80	45.68	448.12	64.99
Junc N25	58.16	0.30	104.72	46.56	456.75	66.25
Junc N26	64.52	5.91	105.00	40.48	397.11	57.60
Junc N27	60.44	0.00	104.80	44.36	435.17	63.12
Junc N28	65.27	4.44	104.79	39.52	387.69	56.23
Junc N29	65.07	0.78	105.00	39.93	391.71	56.81

 Minimum Pressure

**MAXIMUM HOUR DEMAND
Additional Condo Units**

Pipe Report

Link ID	Length m	Diameter mm	Roughness	Flow LPS	Velocity m/s	Headloss m/km	Friction Factor
Pipe P1	50.00	250	110	7.02	0.14	0.16	0.037
Pipe P2	38.00	50	100	-0.30	0.15	1.37	0.058
Pipe P3	17.00	250	110	6.72	0.14	0.14	0.038
Pipe P4	90.00	200	110	1.77	0.06	0.04	0.044
Pipe P5	66.00	200	110	0.98	0.03	0.01	0.048
Pipe P6	92.00	200	110	-0.36	0.01	0.00	0.055
Pipe P7	72.00	250	110	3.95	0.08	0.05	0.041
Pipe P8	70.00	200	110	0.68	0.02	0.01	0.052
Pipe P9	73.00	250	110	7.04	0.14	0.16	0.037
Pipe P10	46.00	250	110	-5.00	0.10	0.08	0.039
Pipe P11	47.00	250	110	-7.47	0.15	0.17	0.037
Pipe P12	84.00	250	110	-14.87	0.30	0.62	0.033
Pipe P13	80.00	300	120	-32.35	0.46	0.92	0.026
Pipe P14	80.00	300	120	-33.35	0.47	0.98	0.026
Pipe P15	60.00	250	110	-11.45	0.23	0.38	0.035
Pipe P16	90.00	250	110	-11.45	0.23	0.38	0.035
Pipe P17	78.00	250	110	-5.75	0.12	0.11	0.038
Pipe P18	62.00	250	110	5.21	0.11	0.09	0.039
Pipe P19	51.00	50	100	1.38	0.70	23.14	0.046
Pipe P20	89.00	50	100	0.96	0.49	11.82	0.049
Pipe P21	81.00	250	110	-0.84	0.02	0.00	0.051
Pipe P22	50.00	250	110	-0.48	0.01	0.00	0.057
Pipe P23	29.00	50	100	-0.48	0.24	3.27	0.054
Pipe P25	28.00	50	100	-0.48	0.24	3.27	0.054
Pipe P26	74.00	250	110	-0.36	0.01	0.00	0.056
Pipe P27	87.00	250	110	-5.04	0.10	0.08	0.039
Pipe P28	43.00	200	110	0.30	0.01	0.00	0.056
Pipe P29	43.00	200	110	0.75	0.02	0.01	0.051
Pipe P30	59.00	50	100	0.30	0.15	1.37	0.058
Pipe P31	35.00	400	120	6.69	0.05	0.01	0.034
Pipe P32	10.00	250	110	-7.02	0.14	0.16	0.037
Pipe P33	65.00	250	110	4.44	0.09	0.07	0.040
Pipe P34	86.00	400	120	5.91	0.05	0.01	0.035

MAXIMUM DAY + FIRE FLOW DEMAND AT N6
Additional Condo Units

Junction Report

Node ID	Elevation m	Demand LPS	Total Head m	Pressure m	Pressure kPa	Pressure psi
Resvr R1	102.90	-192.52	102.90	0.00	0.00	0.00
Resvr R2	97.20	-115.84	97.20	0.00	0.00	0.00
Junc N1	63.33	0.00	95.54	32.21	315.98	45.83
Junc N2	64.92	0.14	95.52	30.60	300.19	43.54
Junc N3	63.21	0.45	95.07	31.86	312.55	45.33
Junc N4	62.75	0.36	95.02	32.27	316.57	45.91
Junc N5	63.07	0.30	94.99	31.92	313.14	45.42
Junc N6	63.52	291.28	93.32	29.80	292.34	42.40
Junc N7	63.42	0.29	95.96	32.54	319.22	46.30
Junc N8	63.91	0.16	95.96	32.05	314.41	45.60
Junc N9	64.71	2.74	99.01	34.30	336.48	48.80
Junc N10	65.58	0.45	100.95	35.37	346.98	50.33
Junc N11	65.01	0.00	98.63	33.62	329.81	47.84
Junc N12	65.17	0.57	98.04	32.87	322.45	46.77
Junc N13	64.48	0.25	97.58	33.10	324.71	47.10
Junc N14	62.13	1.36	97.22	35.09	344.23	49.93
Junc N15	61.25	0.19	96.94	35.69	350.12	50.78
Junc N16	60.38	0.44	96.69	36.31	356.20	51.66
Junc N17	58.90	0.33	96.78	37.88	371.60	53.90
Junc N18	59.15	0.00	96.78	37.63	369.15	53.54
Junc N19	59.30	0.00	96.75	37.45	367.38	53.28
Junc N20	59.43	0.22	96.73	37.30	365.91	53.07
Junc N21	61.74	2.13	96.38	34.64	339.82	49.29
Junc N22	63.67	1.12	95.96	32.29	316.76	45.94
Junc N23	61.42	0.14	97.20	35.78	351.00	50.91
Junc N24	59.12	0.21	97.20	38.08	373.56	54.18
Junc N25	58.16	0.14	97.18	39.02	382.79	55.52
Junc N26	64.52	2.71	102.90	38.38	376.51	54.61
Junc N27	60.44	0.00	96.92	36.48	357.87	51.90
Junc N28	65.27	2.02	98.04	32.77	321.47	46.63
Junc N29	65.07	0.36	102.90	37.83	371.11	53.83

 Minimum Pressure

**MAXIMUM DAY + FIRE FLOW DEMAND AT N6
Additional Condo Units**

Pipe Report

Link ID	Length m	Diameter mm	Roughness	Flow LPS	Velocity m/s	Headloss m/km	Friction Factor
Pipe P1	50.00	250	110	115.35	2.35	27.72	0.025
Pipe P2	38.00	50	100	-0.14	0.07	0.33	0.065
Pipe P3	17.00	250	110	115.21	2.35	27.66	0.025
Pipe P4	90.00	200	110	7.50	0.24	0.52	0.036
Pipe P5	66.00	200	110	7.14	0.23	0.48	0.036
Pipe P6	92.00	200	110	50.97	1.62	18.11	0.027
Pipe P7	72.00	250	110	107.26	2.18	24.23	0.025
Pipe P8	70.00	200	110	-44.12	1.40	13.87	0.028
Pipe P9	73.00	250	110	133.06	2.71	36.12	0.024
Pipe P10	46.00	250	110	0.75	0.02	0.00	0.055
Pipe P11	47.00	250	110	-0.37	0.01	0.00	0.068
Pipe P12	84.00	250	110	-133.59	2.72	36.39	0.024
Pipe P13	80.00	300	120	-189.00	2.67	24.23	0.020
Pipe P14	80.00	300	120	-189.45	2.68	24.34	0.020
Pipe P15	60.00	250	110	-52.67	1.07	6.49	0.028
Pipe P16	90.00	250	110	-52.67	1.07	6.49	0.028
Pipe P17	78.00	250	110	-50.08	1.02	5.91	0.028
Pipe P18	62.00	250	110	49.83	1.02	5.86	0.028
Pipe P19	51.00	50	100	0.63	0.32	5.42	0.052
Pipe P20	89.00	50	100	0.44	0.22	2.79	0.054
Pipe P21	81.00	250	110	-47.84	0.97	5.43	0.028
Pipe P22	50.00	250	110	-0.22	0.00	0.00	0.045
Pipe P23	29.00	50	100	-0.22	0.11	0.77	0.060
Pipe P25	28.00	50	100	-0.22	0.11	0.77	0.060
Pipe P26	74.00	250	110	47.29	0.96	5.32	0.028
Pipe P27	87.00	250	110	45.16	0.92	4.88	0.028
Pipe P28	43.00	200	110	0.14	0.00	0.00	0.086
Pipe P29	43.00	200	110	0.35	0.01	0.00	0.055
Pipe P30	59.00	50	100	0.14	0.07	0.33	0.065
Pipe P31	35.00	400	120	3.07	0.02	0.00	0.038
Pipe P32	10.00	250	110	-115.35	2.35	27.72	0.025
Pipe P33	65.00	250	110	2.02	0.04	0.02	0.045
Pipe P34	86.00	400	120	2.71	0.02	0.00	0.038

MAXIMUM DAY + FIRE FLOW DEMAND AT N18
Additional Condo Units

Junction Report

Node ID	Elevation m	Demand LPS	Total Head m	Pressure m	Pressure kPa	Pressure psi
Resvr R1	102.90	-235.43	102.90	0.00	0.00	0.00
Resvr R2	97.20	-82.59	97.20	0.00	0.00	0.00
Junc N1	63.33	0.00	96.31	32.98	323.53	46.92
Junc N2	64.92	0.14	96.30	31.38	307.84	44.65
Junc N3	63.21	0.45	96.06	32.85	322.26	46.74
Junc N4	62.75	0.36	95.43	32.68	320.59	46.50
Junc N5	63.07	0.30	94.97	31.90	312.94	45.39
Junc N6	63.52	4.83	95.63	32.11	315.00	45.69
Junc N7	63.42	0.29	93.21	29.79	292.24	42.39
Junc N8	63.91	0.16	95.58	31.67	310.68	45.06
Junc N9	64.71	2.74	97.23	32.52	319.02	46.27
Junc N10	65.58	0.45	100.06	34.48	338.25	49.06
Junc N11	65.01	0.00	95.05	30.04	294.69	42.74
Junc N12	65.17	0.57	91.78	26.61	261.04	37.86
Junc N13	64.48	0.25	89.05	24.57	241.03	34.96
Junc N14	62.13	1.36	86.88	24.75	242.80	35.21
Junc N15	61.25	0.19	86.61	25.36	248.78	36.08
Junc N16	60.38	0.44	86.36	25.98	254.86	36.96
Junc N17	58.90	0.33	84.14	25.24	247.60	35.91
Junc N18	59.15	296.11	76.18	17.03	167.06	24.23
Junc N19	59.30	0.00	76.16	16.86	165.40	23.99
Junc N20	59.43	0.22	76.14	16.71	163.93	23.78
Junc N21	61.74	2.13	88.25	26.51	260.06	37.72
Junc N22	63.67	1.12	94.37	30.70	301.17	43.68
Junc N23	61.42	0.14	97.20	35.78	351.00	50.91
Junc N24	59.12	0.21	97.20	38.08	373.56	54.18
Junc N25	58.16	0.14	97.18	39.02	382.79	55.52
Junc N26	64.52	2.71	102.90	38.38	376.51	54.61
Junc N27	60.44	0.00	97.05	36.61	359.14	52.09
Junc N28	65.27	2.02	91.78	26.51	260.06	37.72
Junc N29	65.07	0.36	102.90	37.83	371.11	53.83

 Minimum Pressure

MAXIMUM DAY + FIRE FLOW DEMAND AT N18
Additional Condo Units

Pipe Report

Link ID	Length m	Diameter mm	Roughness	Flow LPS	Velocity m/s	Headloss m/km	Friction Factor
Pipe P1	50.00	250	110	82.10	1.67	14.77	0.026
Pipe P2	38.00	50	100	-0.14	0.07	0.33	0.065
Pipe P3	17.00	250	110	81.96	1.67	14.72	0.026
Pipe P4	90.00	200	110	30.68	0.98	7.08	0.029
Pipe P5	66.00	200	110	30.32	0.97	6.92	0.029
Pipe P6	92.00	200	110	-30.82	0.98	7.13	0.029
Pipe P7	72.00	250	110	50.83	1.04	6.08	0.028
Pipe P8	70.00	200	110	60.84	1.94	25.14	0.026
Pipe P9	73.00	250	110	-15.18	0.31	0.65	0.033
Pipe P10	46.00	250	110	-109.62	2.23	25.23	0.025
Pipe P11	47.00	250	110	-110.74	2.26	25.71	0.025
Pipe P12	84.00	250	110	-95.72	1.95	19.62	0.025
Pipe P13	80.00	300	120	-231.91	3.28	35.39	0.019
Pipe P14	80.00	300	120	-232.36	3.29	35.52	0.019
Pipe P15	60.00	250	110	-133.45	2.72	36.32	0.024
Pipe P16	90.00	250	110	-133.45	2.72	36.32	0.024
Pipe P17	78.00	250	110	-130.86	2.67	35.02	0.024
Pipe P18	62.00	250	110	130.61	2.66	34.90	0.024
Pipe P19	51.00	50	100	0.63	0.32	5.42	0.052
Pipe P20	89.00	50	100	0.44	0.22	2.79	0.054
Pipe P21	81.00	250	110	-128.62	2.62	33.92	0.024
Pipe P22	50.00	250	110	-296.33	6.04	159.12	0.021
Pipe P23	29.00	50	100	-0.22	0.11	0.77	0.060
Pipe P25	28.00	50	100	-0.22	0.11	0.77	0.060
Pipe P26	74.00	250	110	-168.04	3.42	55.65	0.023
Pipe P27	87.00	250	110	-170.17	3.47	56.96	0.023
Pipe P28	43.00	200	110	0.14	0.00	0.00	0.086
Pipe P29	43.00	200	110	0.35	0.01	0.00	0.055
Pipe P30	59.00	50	100	0.14	0.07	0.33	0.065
Pipe P31	35.00	400	120	3.07	0.02	0.00	0.038
Pipe P32	10.00	250	110	-82.10	1.67	14.77	0.026
Pipe P33	65.00	250	110	2.02	0.04	0.02	0.045
Pipe P34	86.00	400	120	2.71	0.02	0.00	0.038

MAXIMUM DAY + FIRE FLOW DEMAND AT N28
Additional Condo Units

Junction Report

Node ID	Elevation m	Demand LPS	Total Head m	Pressure m	Pressure kPa	Pressure psi
Resvr R1	102.90	-226.36	102.90	0.00	0.00	0.00
Resvr R2	97.20	-34.81	97.20	0.00	0.00	0.00
Junc N1	63.33	0.00	97.02	33.69	330.50	47.93
Junc N2	64.92	0.14	97.01	32.09	314.80	45.66
Junc N3	63.21	0.45	96.97	33.76	331.19	48.03
Junc N4	62.75	0.36	96.81	34.06	334.13	48.46
Junc N5	63.07	0.30	96.69	33.62	329.81	47.84
Junc N6	63.52	4.83	96.90	33.38	327.46	47.49
Junc N7	63.42	0.29	96.19	32.77	321.47	46.63
Junc N8	63.91	0.16	96.91	33.00	323.73	46.95
Junc N9	64.71	2.74	97.63	32.92	322.95	46.84
Junc N10	65.58	0.45	100.26	34.68	340.21	49.34
Junc N11	65.01	0.00	94.63	29.62	290.57	42.14
Junc N12	65.17	0.57	90.12	24.95	244.76	35.50
Junc N13	64.48	0.25	91.30	26.82	263.10	38.16
Junc N14	62.13	1.36	92.25	30.12	295.48	42.86
Junc N15	61.25	0.19	91.97	30.72	301.36	43.71
Junc N16	60.38	0.44	91.72	31.34	307.45	44.59
Junc N17	58.90	0.33	93.53	34.63	339.72	49.27
Junc N18	59.15	0.00	93.53	34.38	337.27	48.92
Junc N19	59.30	0.00	93.51	34.21	335.60	48.67
Junc N20	59.43	0.22	93.49	34.06	334.13	48.46
Junc N21	61.74	2.13	94.72	32.98	323.53	46.92
Junc N22	63.67	1.12	96.54	32.87	322.45	46.77
Junc N23	61.42	0.14	97.20	35.78	351.00	50.91
Junc N24	59.12	0.21	97.20	38.08	373.56	54.18
Junc N25	58.16	0.14	97.18	39.02	382.79	55.52
Junc N26	64.52	2.71	102.90	38.38	376.51	54.61
Junc N27	60.44	0.00	97.17	36.73	360.32	52.26
Junc N28	65.27	241.28	83.05	17.78	174.42	25.30
Junc N29	65.07	0.36	102.90	37.83	371.11	53.83

 Minimum Pressure

MAXIMUM DAY + FIRE FLOW DEMAND AT N28
Additional Condo Units

Pipe Report

Link ID	Length m	Diameter mm	Roughness	Flow LPS	Velocity m/s	Headloss m/km	Friction Factor
Pipe P1	50.00	250	110	34.32	0.70	2.94	0.029
Pipe P2	38.00	50	100	-0.14	0.07	0.33	0.065
Pipe P3	17.00	250	110	34.18	0.70	2.91	0.029
Pipe P4	90.00	200	110	14.87	0.47	1.85	0.032
Pipe P5	66.00	200	110	14.51	0.46	1.77	0.033
Pipe P6	92.00	200	110	-16.80	0.53	2.32	0.032
Pipe P7	72.00	250	110	18.87	0.38	0.97	0.032
Pipe P8	70.00	200	110	31.00	0.99	7.21	0.029
Pipe P9	73.00	250	110	2.76	0.06	0.03	0.043
Pipe P10	46.00	250	110	-57.37	1.17	7.60	0.027
Pipe P11	47.00	250	110	-58.49	1.19	7.88	0.027
Pipe P12	84.00	250	110	-61.41	1.25	8.63	0.027
Pipe P13	80.00	300	120	-222.84	3.15	32.87	0.019
Pipe P14	80.00	300	120	-223.29	3.16	32.99	0.019
Pipe P15	60.00	250	110	-158.69	3.23	50.05	0.024
Pipe P16	90.00	250	110	-158.69	3.23	50.05	0.024
Pipe P17	78.00	250	110	83.16	1.69	15.12	0.026
Pipe P18	62.00	250	110	-83.41	1.70	15.21	0.026
Pipe P19	51.00	50	100	0.63	0.32	5.42	0.052
Pipe P20	89.00	50	100	0.44	0.22	2.79	0.054
Pipe P21	81.00	250	110	85.40	1.74	15.89	0.026
Pipe P22	50.00	250	110	-0.22	0.00	0.00	0.045
Pipe P23	29.00	50	100	-0.22	0.11	0.77	0.060
Pipe P25	28.00	50	100	-0.22	0.11	0.77	0.060
Pipe P26	74.00	250	110	-85.95	1.75	16.08	0.026
Pipe P27	87.00	250	110	-88.08	1.79	16.82	0.026
Pipe P28	43.00	200	110	0.14	0.00	0.00	0.086
Pipe P29	43.00	200	110	0.35	0.01	0.00	0.055
Pipe P30	59.00	50	100	0.14	0.07	0.33	0.065
Pipe P31	35.00	400	120	3.07	0.02	0.00	0.038
Pipe P32	10.00	250	110	-34.32	0.70	2.94	0.029
Pipe P33	65.00	250	110	241.28	4.92	108.75	0.022
Pipe P34	86.00	400	120	2.71	0.02	0.00	0.038

MAXIMUM DAY + FIRE FLOW DEMAND SUMMARY

Maximum day plus fire flow demand was modeled for each node.

The following is a summary of the minimum pressures that occurred for each operating condition.

Fire at Junction	Demand (L/s)			Minimum Pressure			
	Maximum Daily	Fire Flow	Max Day + Fire	(m)	kPa	psi	Node
N1	0.00	145.68	145.68	32.10	314.90	45.67	N2
N3	0.45	286.45	286.90	29.93	293.61	42.58	N2
N4	0.36	167.00	167.36	30.58	299.99	43.51	N4
N5	0.30	167.00	167.30	32.16	315.49	45.76	N2
N6	4.62	286.45	291.07	29.81	292.44	42.41	N6
N7	0.29	167.00	167.29	32.24	316.27	45.87	N2
N8	0.16	286.45	286.61	30.24	296.65	43.03	N8
N9	2.74	219.13	221.87	31.92	313.14	45.42	N28
N10	0.45	249.76	250.21	32.47	318.53	46.20	N2
N11	0.00	249.76	249.76	27.75	272.23	39.48	N11
N12	0.57	239.26	239.83	24.96	244.86	35.51	N12
N13	0.25	207.88	208.13	26.69	261.83	37.98	N13
N14	1.36	296.11	297.47	30.19	296.16	42.95	N14
N17	0.33	296.11	296.44	24.57	241.03	34.96	N13
N18	0.00	296.11	296.11	16.71	163.93	23.78	N20
N21	2.13	268.59	270.72	26.68	261.73	37.96	N21
N22	1.12	217.95	219.07	31.16	305.68	44.34	N22
N23	0.14	145.68	145.82	30.32	297.44	43.14	N23
N24	0.21	145.68	145.89	32.61	319.90	46.40	N24
N26	2.71	275.79	278.50	33.45	328.14	47.59	N2
N27	0.00	145.68	145.68	33.25	326.18	47.31	N2
N28	2.02	239.26	241.28	17.79	174.52	25.31	N28
N29	0.36	249.76	250.12	35.05	343.84	49.87	N1

Note: Nodes not appearing in summary are on 50mm leads and are not subject to fireflow.

SANITARY SEWER DESIGN SHEET
Greystone Village - 175 Main Street
Developer: Greystone Village Inc.
Additional Condo Units



PROJECT # : 114025
DESIGNED BY : SZ
CHECKED BY : JAG
DATE PREPARED : 15-Dec-15
DATE REVISED : 04-Apr-16
DATE REVISED : 21-Jun-16

LOCATION			INDIVIDUAL								CUMULATIVE		PEAK FACTOR M	POPULATION FLOW Q(p) (L/s)	PEAK EXTRAN. FLOW Q(i) (L/s)	PEAK DESIGN FLOW Q(d) (L/s)	PROPOSED SEWER								
STREET	FROM MH	TO MH	Area	Single Units	Townhouse Units	Condo Units	Future School Residence	Retirement Home Units	Population (in 1000's)	AREA (ha.)	Population (in 1000's)	AREA (ha.)					LENGTH (m)	PIPE SIZE (mm)	PIPE ID (mm)	TYPE OF PIPE	GRADE %	CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)	Qpeak/Qcap	
*DESCHATELETS AVENUE	153	151	1		21				0.057	0.34	0.057	0.34	4.0	0.92	0.10	1.01	12.6	200	203.20	DR 35	0.65	27.6	0.85	4%	
*DESCHATELETS AVENUE	151	149	2			95			0.200	0.30	0.256	0.640	4.0	4.15	0.18	4.33	30.8	200	203.20	DR 35	0.65	27.6	0.85	16%	
*DESCHATELETS AVENUE	149	147	3							0.05	0.256	0.690	4.0	4.15	0.19	4.34	27.8	200	203.20	DR 35	0.40	21.6	0.67	20%	
*DESCHATELETS AVENUE	147	145	4							0.31	0.256	1.000	4.0	4.15	0.28	4.43	33.6	200	203.20	DR 35	0.40	21.6	0.67	20%	
*DESCHATELETS AVENUE	145	193	5		21		112		0.281	0.74	0.537	1.740	4.0	8.61	0.49	9.10	20.2	200	203.20	DR 35	0.40	21.6	0.67	42%	
*DESCHATELETS AVENUE	193	143									0.537	1.74	4.0	8.61	0.49	9.10	20.2	200	203.20	DR 35	0.40	21.6	0.67	42%	
DESCHATELETS AVENUE	143	141	6			110			0.231	0.21	0.768	1.95	3.9	12.04	0.55	12.59	31.1	200	203.20	DR 35	0.40	21.6	0.67	58%	
DESCHATELETS AVENUE	141	139	7							0.08	0.768	2.030	3.9	12.04	0.57	12.61	27.0	200	203.20	DR 35	0.40	21.6	0.67	58%	
DESCHATELETS AVENUE	139	133	8							0.09	0.768	2.120	3.9	12.04	0.59	12.64	21.8	200	203.20	DR 35	0.40	21.6	0.67	58%	
**FORECOURT DE MAZENOD AVENUE	133	131	9						0.149	0.80			1.5	0.05	0.22	0.28									
DE MAZENOD AVENUE			10		12	102			0.247	0.47	1.015	2.590	3.8	15.60	0.73	16.33	75.3	200	203.20	DR 35	0.40	21.6	0.67	75%	
DE MAZENOD AVENUE	105	131	11		12	102			0.247	0.48	0.247	0.480	4.0	4.00	0.13	4.13	73.6	200	203.20	DR 35	0.40	21.6	0.67	19%	
JEREMIAH KEALEY STREET	131	129	12		6				0.016	0.19	1.277	3.260	3.7	19.29	0.91	20.48	47.7	250	254.00	DR 35	0.40	39.2	0.77	52%	
JEREMIAH KEALEY STREET	129	127	13		6				0.016	0.19	1.294	3.450	3.7	19.52	0.97	20.76	48.7	250	254.00	DR 35	0.40	39.2	0.77	53%	
DESCHATELETS AVENUE	133	135	14		3	45			0.103	0.34	0.103	0.340	4.0	1.66	0.10	1.76	51.2	200	203.20	DR 35	0.65	27.6	0.85	6%	
DESCHATELETS AVENUE	135	137	15		3				0.008	0.13	0.111	0.470	4.0	1.79	0.13	1.93	49.3	200	203.20	DR 35	0.40	21.6	0.67	9%	
SCHOLASTIC DRIVE	137	127	16	4					0.014	0.19	0.124	0.660	4.0	2.01	0.18	2.20	69.9	200	203.20	DR 35	0.40	21.6	0.67	10%	
SCHOLASTIC DRIVE	127	125	17	4					0.014	0.17	1.431	4.280	3.7	21.42	1.20	22.89	59.6	250	254.00	DR 35	0.40	39.2	0.77	58%	
SCHOLASTIC DRIVE	125	109									1.431	4.280	3.7	21.42	1.20	22.89	13.6	250	254.00	DR 35	0.40	39.2	0.77	58%	
PHILOSOPHER PRIVATE	101	111	18	4					0.014	0.17	0.014	0.170	4.0	0.22	0.05	0.27	24.8	200	203.20	DR 35	0.65	27.6	0.85	1%	
TELMON STREET	111	103	19							0.07	0.014	0.240	4.0	0.22	0.07	0.29	17.1	200	203.20	DR 35	0.40	21.6	0.67	1%	
TELMON STREET	103	105	20	1					0.003	0.03	0.017	0.270	4.0	0.28	0.08	0.35	8.4	200	203.20	DR 35	0.40	21.6	0.67	2%	
TELMON STREET	105	107	21	7	3				0.032	0.26	0.049	0.530	4.0	0.79	0.15	0.94	46.3	200	203.20	DR 35	0.40	21.6	0.67	4%	
TELMON STREET	107	109	22	4	3				0.022	0.21	0.071	0.740	4.0	1.14	0.21	1.35	39.7	200	203.20	DR 35	0.40	21.6	0.67	6%	
OUTLET	109	113									1.502	5.020	3.7	22.39	1.41	24.07	11.9	250	254.00	DR 35	0.40	39.2	0.77	61%	
OUTLET	113	115	23							0.04	1.502	5.060	3.7	22.39	1.42	24.08	43.3	250	254.00	DR 35	5.13	140.5	2.77	17%	
CLEGG	123	121	24	6					0.020	0.19	0.020	0.190	4.0	0.33	0.05	0.38	72.5	200	203.20	DR 35	3.16	60.8	1.88	1%	
CLEGG	121	117	25	8					0.027	0.18	0.048	0.370	4.0	0.77	0.10	0.87	77.0	200	203.20	DR 35	0.40	21.6	0.67	4%	
CLEGG	117	115									0.048	0.370	4.0	0.77	0.10	0.87	9.5	200	203.20	DR 35	0.42	22.2	0.68	4%	
OUTLET	115	119									1.550	5.430	3.7	23.03	1.52	24.83	10.6	250	254.00	DR 35	0.41	39.7	0.78	63%	

SANITARY SEWER DESIGN SHEET
Greystone Village - 175 Main Street
Developer: Greystone Village Inc.
Additional Condo Units



PROJECT # : 114025
 DESIGNED BY : SZ
 CHECKED BY : JAG
 DATE PREPARED : 15-Dec-15
 DATE REVISED : 04-Apr-16
 DATE REVISED : 21-Jun-16

LOCATION			INDIVIDUAL								CUMULATIVE			PROPOSED SEWER										
STREET	FROM MH	TO MH	Area	Single Units	Townhouse Units	Condo Units	Future School Residence	Retirement Home Units	Population (in 1000's)	AREA (ha.)	Population (in 1000's)	AREA (ha.)	PEAK FACTOR M	POPULATION FLOW Q(p) (L/s)	PEAK EXTRAN. FLOW Q(i) (L/s)	PEAK DESIGN FLOW Q(d) (L/s)	LENGTH (m)	PIPE SIZE (mm)	PIPE ID (mm)	TYPE OF PIPE	GRADE %	CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)	Qpeak/Qcap

*Part of future phase 2 outletting through phase 1A at outlet 1.

Notes:

1. $Q(d) = Q(p) + Q(i)$
2. $Q(i) = 0.28 \text{ L/sec/ha}$
3. $Q(p) = (P \times q \times M / 86,400)$

Definitions:

- $Q(d)$ = Design Flow (L/sec)
 $Q(p)$ = Population Flow (L/sec)
 $Q(i)$ = Extraneous Flow (L/sec)

P = Population (3.4 persons/single unit, 2.7 persons/townhouse, 2.1 persons/apartment, 2.0 persons/ school residence, 1.4 persons/retirement residence)

- q = Average per capita flow = 350 L/cap/day - Residential
 q = Average per gross ha. flow = 35000 L/gross ha/day - Light industrial
 q = Average per gross ha. flow = 50000 L/gross ha/day - Commercial/Mixed use
 M = Harmon Formula (maximum of 4.0)
 Min pipe size 200mm @ min. slope 0.32%

** Parkland: Area = 0.91 ha, Flow Rate for parks with flush toilets = 20L/Day/Person, peak design flow from parkland to be added to peak design flow of subsequent pipes.

Population = 75 Persons/acre
 Institutional Peaking factor = 1.5
 Details from Appendix 4-A OSDG