

PRELIMINARY PRESSURE SEWER - PIPE SIZING AND BRANCH ANALYSIS
Talking Rock Phase 1 Pressure Sewer

August 27, 2002
A. J. O. J. R. S.

Zone Number	Pumps to Zone	Number of Cores in Zone	Accum Cores in Zone	Gal/Day per Core	Max Flow per Core	Max Sim Ops	Max Flow (GPM)	Pipe Size (Inches)	Max Velocity (FPS)	Length of Main this Zone	Friction Loss Factor (ft/100ft)	Friction Loss this Zone	Accumulated Friction Loss (Feet)	Max Main Elevation	Minimum Pump Elevation	Static Head (Feet)	Total Dynamic Head (ft)
its spreadsheet was calculated using pipe diameters for: SDR11HDPE																	
1.00	2.00	3	3	235.00	11.00	2	22.00	2.00	2.38	340.00	1.19	4.04	43.43	4,950.00	4,885.00	65.00	108.43
2.00	7.00	11	14	235.00	11.00	4	44.00	3.00	2.19	1,205.00	0.65	7.83	39.39	4,950.00	4,860.00	90.00	129.39
3.00	4.00	3	3	235.00	11.00	2	22.00	2.00	2.38	260.00	1.19	3.09	42.07	4,950.00	4,860.00	90.00	132.07
4.00	6.00	2	5	235.00	11.00	3	33.00	2.50	2.44	80.00	0.99	0.80	38.98	4,950.00	4,865.00	85.00	123.98
5.00	6.00	2	2	235.00	11.00	2	22.00	2.00	2.38	100.00	1.19	1.19	39.37	4,950.00	4,865.00	85.00	124.37
6.00	7.00	6	13	235.00	11.00	4	44.00	3.00	2.19	1,020.00	0.65	6.63	38.19	4,950.00	4,880.00	70.00	108.19
7.00	10.00	1	28	235.00	11.00	5	55.00	3.00	2.74	290.00	0.98	2.85	31.56	4,950.00	4,920.00	30.00	61.56
8.00	9.00	3	3	235.00	11.00	2	22.00	2.00	2.38	100.00	1.19	1.19	34.06	4,950.00	4,900.00	50.00	84.06
9.00	10.00	8	11	235.00	11.00	4	44.00	3.00	2.19	640.00	0.65	4.16	32.87	4,950.00	4,900.00	50.00	82.87
10.00	13.00	1	40	235.00	11.00	6	66.00	3.00	3.29	335.00	1.38	4.61	28.71	4,950.00	4,920.00	30.00	58.71
11.00	12.00	3	3	235.00	11.00	2	22.00	2.00	2.38	190.00	1.19	2.26	29.93	4,950.00	4,890.00	60.00	89.93
12.00	13.00	7	10	235.00	11.00	4	44.00	3.00	2.19	550.00	0.65	3.57	27.67	4,950.00	4,895.00	55.00	82.67
13.00	15.00	4	54	235.00	11.00	7	77.00	4.00	2.32	640.00	0.54	3.45	24.09	4,950.00	4,900.00	50.00	74.09
14.00	15.00	3	3	235.00	11.00	2	22.00	2.00	2.38	345.00	1.19	4.10	24.74	4,950.00	4,920.00	30.00	54.74
15.00	91.00	2	59	235.00	11.00	7	77.00	4.00	2.32	880.00	0.54	4.75	20.64	4,950.00	4,880.00	70.00	90.64
16.00	90.00	2	2	235.00	11.00	2	22.00	2.00	2.38	260.00	1.19	3.09	29.31	4,950.00	4,930.00	20.00	49.31
17.00	90.00	3	37	235.00	11.00	6	66.00	3.00	3.29	570.00	1.38	7.85	34.07	4,950.00	4,920.00	30.00	64.07
18.00	19.00	3	3	235.00	11.00	2	22.00	2.00	2.38	135.00	1.19	1.61	56.67	4,950.00	4,915.00	35.00	91.67
19.00	21.00	4	7	235.00	11.00	3	33.00	2.50	2.44	245.00	0.99	2.44	55.06	4,950.00	4,935.00	15.00	70.06
20.00	21.00	3	3	235.00	11.00	2	22.00	2.00	2.38	290.00	1.19	3.45	56.07	4,950.00	4,905.00	45.00	101.07
21.00	24.00	3	13	235.00	11.00	4	44.00	3.00	2.19	325.00	0.65	2.11	52.63	4,950.00	4,920.00	30.00	82.63
22.00	23.00	3	3	235.00	11.00	2	22.00	2.00	2.38	200.00	1.19	2.38	55.28	4,950.00	4,910.00	40.00	95.28
23.00	24.00	1	4	235.00	11.00	3	33.00	2.50	2.44	240.00	0.99	2.39	52.90	4,950.00	4,935.00	15.00	67.90
24.00	27.00	2	19	235.00	11.00	5	55.00	3.00	2.74	300.00	0.98	2.95	50.51	4,950.00	4,945.00	5.00	55.51
25.00	26.00	3	3	235.00	11.00	2	22.00	2.00	2.38	100.00	1.19	1.19	52.29	4,950.00	4,880.00	70.00	122.29
26.00	27.00	4	7	235.00	11.00	3	33.00	2.50	2.44	355.00	0.99	3.53	51.10	4,950.00	4,885.00	65.00	116.10
27.00	17.00	6	32	235.00	11.00	6	66.00	3.00	3.29	980.00	1.38	13.50	47.57	4,950.00	4,905.00	45.00	92.57
28.00	17.00	2	2	235.00	11.00	2	22.00	2.00	2.38	200.00	1.19	2.38	36.45	4,950.00	4,930.00	20.00	56.45
29.00	32.00	3	3	235.00	11.00	2	22.00	2.00	2.38	270.00	1.19	3.21	18.29	5,000.00	4,950.00	50.00	68.29
30.00	31.00	3	3	235.00	11.00	2	22.00	2.00	2.38	200.00	1.19	2.38	23.11	5,000.00	4,895.00	105.00	128.11
31.00	32.00	8	11	235.00	11.00	4	44.00	3.00	2.19	870.00	0.65	5.65	20.73	5,000.00	4,910.00	90.00	110.73
32.00	35.00	2	16	235.00	11.00	4	44.00	3.00	2.19	270.00	0.65	1.75	15.08	5,000.00	4,975.00	25.00	40.08
33.00	34.00	3	3	235.00	11.00	2	22.00	2.00	2.38	150.00	1.19	1.78	20.17	5,000.00	4,935.00	65.00	85.17
34.00	35.00	7	10	235.00	11.00	4	44.00	3.00	2.19	780.00	0.65	5.07	18.39	5,000.00	4,965.00	35.00	53.39
35.00	38.00	4	30	235.00	11.00	5	55.00	3.00	2.74	655.00	0.98	6.44	13.32	5,000.00	4,980.00	20.00	33.32
36.00	37.00	3	3	235.00	11.00	2	22.00	2.00	2.38	155.00	1.19	1.84	14.61	5,000.00	4,955.00	45.00	59.61
37.00	38.00	9	12	235.00	11.00	4	44.00	3.00	2.19	905.00	0.65	5.88	12.77	5,000.00	4,935.00	65.00	77.77

PRELIMINARY PRESSURE SEWER - PIPE SIZING AND BRANCH ANALYSIS
Talking Rock Phase 1 Pressure Sewer

Zone Number	Pumps to Zone	Number of Cores in Zone	Accum Cores in Zone	Gal/Day per Core	Max Flow per Core	Max Sim Ops	Max Flow (GPM)	Pipe Size (Inches)	Max Velocity (FPS)	Length of Main this Zone	Friction Loss Factor (ft/100ft)	Friction Loss this Zone	Accumulated Friction Loss (Feet)	Max Main Elevation	Minimum Pump Elevation	Static Head (Feet)	Total Dynamic Head (ft)
its spreadsheet was calculated using pipe diameters for: SDR11HDPE																	
38.00	38.00	2	44	235.00	11.00	6	66.00	3.00	3.29	500.00	1.38	6.89	6.89	5,000.00	4,990.00	10.00	16.89
51.00	52.00	3	3	235.00	11.00	2	22.00	2.00	2.38	150.00	1.19	1.78	24.85	5,000.00	4,965.00	35.00	59.85
52.00	55.00	3	6	235.00	11.00	3	33.00	2.50	2.44	250.00	0.99	2.49	23.06	5,000.00	4,954.00	46.00	69.06
53.00	54.00	3	3	235.00	11.00	2	22.00	2.00	2.38	145.00	1.19	1.72	24.54	5,000.00	4,935.00	65.00	89.54
54.00	55.00	3	6	235.00	11.00	3	33.00	2.50	2.44	225.00	0.99	2.24	22.82	5,000.00	4,944.00	56.00	78.82
55.00	66.00	1	13	235.00	11.00	4	44.00	3.00	2.19	560.00	0.65	3.64	20.58	5,000.00	4,985.00	15.00	35.58
56.00	59.00	3	3	235.00	11.00	2	22.00	2.00	2.38	370.00	1.19	4.40	28.52	5,000.00	4,923.00	77.00	105.52
57.00	58.00	3	3	235.00	11.00	2	22.00	2.00	2.38	150.00	1.19	1.78	30.00	5,000.00	4,910.00	90.00	120.00
58.00	59.00	7	10	235.00	11.00	4	44.00	3.00	2.19	630.00	0.65	4.09	28.22	5,000.00	4,915.00	85.00	113.22
59.00	62.00	2	15	235.00	11.00	4	44.00	3.00	2.19	425.00	0.65	2.76	24.12	5,000.00	4,950.00	50.00	74.12
60.00	61.00	3	3	235.00	11.00	2	22.00	2.00	2.38	105.00	1.19	1.25	24.65	5,000.00	4,945.00	55.00	79.65
61.00	62.00	1	4	235.00	11.00	3	33.00	2.50	2.44	205.00	0.99	2.04	23.40	5,000.00	4,960.00	40.00	63.40
62.00	65.00	1	20	235.00	11.00	5	55.00	3.00	2.74	275.00	0.98	2.70	21.36	5,000.00	4,990.00	10.00	31.36
63.00	64.00	3	3	235.00	11.00	2	22.00	2.00	2.38	80.00	1.19	0.95	22.84	5,000.00	4,945.00	55.00	77.84
64.00	65.00	4	7	235.00	11.00	3	33.00	2.50	2.44	325.00	0.99	3.23	21.89	5,000.00	4,965.00	35.00	56.89
65.00	66.00	0	27	235.00	11.00	5	55.00	3.00	2.74	175.00	0.98	1.72	18.66	5,000.00	4,990.00	10.00	28.66
66.00	69.00	3	43	235.00	11.00	6	66.00	3.00	3.29	400.00	1.38	5.51	16.94	5,000.00	4,987.00	13.00	29.94
67.00	68.00	3	3	235.00	11.00	2	22.00	2.00	2.38	135.00	1.19	1.61	17.21	5,000.00	4,955.00	45.00	62.21
68.00	69.00	4	7	235.00	11.00	3	33.00	2.50	2.44	420.00	0.99	4.18	15.61	5,000.00	4,970.00	30.00	45.61
69.00	69.00	0	50	235.00	11.00	6	66.00	3.00	3.29	830.00	1.38	11.43	11.43	5,000.00	4,990.00	10.00	21.43
90.00	91.00	7	46	235.00	11.00	6	66.00	3.00	3.29	750.00	1.38	10.33	26.22	4,950.00	4,920.00	30.00	56.22
91.00	91.00	0	105	235.00	11.00	8	88.00	4.00	2.65	2,300.00	0.69	15.89	15.89	4,950.00	4,890.00	60.00	75.89

PRELIMINARY PRESSURE SEWER - ACCUMULATED RETENTION TIME (HR)
Talking Rock Phase 1 Pressure Sewer

August 27, 2002

Zone Number	Pumps to Zone	Accumulated Total of Cores this Zone	Existing Pipe Size	Gallons per 100 Lineal Feet	Length of Zone	Capacity of Zone	Average Daily Flow	Average Fluid Changes per Day	Average Retention Time (Hr)	Accumulated Retention Time (Hr)
this spreadsheet was calculated using pipe diameters for: SDR11HDPE										
1.00	2.00	3	2.00	15.40	340.00	52.37	705	13.46	1.78	8.11
2.00	7.00	14	3.00	33.47	1,205.00	403.27	3,290	8.16	2.94	6.33
3.00	4.00	3	2.00	15.40	260.00	40.05	705	17.60	1.36	7.80
4.00	6.00	5	2.50	22.57	80.00	18.06	1,175	65.07	0.37	6.44
5.00	6.00	2	2.00	15.40	100.00	15.40	470	30.51	0.79	6.86
6.00	7.00	13	3.00	33.47	1,020.00	341.35	3,055	8.95	2.68	6.07
7.00	10.00	28	3.00	33.47	290.00	97.05	6,580	67.80	0.35	3.39
8.00	9.00	3	2.00	15.40	100.00	15.40	705	45.77	0.52	5.55
9.00	10.00	11	3.00	33.47	640.00	214.18	2,585	12.07	1.99	5.02
10.00	13.00	40	3.00	33.47	335.00	112.11	9,400	83.85	0.29	3.04
11.00	12.00	3	2.00	15.40	190.00	29.27	705	24.09	1.00	5.63
12.00	13.00	10	3.00	33.47	550.00	184.06	2,350	12.77	1.88	4.63
13.00	15.00	54	4.00	55.31	640.00	354.00	12,690	35.85	0.67	2.75
14.00	15.00	3	2.00	15.40	345.00	53.14	705	13.27	1.81	3.89
15.00	91.00	59	4.00	55.31	880.00	486.75	13,865	28.48	0.84	2.08
16.00	90.00	2	2.00	15.40	260.00	40.05	470	11.74	2.04	3.84
17.00	90.00	37	3.00	33.47	570.00	190.76	8,695	45.58	0.53	2.32
18.00	19.00	3	2.00	15.40	135.00	20.79	705	33.90	0.71	6.28
19.00	21.00	7	2.50	22.57	245.00	55.30	1,645	29.75	0.81	5.57
20.00	21.00	3	2.00	15.40	290.00	44.67	705	15.78	1.52	6.28
21.00	24.00	13	3.00	33.47	325.00	108.76	3,055	28.09	0.85	4.76
22.00	23.00	3	2.00	15.40	200.00	30.81	705	22.89	1.05	6.34
23.00	24.00	4	2.50	22.57	240.00	54.17	940	17.35	1.38	5.29
24.00	27.00	19	3.00	33.47	300.00	100.40	4,465	44.47	0.54	3.91
25.00	26.00	3	2.00	15.40	100.00	15.40	705	45.77	0.52	5.06
26.00	27.00	7	2.50	22.57	355.00	80.12	1,645	20.53	1.17	4.54
27.00	17.00	32	3.00	33.47	980.00	327.97	7,520	22.93	1.05	3.37
28.00	17.00	2	2.00	15.40	200.00	30.81	470	15.26	1.57	3.89
29.00	32.00	3	2.00	15.40	270.00	41.59	705	16.95	1.42	3.13
30.00	31.00	3	2.00	15.40	200.00	30.81	705	22.89	1.05	5.46
31.00	32.00	11	3.00	33.47	870.00	291.16	2,585	8.88	2.70	4.41
32.00	35.00	16	3.00	33.47	270.00	90.36	3,760	41.61	0.58	1.71
33.00	34.00	3	2.00	15.40	150.00	23.10	705	30.51	0.79	4.59
34.00	35.00	10	3.00	33.47	780.00	261.04	2,350	9.00	2.67	3.80
35.00	38.00	30	3.00	33.47	655.00	219.20	7,050	32.16	0.75	1.13
36.00	37.00	3	2.00	15.40	155.00	23.87	705	29.53	0.81	3.78
37.00	38.00	12	3.00	33.47	905.00	302.87	2,820	9.31	2.58	2.97
38.00	38.00	44	3.00	33.47	500.00	167.33	10,340	61.79	0.39	0.39
51.00	52.00	3	2.00	15.40	150.00	23.10	705	30.51	0.79	4.10

Prepared By:
sfh

PRELIMINARY PRESSURE SEWER - ACCUMULATED RETENTION TIME (HR)
Talking Rock Phase 1 Pressure Sewer

August 27, 2002

Zone Number	Pumps to Zone	Accumulated Total of Cores this Zone	Existing Pipe Size	Gallons per 100 Lineal Feet	Length of Zone	Capacity of Zone	Average Daily Flow	Average Fluid Changes per Day	Average Retention Time (Hr)	Accumulated Retention Time (Hr)
*this spreadsheet was calculated using pipe diameters for: SDR11HDPE										
52.00	55.00	6	2.50	22.57	250.00	56.43	1,410	24.99	0.96	3.32
53.00	54.00	3	2.00	15.40	145.00	22.33	705	31.57	0.76	3.98
54.00	55.00	6	2.50	22.57	225.00	50.78	1,410	27.77	0.86	3.22
55.00	66.00	13	3.00	33.47	560.00	187.41	3,055	16.30	1.47	2.36
56.00	59.00	3	2.00	15.40	370.00	56.99	705	12.37	1.94	4.49
57.00	58.00	3	2.00	15.40	150.00	23.10	705	30.51	0.79	5.48
58.00	59.00	10	3.00	33.47	630.00	210.84	2,350	11.15	2.15	4.70
59.00	62.00	15	3.00	33.47	425.00	142.23	3,525	24.78	0.97	2.55
60.00	61.00	3	2.00	15.40	105.00	16.17	705	43.59	0.55	3.31
61.00	62.00	4	2.50	22.57	205.00	46.27	940	20.32	1.18	2.76
62.00	65.00	20	3.00	33.47	275.00	92.03	4,700	51.07	0.47	1.58
63.00	64.00	3	2.00	15.40	80.00	12.32	705	57.21	0.42	2.60
64.00	65.00	7	2.50	22.57	325.00	73.35	1,645	22.43	1.07	2.18
65.00	66.00	27	3.00	33.47	175.00	58.57	6,345	108.34	0.22	1.11
66.00	69.00	43	3.00	33.47	400.00	133.86	10,105	75.49	0.32	0.89
67.00	68.00	3	2.00	15.40	135.00	20.79	705	33.90	0.71	2.66
68.00	69.00	7	2.50	22.57	420.00	94.79	1,645	17.35	1.38	1.95
69.00	69.00	50	3.00	33.47	830.00	277.77	11,750	42.30	0.57	0.57
90.00	91.00	46	3.00	33.47	750.00	251.00	10,810	43.07	0.56	1.79
91.00	91.00	105	4.00	55.31	2,300.00	1,272.20	24,675	19.40	1.24	1.24

Note: This analysis is valid only with the use of progressive cavity type grinder pumps as manufactured by Environment One