



# Wastewater Flow Monitoring

2022 Clean and Safe Drinking Water Workshop

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# Presentation Outline

- Why Monitor Flows
- System Maps
  - Wastewater Collection System
  - Site Selection
- Flow Monitoring
  - Equipment
  - Locations
  - Data Logging
- Cost
- Safety
- Questions



# Why Monitor Flows

- Federal Gov. - Wastewater Systems Effluent Regulations (WSER), enacted in 2012 and made under the Federal Fisheries Act.
  - As per section nine (9) of the regulations, monitoring equipment must be installed at the final discharge point by Jan 1, 2013 to continuously measure influent or effluent volumes.
  - City received approval in 2013 to consolidate outfalls to one centralized monitoring location.



# Why Monitor Flows

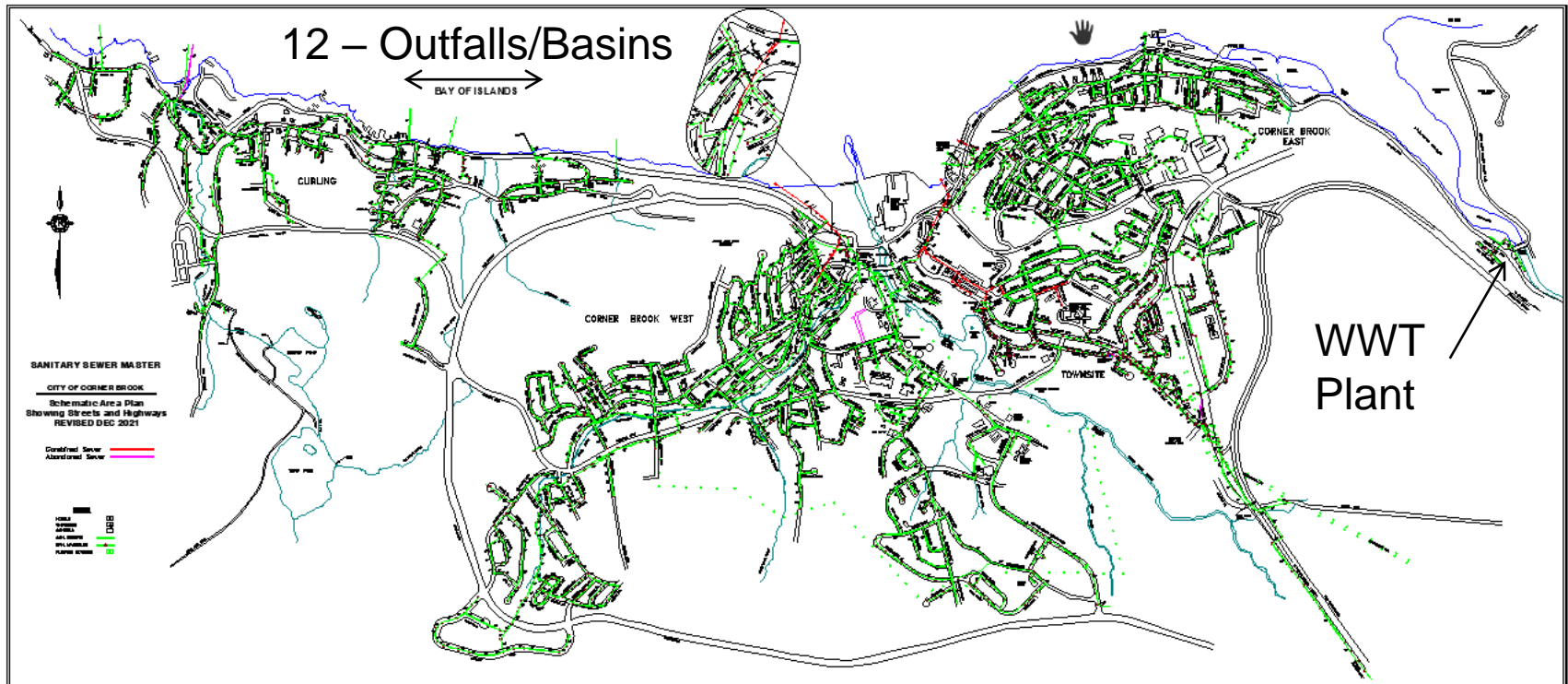
- Provincial Gov.– Department of Environment, Climate Change and Municipalities – Water Resources Management Division.
  - Permit to Operate - Class II Wastewater Treatment Plant
- Municipal Gov. – Wastewater discharge agreement with the Town of Massey Dr.





# System Maps – WWC System

## SANITARY SEWER MASTER





# System Maps – WWC System

- 12 – Outfalls/Basins (A to K)
- 11 - Untreated Outfalls/Basins
- 1 - Secondary-Level Treatment Plant



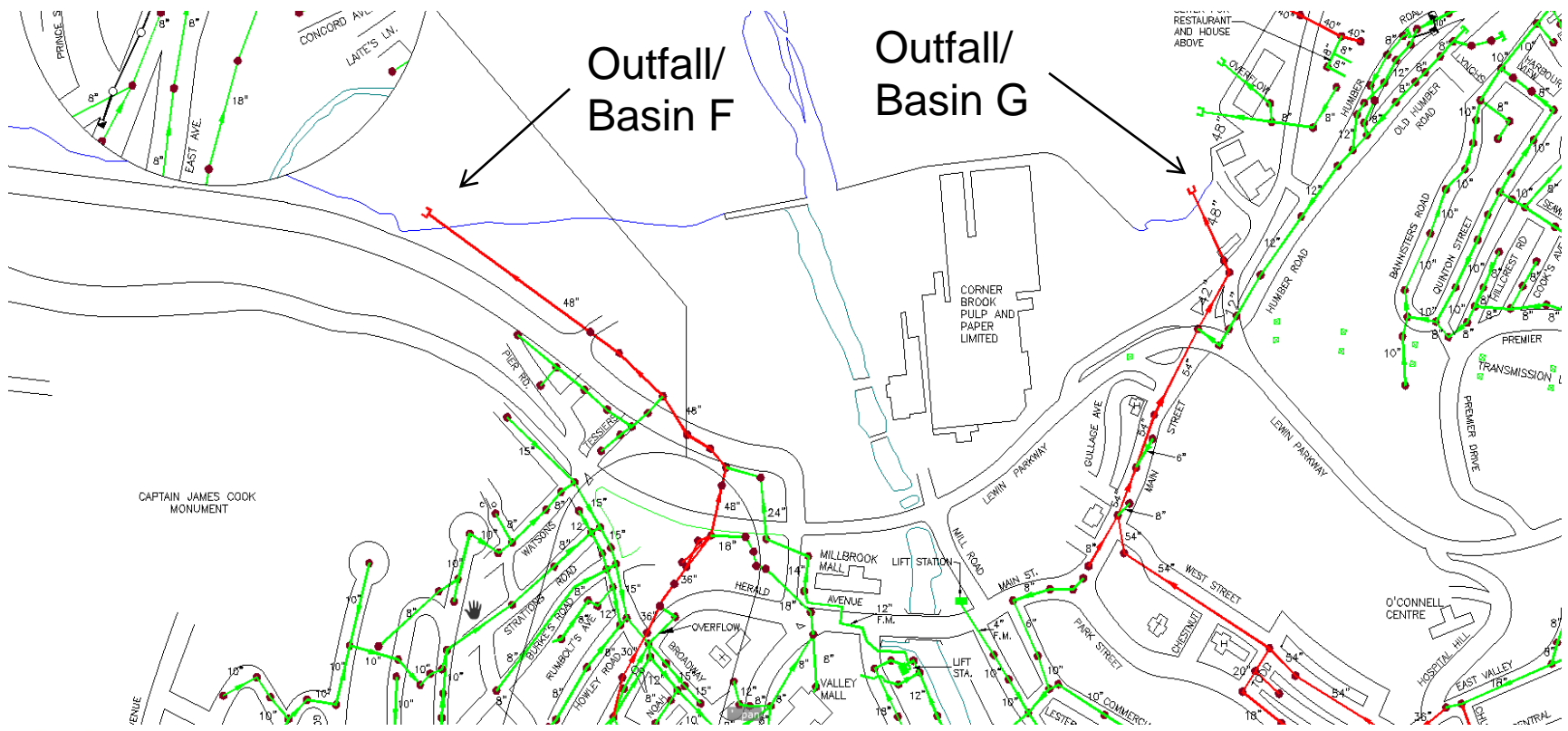
# System Maps – Site Selection

- Outfalls/Basins - F (Griffin Dr.), G (Main St.) & K (Riverside Dr.)
- City Boundary – Town of Massey Dr.





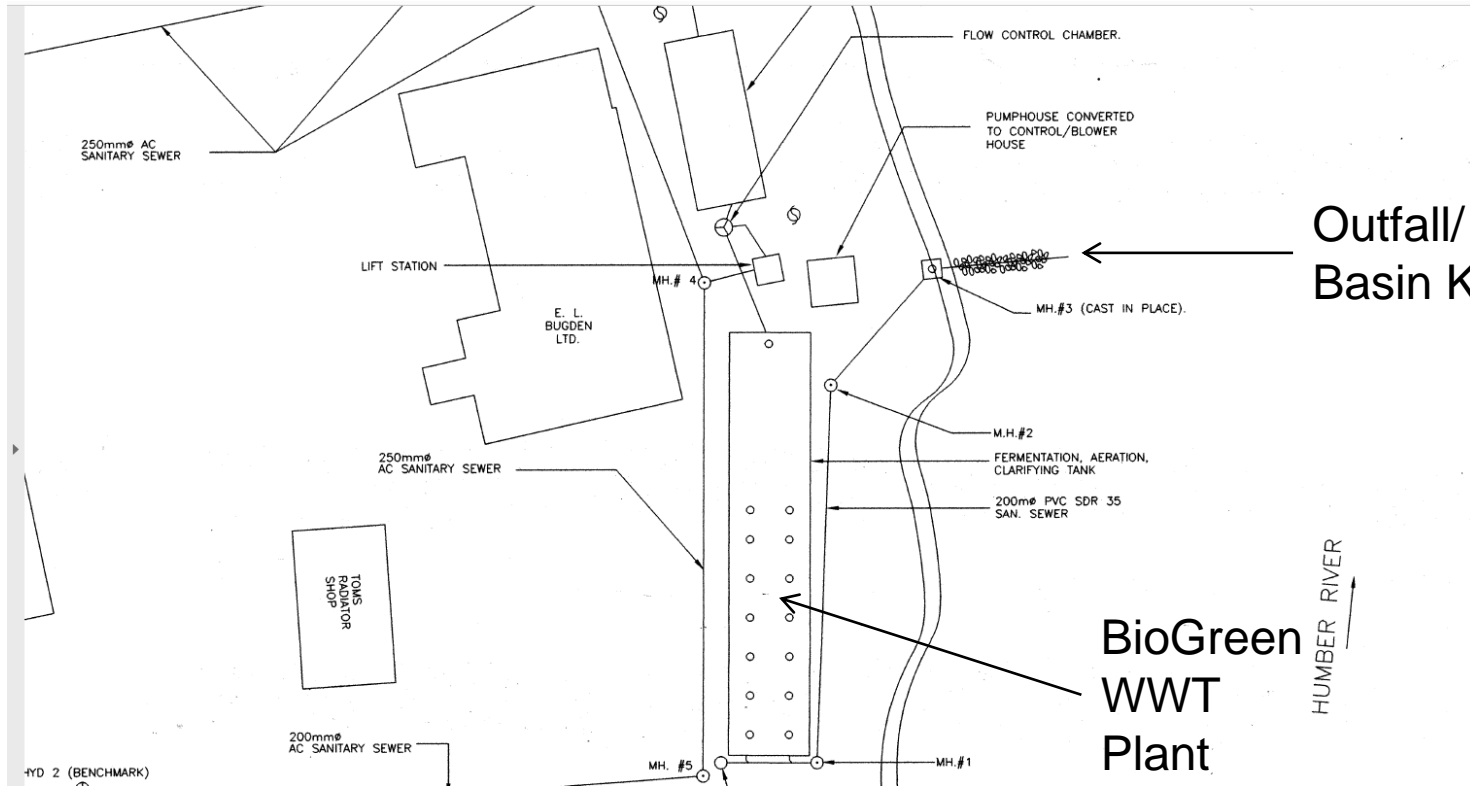
# System Maps – Site Selection





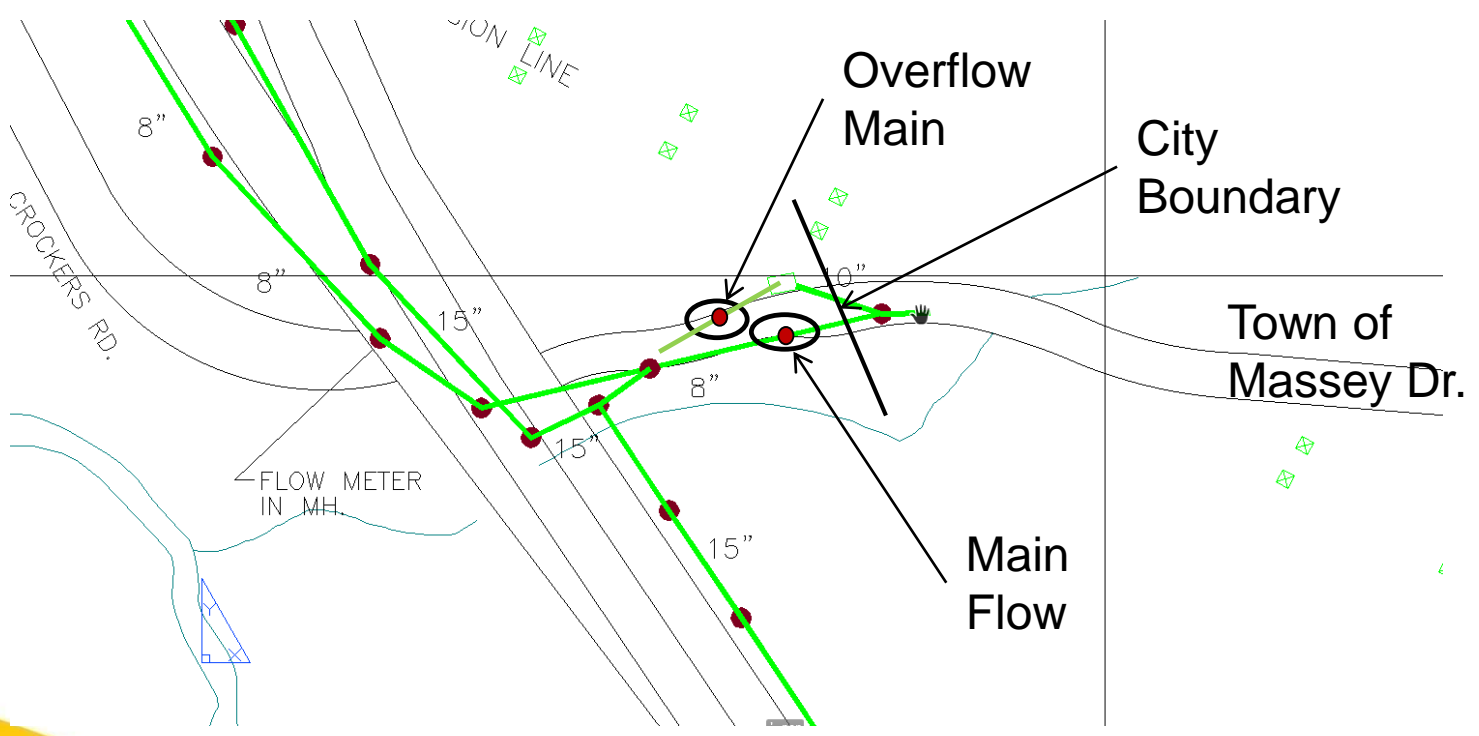


# System Maps – Site Selection





# System Maps – Site Selection





# Flow Monitoring – Equipment

- Greyline Instruments Inc.
- Ultrasonic Technology – designed for measuring flow in open channels, sewer, partially filled and surcharged pipes.
- Models
  - MantaRay, portable area-velocity flow meter
  - AVFM – II, area-velocity flow meter
  - AVFM – 5.0, area-velocity flow meter





# Flow Monitoring – Equipment

Outfalls/Basins F & G

Outfall/Basin K (BioGreen)

MantaRay  
Portable  
Flow Meter  
AVFM



AVFM – II

UPS







# Flow Monitoring – Equipment

City Boundary - Massey Dr.





# Flow Monitoring – Equipment

- S.S. sensor mounting bands in various sizes 150mm to 1800 mm (6” to 72”) dia.
- S.S. hydraulic dam band 200mm (8”) dia. (Massey Dr. overflow & Bio-Green)
- S.S. band adjustment jack (bands 250mm (10”) dia. & larger)





# Flow Monitoring – Equipment

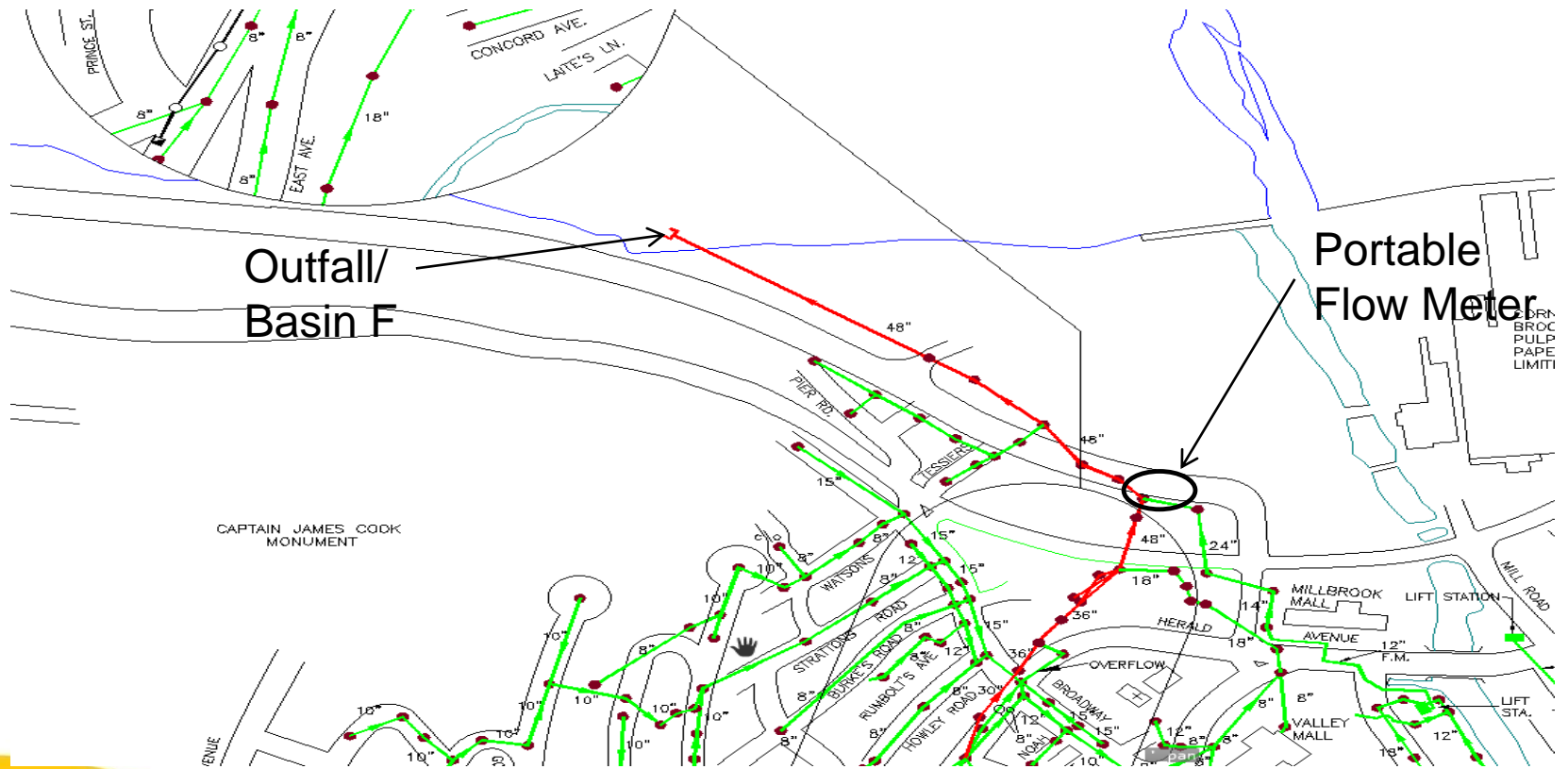
- MantaRay portable meter sensor cable extension 50ft. (15m)







# Flow Monitoring - Location # 1







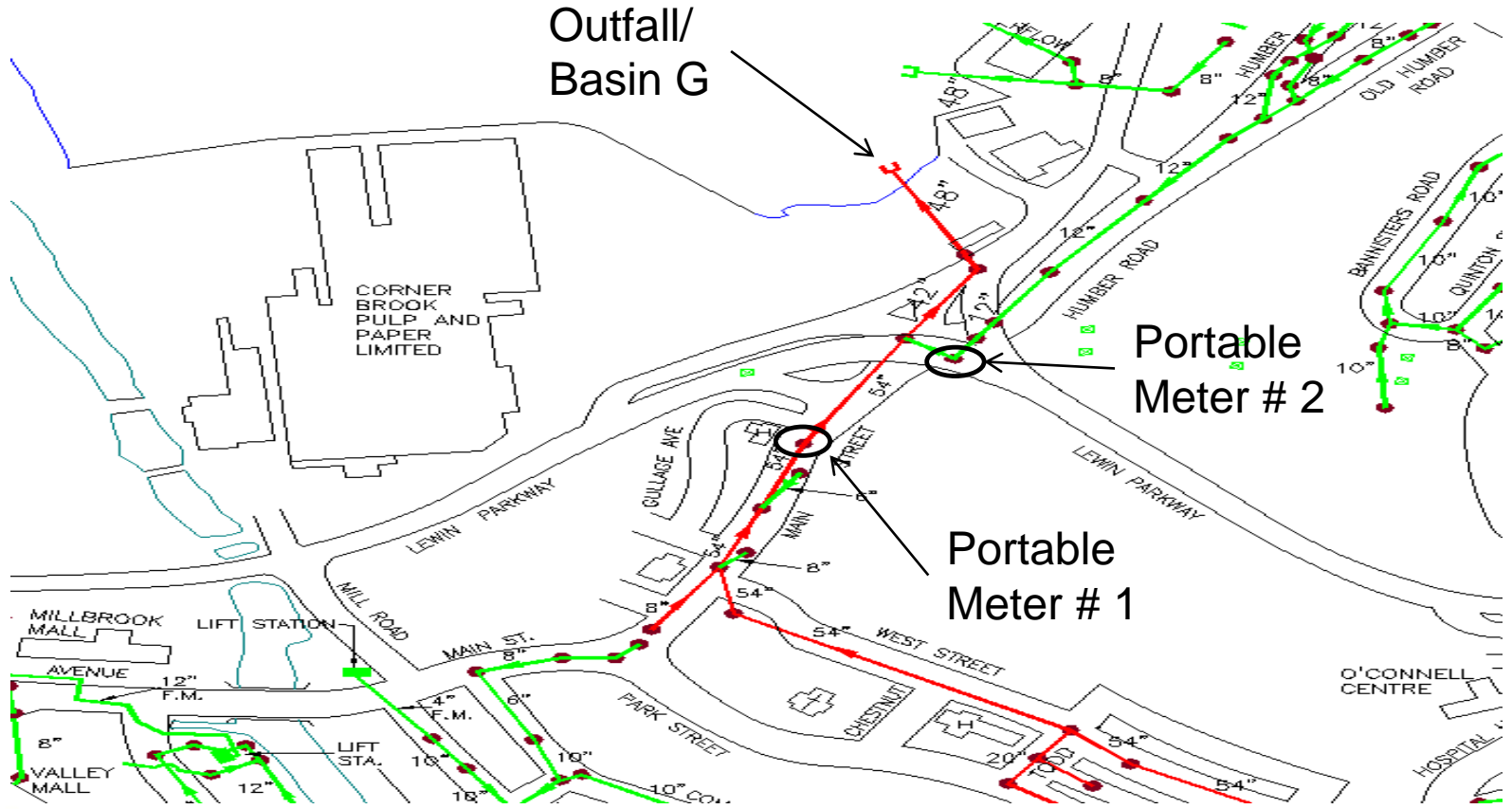
# Flow Monitoring - Location # 1

## MantaRay Portable Flow Meter





# Flow Monitoring - Location # 2







# Flow Monitoring - Location # 2

## MantaRay Portable Flow Meter # 1





# Flow Monitoring - Location # 2

## MantaRay Portable Flow Meter # 1



9.5mm dia.  
Concrete  
Anchors & Eye  
Bolts

Sensor Cable



Tether  
Cables





# Flow Monitoring - Location # 2

## MantaRay Portable Flow Meter # 2





# Flow Monitoring - Location # 2

## MantaRay Portable Flow Meter # 2







# Flow Monitoring – Location # 2

## MantaRay Portable Flow Meter # 2







# Flow Monitoring - Location # 2

## MantaRay Portable Flow Meter # 2







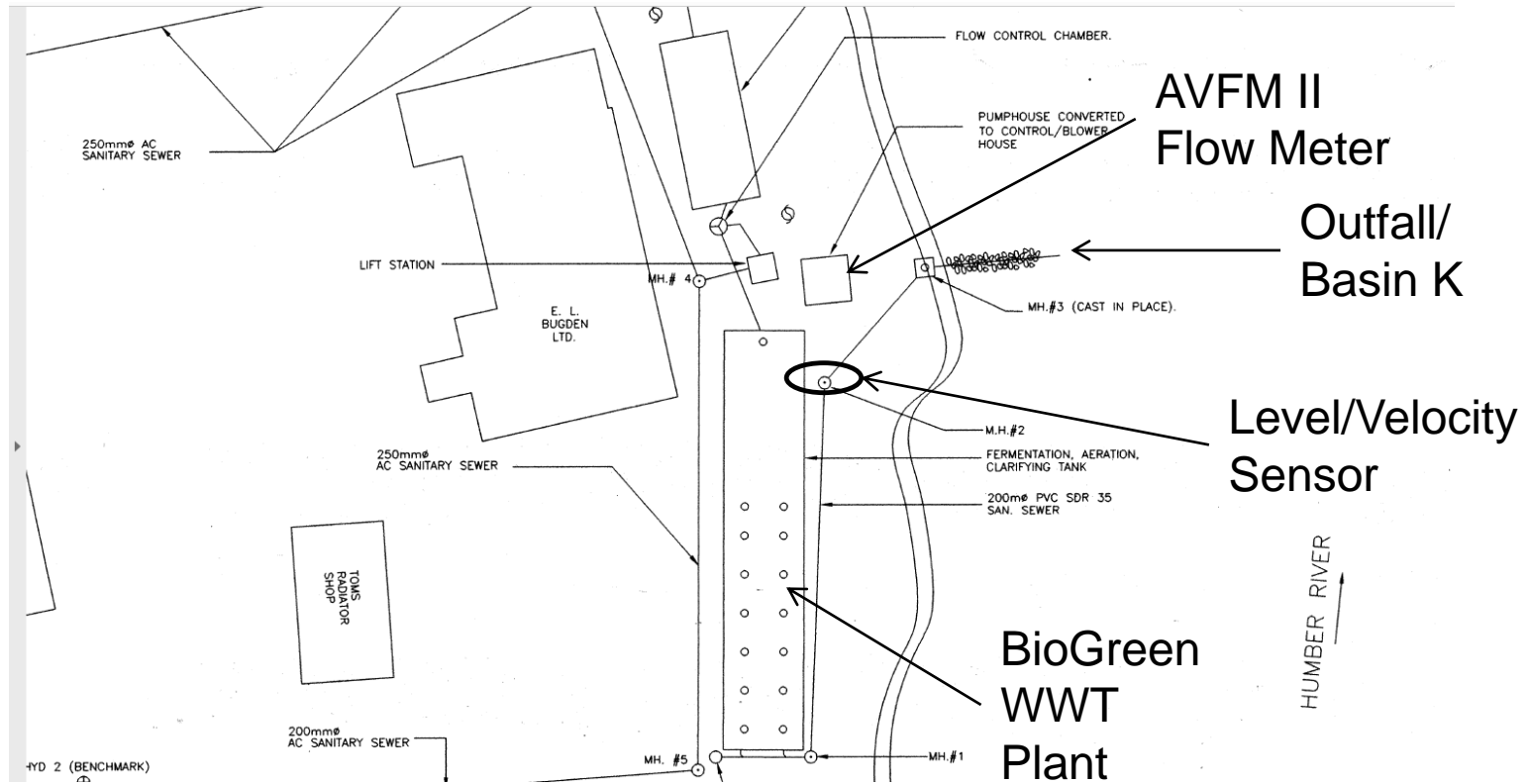
# Flow Monitoring - Location # 2

## MantaRay Portable Flow Meter # 2





# Flow Monitoring - Location # 3







# Flow Monitoring - Location # 3

## AVFM II Flow Meter







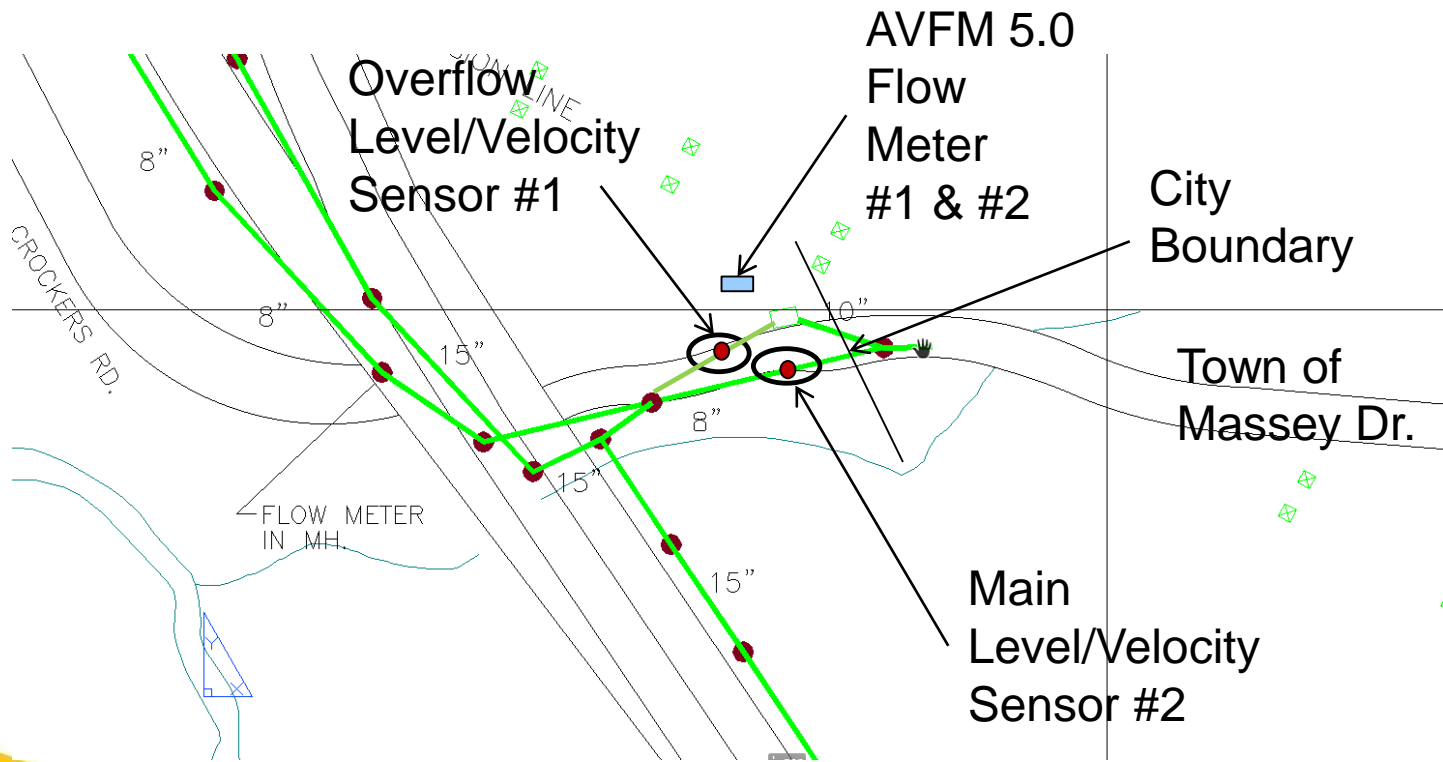
# Flow Monitoring - Location # 3

## Level/Velocity Sensor





# Flow Monitoring - Location # 4

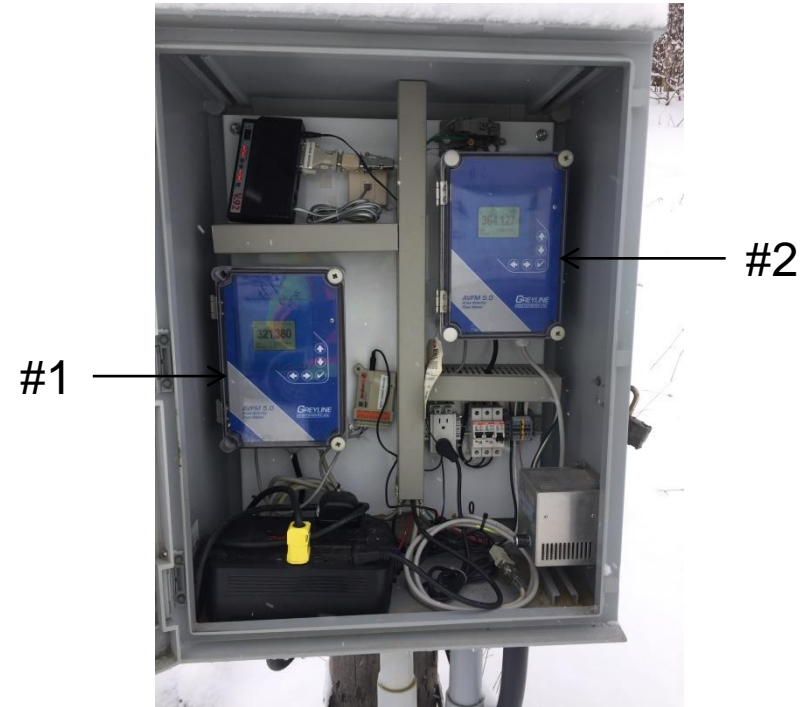






# Flow Monitoring - Location # 4

## AVFM 5.0 Flow Meter # 1 & # 2







# Flow Monitoring - Location # 4 Level/Velocity Sensor # 2





# Flow Monitoring - Location # 4

## Level/Velocity Sensor # 2







# Data Logging

- Manual records
- Portable flow meter Internal data logger
- Remote monitoring external data logger





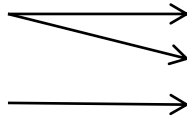
# Data Logging – Manual Records

- Recorded daily

Massey Dr.

Basin K

BioGreen



**The City of Corner Brook**  
Flow Meter Chambers

Daily Meter Readings

	CHECK LIST	TIME CHECKED	WORK DESCRIPTION	Weekly Chamber Inspection Y/N	Confined Space if yes Confined Space Entry Procedure must be followed	Type of Rescue Plan
<b>Route 1</b>						
1	Massey Drive Crocker's Road Water Flow Meter	9:25 <sup>91</sup>	Flow L/Min = 275.1 Total M <sup>3</sup> = 2312073	Yes Check if complete <input type="checkbox"/>	Yes	Tri-Pod
2	Crockers Road Water Flow Meter (18")	9:28 <sup>92</sup>	Flow L/Min = 1972 Total M <sup>3</sup> = 6302177	No	No	
3	Crockers Road Water Flow Meter (20")	9:30 <sup>93</sup>	Flow L/Min = 13090 Total M <sup>3</sup> = 5342458	No	No	
4	Massey Drive Sewer Flow Meter #1	9:30 <sup>94</sup>	Flow L/Min = 140.618 Total L = 110886388	Yes Check if complete <input type="checkbox"/>	Yes	Tri-Pod
5	Massey Drive Sewer Flow Meter #2	9:30 <sup>95</sup>	Flow L/Min = 414.279 Total L = 1018490980	Yes Check if complete <input type="checkbox"/>	Yes	Tri-Pod
6	Bio Green Wastewater Treatment Riverside Drive	11:00 <sup>96</sup>	Flow L/Min = 18.01 Total L = 98417644	Yes Check if complete <input type="checkbox"/>	Yes	Tri-Pod
7	Blomidon Country Club West Valley Road (Meter Chamber) During open season	9:20 <sup>97</sup>	Flow L/Min = - Total M <sup>3</sup> = 292761	Yes Check if complete <input type="checkbox"/>	Yes	
8	WRRH West Valley Road (Meter Chamber)	9:00 <sup>98</sup>	Flow L/Min = 382.6 Total M <sup>3</sup> = 1479149	Yes Check if complete <input type="checkbox"/>	Yes	Tri-Pod
<b>Route 2</b>						
1	ML Moriah Water Flow Meter	9:40AM	Flow L/Min = 374.2 Total M <sup>3</sup> = 824091.55	Yes Check if complete <input type="checkbox"/>	Yes	Tri-Pod
2	Mill Meter 10 main Street (Meter Chamber & Display Cabinet)	8:20 <sup>99</sup>	Flow L/Min = 0 Total M <sup>3</sup> = 0	Yes Check if complete <input type="checkbox"/>	Yes	Tri-Pod
3	Corner Brook Port Gearyville Road (Meter Chamber)	10:35 <sup>100</sup>	Flow L/Min = 190.4 Total M <sup>3</sup> = 17836.6	Yes Check if complete <input type="checkbox"/>	Yes	Tri-Pod

DATE: \_\_\_\_\_ SIGNATURE: \_\_\_\_\_


NOTE: Daily readings do not require Confined Space Entry. Weekly inspections require Confined Space Entry as indicated.

Revised January 9 2020



# Data Logging - MantaRay Portable Flow Meter, Internal Data Logger

- Downloaded bi-weekly
- 2 million point data capacity
- 15 min. logging interval
- USB memory stick
- Open data file with Greyline Logger V2.90 software to create data table & graph
- Export to Microsoft Excel



Sleep Mode Interval	Battery Life
Continuous	60 hours
30 sec	6 days
1 min	10 days
2 min	18 days
5 min	38 days
10 min	52 days
15 min	74 days
30 min	90 days
1 hr	110 days



# Data Logging– MantaRay Portable Flow Meter, Internal Data Logger

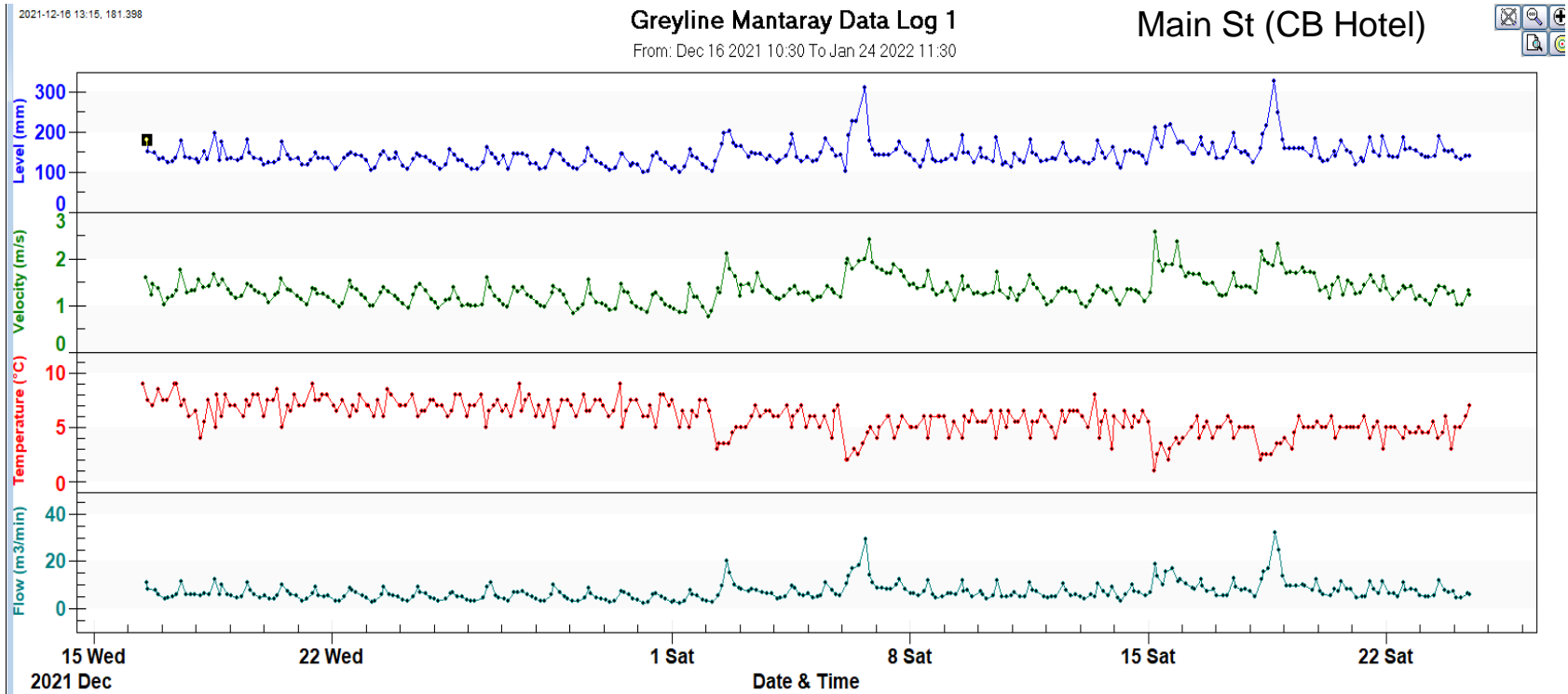


1 Greyline MantaRay Data Log 1- Main St (CB Hotel)					
2 From: Dec 16 2021 10:30 To Jan 24 2022 11:30					
3					
4	Date and Time	Level (mm)	Velocity (m/s)	Temperature (°C)	Flow (m3/min)
5					
6	2021-12-16 10:30	140.098	1.418	9	6.749
7	2021-12-16 10:45	128.299	1.428	9	5.973
8	2021-12-16 11:00	134.499	1.404	9	6.294
9	2021-12-16 11:15	135.599	1.41	9	6.398
10	2021-12-16 11:30	138.899	1.423	9	6.688
11	2021-12-16 11:45	124.099	1.454	9	5.792
12	2021-12-16 12:00	131.599	1.449	9	6.292
13	2021-12-16 12:15	151.998	1.545	9	8.288
14	2021-12-16 12:30	178.598	1.593	7	10.814
15	2021-12-16 12:45	166.697	1.406	6	8.632
16	2021-12-16 13:00	168.999	1.545	6	9.677
17	2021-12-16 13:15	181.398	1.59	6	11.043
18	2021-12-16 13:30	175.399	1.573	6	10.401
19	2021-12-16 13:45	181.198	1.621	6	11.24
20	2021-12-16 14:00	121.7	1.387	6	5.369
21	2021-12-16 14:15	130.599	1.439	8	6.179
22	2021-12-16 14:30	124.999	1.446	8	5.822
23	2021-12-16 14:45	129.399	1.465	9	6.205
24	2021-12-16 15:00	131.399	1.386	9	6.005
25	2021-12-16 15:15	122.3	1.427	9	5.564





# Data Logging – MantaRay Portable Meter, Internal Data Logger





# Data Logging – Remote Monitoring, Massey Drive - AVFM-5.0 Flow Meter, External Data Logger



- Downloaded monthly
- Data Logger
  - ACR SmartReader Plus 7
  - 32KB memory capacity
- 3 minute timestamp logging interval



# Data Logging – Remote Monitoring, Massey Drive - AVFM-5.0 Flow Meter, External Data Logger

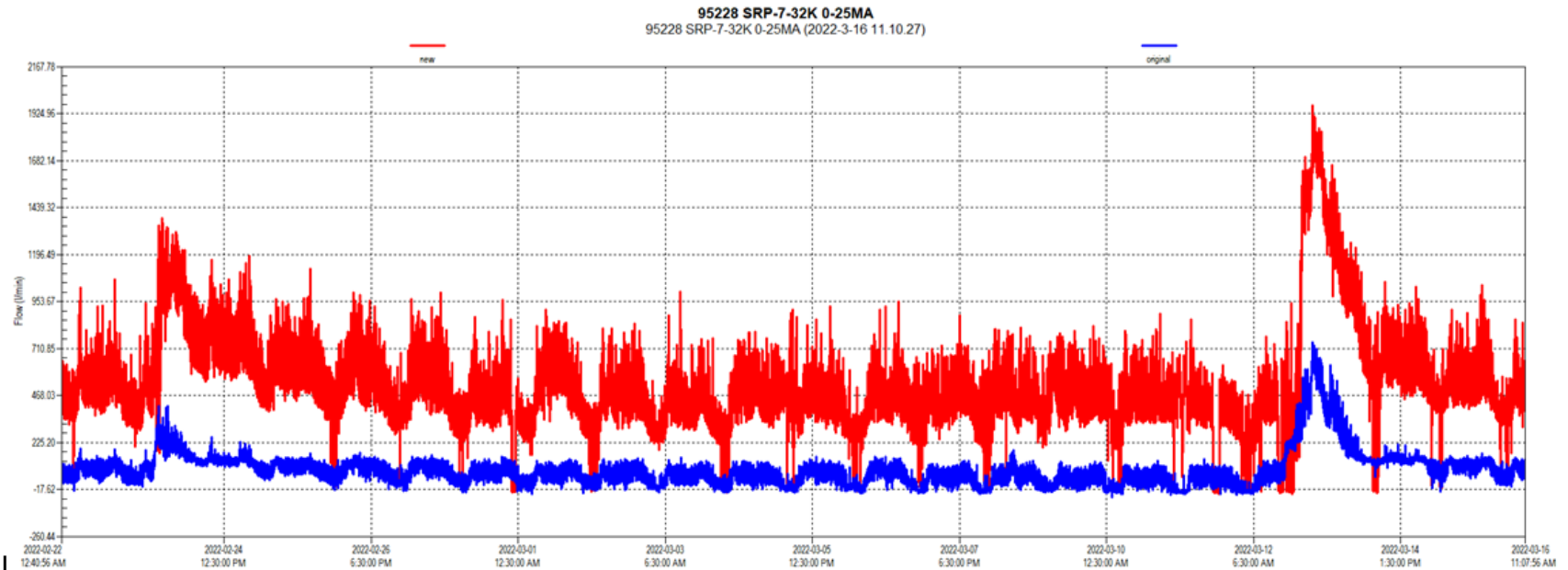
- Download log files with ACR TrendReader 2 data logger software to create data table & graph

	A	B	C	D
1	Timestamp	Main l/mi	Overflow l/min	
2	2022-02-22 0:40	515.22	110.29	
3	2022-02-22 0:43	458.91	82.23	
4	2022-02-22 0:46	416.67	58.84	
5	2022-02-22 0:49	393.2	44.81	
6	2022-02-22 0:52	430.75	35.45	
7	2022-02-22 0:55	501.14	44.81	
8	2022-02-22 0:58	458.91	91.58	
9	2022-02-22 1:01	646.63	58.84	
10	2022-02-22 1:04	487.07	114.97	
11	2022-02-22 1:07	435.44	91.58	
12	2022-02-22 1:10	388.51	54.16	
13	2022-02-22 1:13	393.2	40.13	
14	2022-02-22 1:16	393.2	30.78	
15	2022-02-22 1:19	379.12	30.78	
16	2022-02-22 1:22	369.73	12.07	
17	2022-02-22 1:25	365.04	30.78	
18	2022-02-22 1:28	369.73	16.75	
19	2022-02-22 1:31	627.86	35.45	
20	2022-02-22 1:34	534	114.97	
21	2022-02-22 1:37	449.52	96.26	





# Data Logging – Remote Monitoring, Massey Drive, AVFM-5.0 Flow Meter, External Data Logger





# Cost

- MantaRay portable flow meter – \$5000.00ea.
- S.S. sensor mounting band kit (400mm to 2031mm (16” to 80”) pipe dia.)\$1,913.00ea.
- S.S. sensor mounting band – 200mm (8”) \$175.00ea., 250mm (10”) \$300.00ea. & 300mm (12”) dia. \$325.00ea.
- MantaRay portable flow sensor cable extension \$295.00ea.
- S.S. hydraulic dam band – 200mm (8”) \$185.00ea.



# Safety

- Toolbox Talk
- Pre-hazard Assessment (Site Assessment)
- PPE (Personal Protective Equipment)
- Traffic Control (Traffic Plan)
- Confined Spaced Entry (SWP & Permit)
- Fall Protection (SWP & Permit)
- Ladder Inspection Form





# Safety





# Safety







# Safety







Any Questions??



Thank You!!