

Appendix E

Sewer Siphon Sonar Data

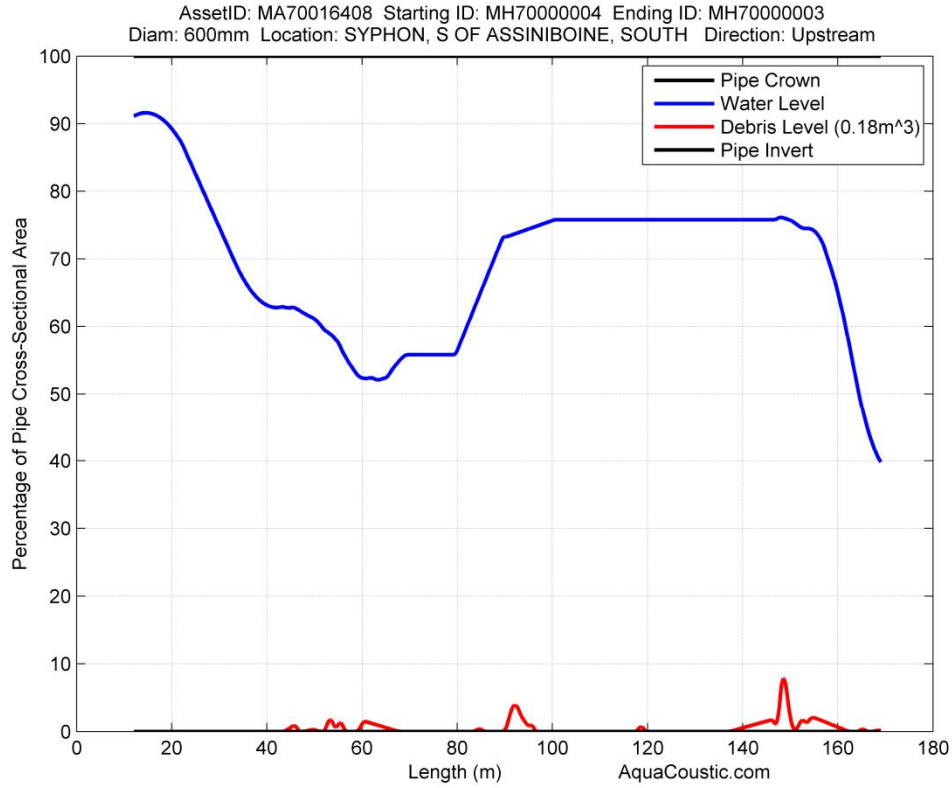


Figure 1 – Site 1a – St. James Interceptor (600 mm)

PID: MH70000004-MH70000003						
Inspected By: AquaCoustic Remote Technologies Inc.						
Field Data Input Date: 11/23/2012		Pipe Size (mm): 600				
QC Review: K Koughan		Pipe Material: ZZZ				
QC Date: 10/3/2013						
Upstream MH: MH70000004		Accumulated Volume (m ³): 0.18				
Downstream MH: MH70000003		As-built Capacity (m ³): 57.37				
Length Surveyed (m): 157.0		As-is Capacity (m ³): 57.18				
Map Length (m): 202.9						
General Comments:						
Direction of Travel:	Upstream	Inspection Date:	11/23/2012	Starting m:	12.0	
Sonar Operator:	TTAYLOR	Inspection Time:	1:39:40 PM	Ending m:	169.0	
Starting Station (m)	Ending Station (m)	Average Cross-sectional restriction (%)	Maximum Cross-sectional restriction (%)	Volume of Debris (m ³)	Accumulated Volume (m ³)	Water Level (%)
12.0	20.0	0.0	0.0	0.0	0.0	91.0
20.0	30.0	0.0	0.0	0.0	0.0	82.4
30.0	40.0	0.0	0.0	0.0	0.0	67.8
40.0	50.0	0.2	1.4	0.0	0.0	62.4
50.0	60.0	0.6	2.2	0.0	0.0	56.9
60.0	70.0	0.6	1.5	0.0	0.0	53.4
70.0	80.0	0.0	0.0	0.0	0.0	55.8
80.0	90.0	0.1	0.9	0.0	0.0	65.2
90.0	100.0	1.2	3.9	0.0	0.1	74.4
100.0	110.0	0.0	0.0	0.0	0.1	75.8
110.0	120.0	0.1	1.1	0.0	0.1	75.8
120.0	130.0	0.0	0.0	0.0	0.1	75.8
130.0	140.0	0.1	0.6	0.0	0.1	75.8
140.0	150.0	2.3	9.5	0.1	0.1	75.9
150.0	160.0	1.3	2.2	0.0	0.2	72.6
160.0	169.0	0.1	0.6	0.0	0.2	50.8
Maximum Values:			9.5	0.1	0.2	91.0
Average Values:			1.5	0.0		69.5

Figure 2 – Site 1a – St. James Interceptor (600 mm)

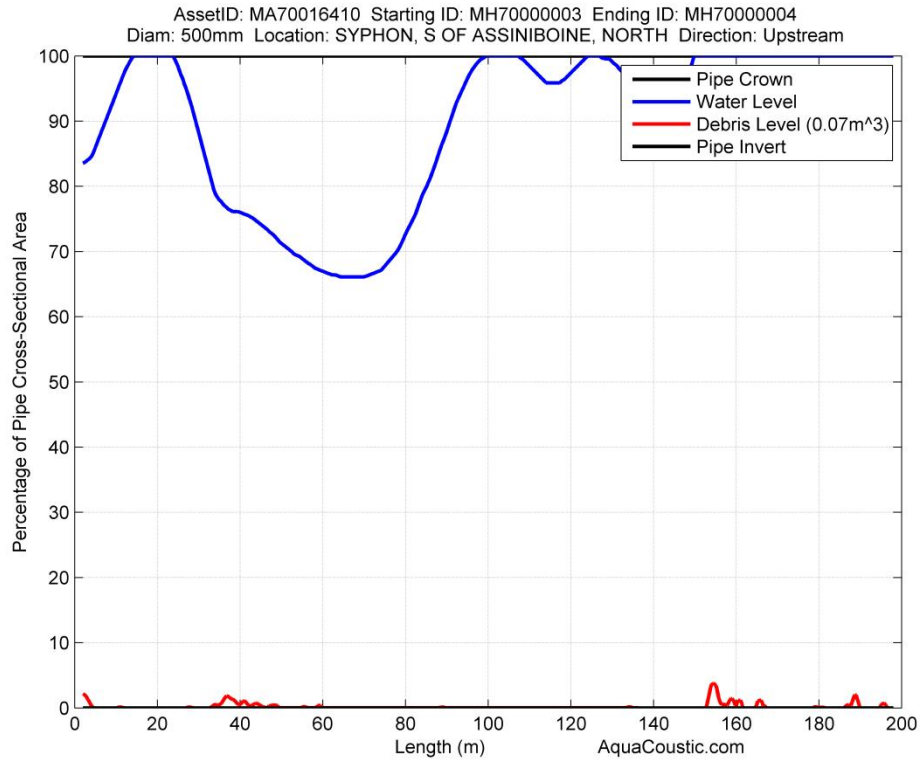


Figure 3 – Site 1b – St. James Interceptor (500 mm)

PID: MH70000004-MH70000003						
Inspected By: AquaCoustic Remote Technologies Inc.						
Field Data Input Date: 11/23/2012		Pipe Size (mm): 500				
QC Review: K Koughan		Pipe Material: ZZZ				
QC Date: 10/4/2013						
Upstream MH: MH70000004		Accumulated Volume (m ³): 0.07				
Downstream MH: MH70000003		As-built Capacity (m ³): 39.78				
Length Surveyed (m): 196.0		As-is Capacity (m ³): 39.71				
Map Length (m): 202.6						
General Comments:						
Direction of Travel:	Upstream	Inspection Date:	11/23/2012	Starting m:	2.0	
Sonar Operator:	TTAYLOR	Inspection Time:	9:53:55 AM	Ending m:	198.0	
Starting Station (m)	Ending Station (m)	Average Cross-sectional restriction (%)	Maximum Cross-sectional restriction (%)	Volume of Debris (m ³)	Accumulated Volume (m ³)	Water Level (%)
2.0	10.0	0.3	2.1	0.0	0.0	88.0
10.0	20.0	0.0	0.3	0.0	0.0	98.9
20.0	30.0	0.0	0.3	0.0	0.0	96.7
30.0	40.0	0.7	2.2	0.0	0.0	79.6
40.0	50.0	0.4	1.2	0.0	0.0	74.0
50.0	60.0	0.1	0.9	0.0	0.0	68.9
60.0	70.0	0.0	0.0	0.0	0.0	66.3
70.0	80.0	0.0	0.0	0.0	0.0	68.3
80.0	90.0	0.0	0.3	0.0	0.0	80.1
90.0	100.0	0.0	0.0	0.0	0.0	95.8
100.0	110.0	0.0	0.0	0.0	0.0	99.8
110.0	120.0	0.0	0.0	0.0	0.0	96.6
120.0	130.0	0.0	0.0	0.0	0.0	99.3
130.0	140.0	0.0	0.4	0.0	0.0	95.6
140.0	150.0	0.0	0.0	0.0	0.0	94.1
150.0	160.0	1.1	3.9	0.0	0.1	100.0
160.0	170.0	0.3	3.2	0.0	0.1	100.0
170.0	180.0	0.0	0.5	0.0	0.1	100.0
180.0	190.0	0.3	3.0	0.0	0.1	100.0
190.0	198.0	0.1	1.5	0.0	0.1	100.0
Maximum Values:			3.9	0.0	0.1	100.0
Average Values:			1.0	0.0		90.1

Figure 4 – Site 1b – St. James Interceptor (500 mm)

Asset Number: MA00017096 US Node: CS00000533 DS Node: CS00000532 Diam: 800mm Dir: Downstream
 Location: NORTHEAST INTERCEPTOR SIPHON , CROSSING RED RIVER AT WHELLAMS LN/KILDONAN G.C.

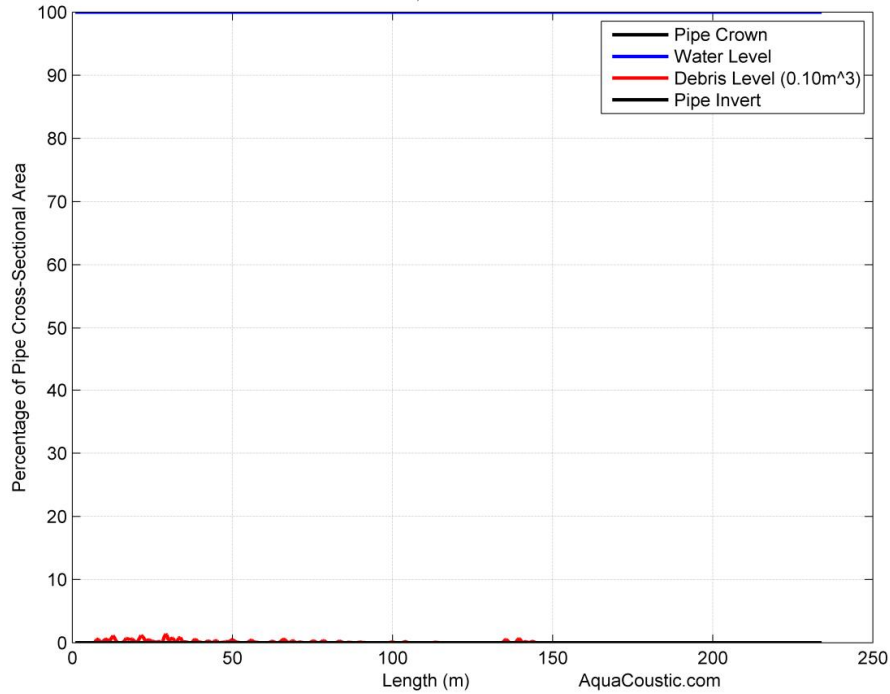


Figure 5 – Northeast Interceptor (800 mm)

PID: MA0001796						
Inspected By: AquaCoustic Remote Technologies Inc.			Pipe Size (mm): 800			
Field Data Input Date: 10/1/2013			Pipe Material: ZZZ			
QC Review: K Koughan			Accumulated Volume (m ³): 0.10			
QC Date: 11/4/2013			As-built Capacity (m ³): 117.58			
Upstream MH: CS00000533			As-is Capacity (m ³): 117.48			
Downstream MH: CS00000532						
Length Surveyed (m): 233.0						
Map Length (m): 233.91						
General Comments:						
Direction of Travel: Downstream		Inspection Date: 10/1/2013		Starting m: 1.0		
Sonar Operator: JORR		Inspection Time: 2:42:06 PM		Ending m: 234.0		
Starting Station (m)	Ending Station (m)	Average Cross-sectional restriction (%)	Maximum Cross-sectional restriction (%)	Volume of Debris (m ³)	Accumulated Volume (m ³)	Water Level (%)
1.0	10.0	0.1	1.4	0.0	0.0	100.0
10.0	20.0	0.4	1.5	0.0	0.0	100.0
20.0	30.0	0.5	2.2	0.0	0.0	100.0
30.0	40.0	0.3	1.5	0.0	0.1	100.0
40.0	50.0	0.2	0.9	0.0	0.1	100.0
50.0	60.0	0.1	0.6	0.0	0.1	100.0
60.0	70.0	0.1	0.7	0.0	0.1	100.0
70.0	80.0	0.1	0.5	0.0	0.1	100.0
80.0	90.0	0.0	0.4	0.0	0.1	100.0
90.0	100.0	0.0	0.2	0.0	0.1	100.0
100.0	110.0	0.0	0.4	0.0	0.1	100.0
110.0	120.0	0.0	0.1	0.0	0.1	100.0
120.0	130.0	0.0	0.0	0.0	0.1	100.0
130.0	140.0	0.1	0.9	0.0	0.1	100.0
140.0	150.0	0.0	0.3	0.0	0.1	100.0
150.0	160.0	0.0	0.0	0.0	0.1	100.0
160.0	170.0	0.0	0.0	0.0	0.1	100.0
170.0	180.0	0.0	0.0	0.0	0.1	100.0
180.0	190.0	0.0	0.0	0.0	0.1	100.0
190.0	200.0	0.0	0.0	0.0	0.1	100.0
200.0	210.0	0.0	0.0	0.0	0.1	100.0
210.0	220.0	0.0	0.0	0.0	0.1	100.0
220.0	230.0	0.0	0.0	0.0	0.1	100.0
230.0	234.0	0.0	0.0	0.0	0.1	100.0
Maximum Values:			2.2	0.0	0.1	100.0
Average Values:			0.5	0.0		100.0

Figure 6 – Northeast Interceptor (800 mm)

Asset Number: MA00017097 US Node: CS00000533 DS Node: CS00000532 Diam: 500mm Dir: Downstream
 Location: NORTHEAST INTERCEPTOR SIPHON, CROSSING RED RIVER AT WHELLAMS LN/KILDONAN G.C.

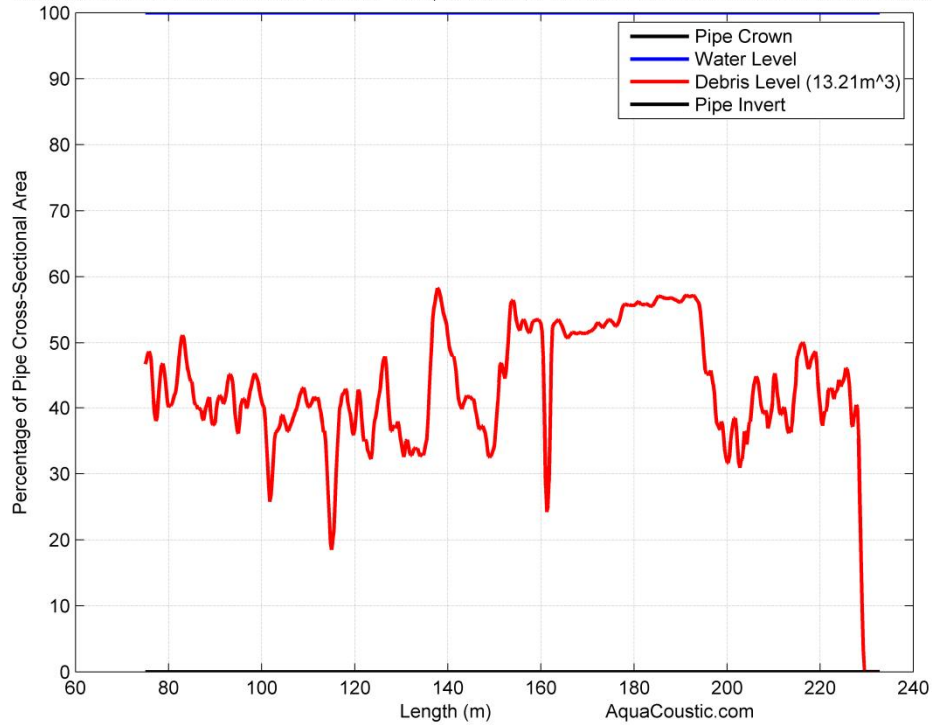


Figure 7 – Northeast Interceptor (500 mm)

PID: MA0001797							
Inspected By: AquaCoustic Remote Technologies Inc.							
Field Data Input Date: 10/1/2013			Pipe Size (mm): 500				
QC Review: K Koughan			Pipe Material: ZZZ				
QC Date: 11/4/2013							
Upstream MH: CS00000533			Accumulated Volume (m ³): 0.00				
Downstream MH: CS00000532			As-built Capacity (m ³): 45.82				
Length Surveyed (m): -75.0			As-is Capacity (m ³): 45.82				
Map Length (m): 233.34							
General Comments:							
Direction of Travel:	Downstream		Inspection Date:	10/1/2013		Starting m:	75.0
Sonar Operator:	JORR		Inspection Time:	12:24:20 PM		Ending m:	0.0
Starting Station (m)	Ending Station (m)	Average Cross-sectional restriction (%)	Maximum Cross-sectional restriction (%)	Volume of Debris (m³)	Accumulated Volume (m³)	Water Level (%)	
75.0	80.0	43.2	51.6	0.4	0.4	100.0	
80.0	90.0	42.4	52.0	0.9	1.3	100.0	
90.0	100.0	41.7	47.0	0.8	2.1	100.0	
100.0	110.0	37.4	43.9	0.8	2.8	100.0	
110.0	120.0	36.0	48.2	0.7	3.5	100.0	
120.0	130.0	38.5	48.7	0.8	4.3	100.0	
130.0	140.0	42.9	59.2	0.9	5.1	100.0	
140.0	150.0	39.4	50.0	0.8	5.9	100.0	
150.0	160.0	51.1	57.1	1.0	6.9	100.0	
160.0	170.0	48.5	53.7	1.0	7.8	100.0	
170.0	180.0	53.7	56.6	1.1	8.9	100.0	
180.0	190.0	56.3	57.3	1.1	10.0	100.0	
190.0	200.0	46.9	57.4	0.9	10.9	100.0	
200.0	210.0	38.5	47.7	0.8	11.7	100.0	
210.0	220.0	43.4	50.8	0.9	12.5	100.0	
220.0	230.0	33.9	48.4	0.7	13.2	100.0	
230.0	232.8	0.0	0.0	0.0	13.2	100.0	
Maximum Values:			59.2	1.1	13.2	100.0	
Average Values:			48.8	0.8		100.0	

Figure 8 – Northeast Interceptor (500 mm)

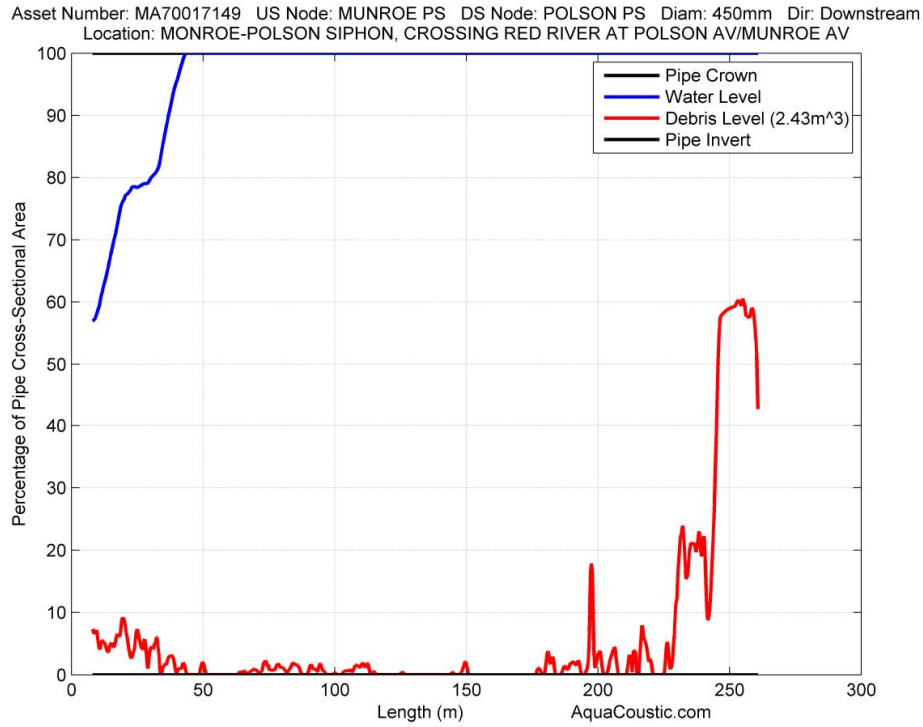


Figure 9 – Monroe-Polson (450 mm)

PID: MA70017149						
Inspected By: AquaCoustic Remote Technologies Inc.			Pipe Size (mm): 450			
Field Data Input Date: 6/20/2013			Pipe Material: ZZZ			
QC Review: K Koughan			Accumulated Volume (m ³): 2.43			
QC Date: 11/4/2013			As-built Capacity (m ³): 42.32			
Upstream MH: MUNROE PS			As-is Capacity (m ³): 39.89			
Downstream MH: POLSON PS						
Length Surveyed (m): 252.8						
Map Length (m): 266.1						
General Comments:						
Direction of Travel: Downstream		Inspection Date: 6/20/2013		Starting m: 8.0		
Sonar Operator: JTAYLOR		Inspection Time: 10:16:27 AM		Ending m: 260.8		
Starting Station (m)	Ending Station (m)	Average Cross-sectional restriction (%)	Maximum Cross-sectional restriction (%)	Volume of Debris (m ³)	Accumulated Volume (m ³)	Water Level (%)
8.0	10.0	6.1	8.2	0.0	0.0	57.6
10.0	20.0	5.7	10.8	0.1	0.1	67.8
20.0	30.0	4.6	10.1	0.1	0.2	78.4
30.0	40.0	2.5	9.4	0.0	0.2	86.5
40.0	50.0	0.7	2.5	0.0	0.2	99.2
50.0	60.0	0.1	1.4	0.0	0.2	100.0
60.0	70.0	0.4	1.4	0.0	0.2	100.0
70.0	80.0	1.1	3.2	0.0	0.3	100.0
80.0	90.0	0.8	2.0	0.0	0.3	100.0
90.0	100.0	0.7	2.8	0.0	0.3	100.0
100.0	110.0	0.7	2.3	0.0	0.3	100.0
110.0	120.0	0.5	2.6	0.0	0.3	100.0
120.0	130.0	0.1	0.7	0.0	0.3	100.0
130.0	140.0	0.0	0.0	0.0	0.3	100.0
140.0	150.0	0.4	3.1	0.0	0.3	100.0
150.0	160.0	0.0	0.0	0.0	0.3	100.0
160.0	170.0	0.0	0.0	0.0	0.3	100.0
170.0	180.0	0.3	3.8	0.0	0.3	100.0
180.0	190.0	1.4	5.6	0.0	0.3	100.0
190.0	200.0	3.5	26.2	0.1	0.4	100.0
200.0	210.0	1.5	5.3	0.0	0.4	100.0
210.0	220.0	2.9	10.4	0.0	0.5	100.0
220.0	230.0	2.8	14.6	0.0	0.5	100.0
230.0	240.0	20.5	28.0	0.3	0.8	100.0
240.0	250.0	39.1	59.1	0.6	1.5	100.0
250.0	260.0	58.4	62.9	1.0	2.4	100.0
260.0	260.8	40.1	49.3	0.1	2.4	100.0
Maximum Values:			62.9	1.0	2.4	100.0
Average Values:			12.1	0.1		95.9

Figure 10 – Monroe-Polson (450 mm)