



Paperless Data Collection

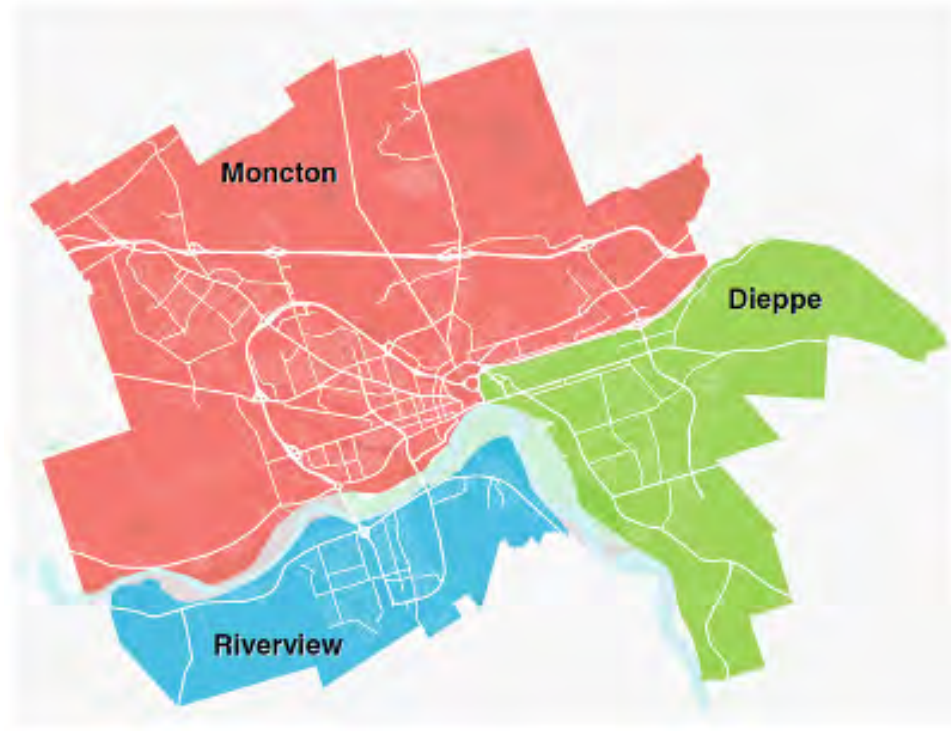
How City of Moncton staff leveraged geospatial technology to modernize and standardize data collection

Julie Stokes, Shannon Josey | October 30, 2020

Background

City of Moncton Utilities department is responsible for providing clean drinking water to the Tri-community of Moncton, Riverview, and Dieppe (pop. ~125,000).

- Water treatment- owned by City of Moncton, operated Veolia Canada
- Wastewater treatment - TransAqua (commission for the Tri-community)
- Transmission/water distribution - City of Moncton to Dieppe/Riverview boundaries



Tri-community: Moncton, Riverview, Dieppe

The Problem

COVID-19: staff working remotely, but still relying on paper processes

- Decrease in productive time
- Employee safety
- Geographic challenges (remote work stations)

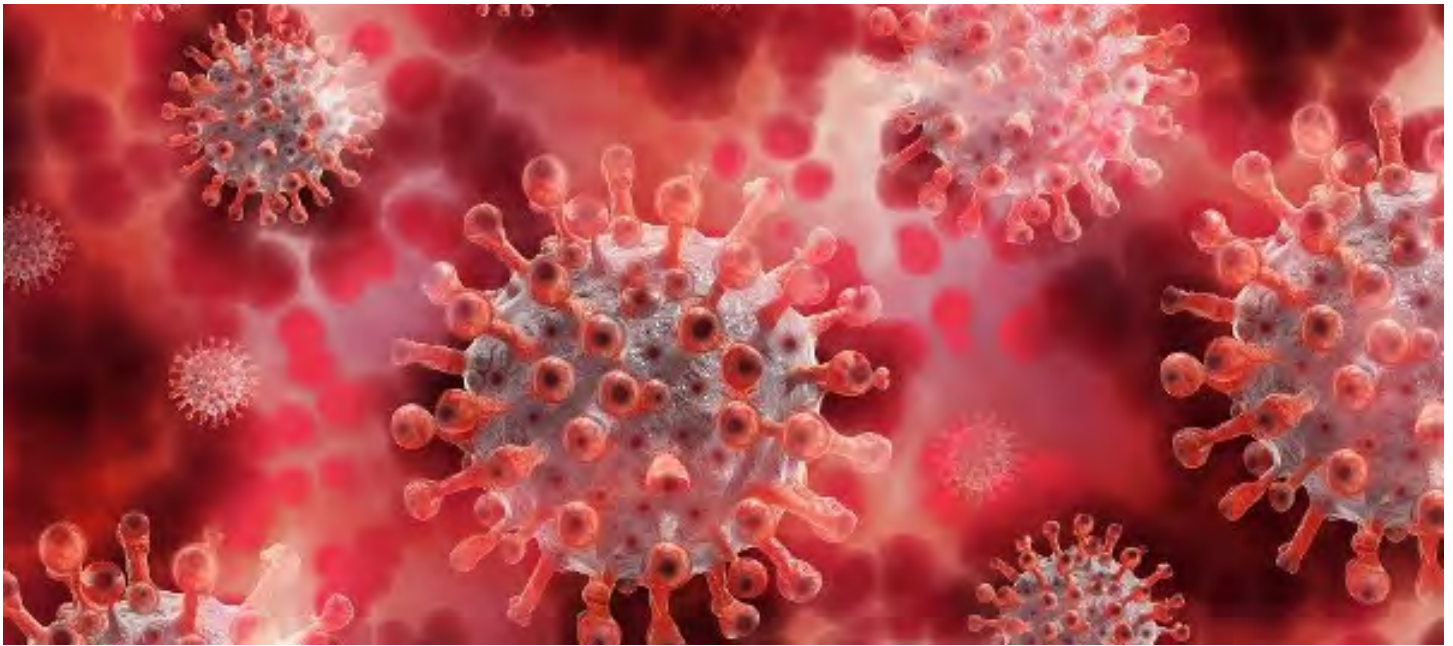
Our solution...



ESRI Apps

why ESRI apps?

- Included in our suite of offerings from GIS vendor (no added \$)
- Location based data collection
- GIS integrated
- Reliable
- Centralized data (ArcGIS Online)
- Survey123 (create form, collect data, view results)
- Dashboard (live updates - data driven)
- Workforce (assign work based on assets)
- Storymaps (this presentation)



"High Level of Touch" processes

- Chlorine residuals monitoring program (required by dept. health, twice weekly collection)
- Hazard assessment sheets
- Preventative maintenance (PM) sheets
- Valve maintenance program (4035 valves to maintain)

Chlorine Residuals Monitoring Program



The City of Moncton is regulated by the Department of Environment and Local Government, in coordination with Department of Health, to ensure that we provide clean potable water to our residents.

- Regulations to be adhered to are part of a Certificate of Approval to Operate.
- One of those requirements is that chlorine levels are maintained to prevent bacteria growth that could cause illness.

Before...

Data Collection

- 19 hydrants on dead-end streets
- Flushing/sample bi-weekly
- Paper sheet filled out by field crews
- Flushing start/end times
- Initial and resulting chlorine residuals



City of Moncton- Scheduled Flushing of Dead ends & Monitoring of Chlorine Residuals

Hydrant No.	Site/Hydrant	Freq. 2/wk.	Date	Initial c/l	Flushing		Residuals c/l	Comments
					Start	Finish		
104	610m - inside Casseus	S	10/22/20	0.37	8:30a	8:30a	0.25	
2084	Mitacuser Blvd-2nd hydr east of Errens	S	21	0.04	8:40a	9:40a	0.68	Use hose to get to CB
1001	35 Hooper Dr	S	21	0.27	9:00a	9:00a	0.27	***** Sign ****
0980	Stadium Rd - last hydr	S	21	0.09	9:20a	9:31a	0.32	
2058	57 Frederic	S	9	0.65	10:02a	10:02a	0.65	
2012	40 Glenvale	S	21	0.13	10:13a	10:16a	0.23	Use hose
0930	76 Glenvale	S	21	0.07	10:29a	10:33a	0.21	
0020	1510 Sherbrooke St - last hydr	S	21	0.13	10:42a	10:52a	0.25	
0005	28 Neville	S	21	0.09	11:15a	11:40a	0.21	
0278	604 McLaughlin	S	21	0.22	11:35a	12:35a	0.22	Use hose - run down to CB

Analysis and Reporting

- Reviewed by supervisors for deficiencies
- Manual data entry work, prone to errors
- Create graphs for monitoring
- Deficiencies difficult to monitor - cumbersome spreadsheet

The image shows a man in a suit standing in front of a large, complex spreadsheet. The spreadsheet is titled "SCHEDULED FEEDINGS OF DUCKS WITH A MONITORING OF CHICKEN FEEDBACK". It contains columns for "DATE", "TIME", "FEEDING", "FEEDING TIME", "FEEDING VOLUME", and "FEEDING COMMENTS". The man has his arms outstretched, looking at the camera. The spreadsheet is very dense with data, and the man appears to be presenting it.

Now...

	Z/W/L		d2	Start	Finish	d2	
3 - Inside Collection	S	11	0.37	8:30am	8:30am	0.37	
inside Blvd - 2nd hydr east	S	11	0.04	8:44am	9:48am	0.68	Use Note To
inside Dr	S	11	0.27	9:00am	9:00am	0.27	Use Note To
Over Rd - 4th hydr	S	11	0.09	9:28am	9:31am	0.32	
Over Rd	S	11	0.05	10:07am	10:07am	0.05	
Over Rd	S	11	0.13	10:13am	10:16am	0.23	Use Note To
Over Rd	S	11	0.07	10:29am	10:33am	0.21	
Over Rd - 1st hydr	S	11	0.13	10:42am	10:57am	0.25	
Over Rd	S	11	0.09	11:05am	11:05am	0.21	
McLaughlin	S	11					Use Note To
Over Rd - 6th hydr	S	11	0.40	12:16pm	12:16pm	0.40	
Over Rd (1st hydr)	S	11	0.27	1:48pm	1:48pm	0.27	
Over Rd	S	11	0.26	1:05pm	1:05pm	0.26	
Over Rd - 1st hydr	S	11	0.66	12:53pm	12:53pm	0.66	
Over Rd	S	11	0.16	2:24pm	2:24pm	0.16	Use Note To
Over Rd	S	11	0.06	2:00pm	2:36pm	0.62	
Over Rd	S	11	0.29	1:47pm	1:47pm	0.29	



Hydrant Number & Size *

Employee *

Whisker Number *

Date *

Printed, September 21, 2020

Initial d2 *

Printing Start *

Printing End *

Printing Link *

Printing Link *

Comments *

Using Survey123

- Recreated paper form into a web-based form
- Specified mandatory fields
- Pick lists
- Auto-populated fields
- Automated date and time fields
- Set constraints

Field staff collect data

- Using **Survey123** app (iOS or Android)
- Collect info for each hydrant
- Data uploaded in real time
- Option to collect offline



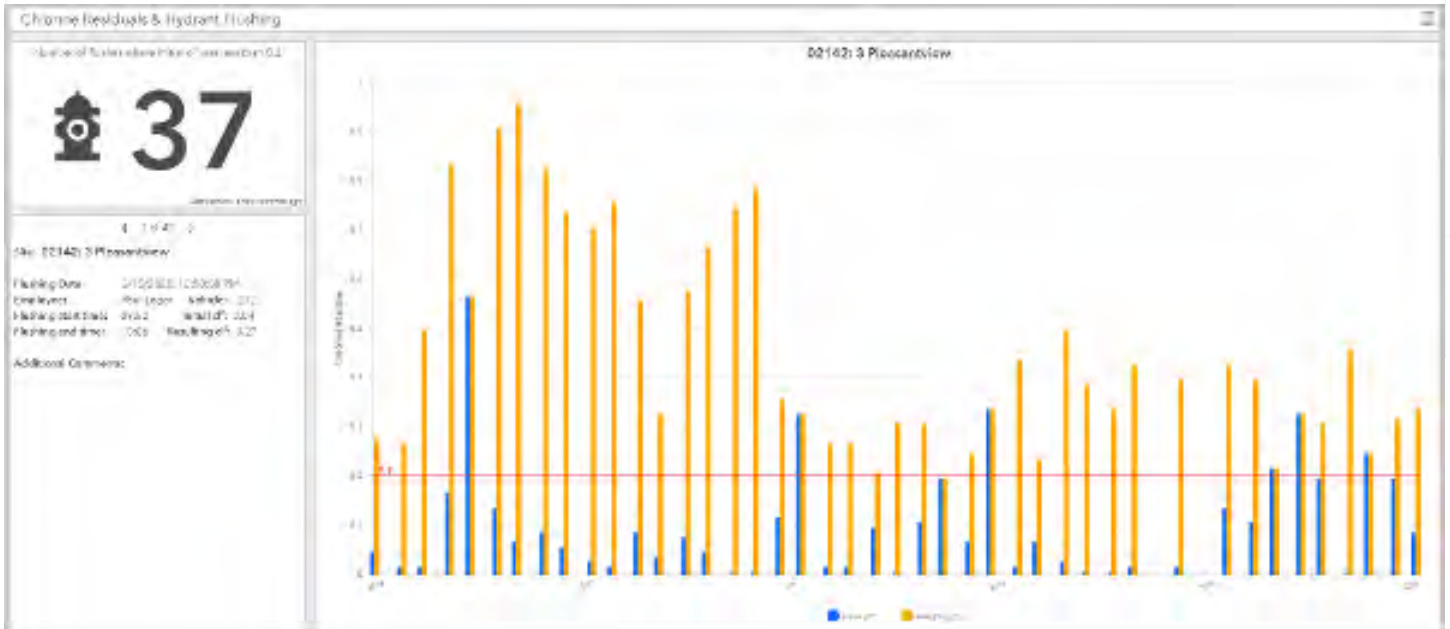
View Results

- Supervisors can view results immediately
- Query and filter
- Export data if necessary (regulation and compliance)

Hydrant Number & Site	Employee	Vehicle Number	Date	Initial c12	Flushing Start	Final c12
00738: 684 McLaughlin. Note: Use Hose - Air Gap	200644	276	Sep 25, 2020	0.21	12:24	12:12
01928: 210 Royal	200644	276	Sep 25, 2020	0.33	12:10	12:11

Dashboard

- Updated in real time as surveys come in
- Data comes directly from chlorine residuals survey
- Supervisors can quickly make informed decisions



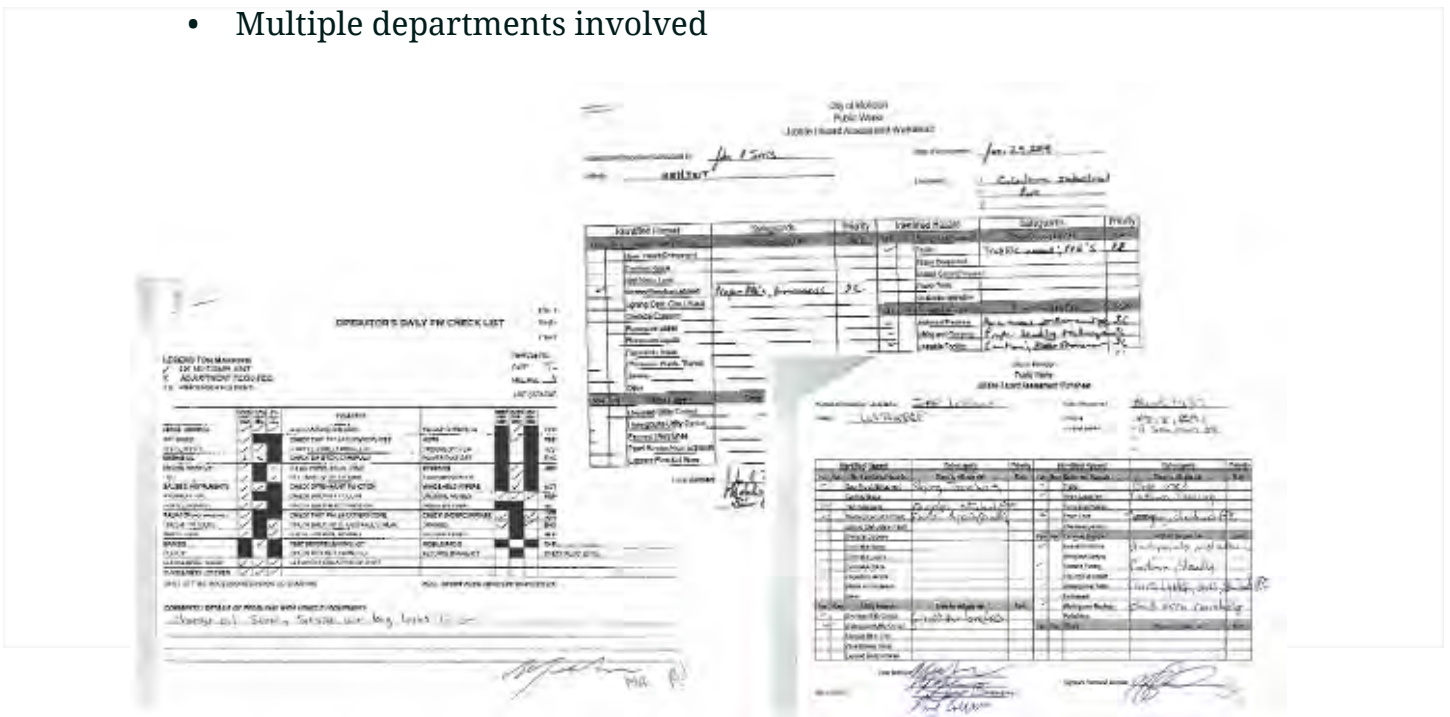
Preventative maintenance and hazard assessment sheets

- NBCSA safety requirement
- Annual audit
- Daily forms



Before...

- Field staff required to fill out on paper each day
- Piles of paper for Supervisors to review
- Incomplete or incorrect information
- Hard to read = hard to resolve problems
- Multiple departments involved



Now...

Hazard assessment

- Filled out digitally (on device)
- Centrally located data - no paper chasing
- Appropriate steps to mitigate risk
- Makes audit submission efficient
- Create pdf export when needed

8:37 AM Thu Oct 22

Utilities Group Jobsite Hazard Assessment Worksheet

Identified Hazard & Safeguards

Environmental Hazards

Open Trench/Entrapment (2B)
Yes

Confined Space (2B)
Yes

High Noise Level (3C)
Yes

Weather (2B)
www.weather.com
● Yes

Number: 1 ✓ 2 ✓ 3 ✓ 4 ✓ 5 ✓

Steps to mitigate risk:
SWP working extreme weather, Standard PPE

Lighting (3C)
dark/light/flash
Yes

Chemical Exposure (3B)
● Yes

Number: ✓ 1 ✓ 2 ✓ 3 ✓ 4 ✓ 5 ✓

Steps to mitigate risk:
Standard PPE, gloves, eye protection, WHMIS training, MSDS Sheet, SWP Material Handling, eye wash station/portable

Vegetation Exposure (3C)
● Yes

Number: 1 2

City of Moncton - Utilities Dept
Public Works
Jobsite Hazard Assessment Worksheet

The following 4 questions must be asked of each crew member before start of shift/work.

1. Do you have any of the following symptoms: Fever/feverish, new or exacerbation of chronic cough, or difficulty breathing? no

2. Have you returned from China, Iran or Italy within the last 14 days or have you returned from any other out of country destination since March 13, 2020? no

3. Have you had close contact with a confirmed or probable Covid-19 case? no

4. Have you had close contact with a person being tested for COVID-19? no

If any persons answer YES to any of the above questions, they must immediately leave work and self isolate
If any persons answer YES to question #1, they must immediately leave work, self isolate and call 811 for an assessment.

***** Reminder of the 2m physical distancing*****

If the 2m distancing cannot be kept, employees are required to wear appropriate PPE (N95 mask, Safety Glasses and gloves)

Assessment/Inspection Conducted by: Matt Arseneau Date of Assessment: October 22, 2020

Location Number: 1 Various Activity: UWHYWT - WATER - HYD
2 Activity: CHECK-WATER/ICE
3 Activity: Activity

Identified Hazard (Priority)	Yes	Num	Environmental Hazards	Safeguards	Steps to mitigate risk	Identified Hazard (priority)	Yes	Num	Personal Hazards	Steps to mitigate risk
Open Trench/Entrapment (2B)						Auxiliary Position (3C)				Self care safety training, site housekeeping, SWP materials handling
Confined Space (2B)	Yes	1				Lifting and Carrying (3C)				
High Noise Level (3C)						Unstable Footing (2B)				
Weather (2B) (Snow/Ice/High Wind)	Yes	1				Slip Trip Fall Hazard (2B)				SWP Steps: Ties and Fall, standard PPE
Lighting (3C) (Dark, Glare, Flicker)	Yes	1				Working Near Traffic (2B)				Cones, Flashers, Standard PPE
Chemical Exposure (2B)						Fall Hazard (2A)				
Vegetation Hazards (3C)						Working Alone (2C)				
Mobile or Ped Hazards (3C)						Unsat customer (3C)				
Exposure: Wastewater (2B)										
Other:										
Yes	Num	Utility Hazards	Steps to mitigate risk	Yes	Num	Others:	Steps to mitigate risk			
		Overhead Utility Contact (2B)								
		Underground Utility Contact (2B)								
Yes	Num	Equipment Hazards	Steps to mitigate risk							
Yes	1	Tools (1B)								
		Cones, Flashers, Standard PPE								
		Heavy Equipment (1B)								
		Compressed Gases (2B)								

Preventative maintenance sheets (PM sheet)

- Centralized data easy to review by supervisor - audit submissions
- PDF format great for sharing between departments
- Issues can be quickly identified and sent to mechanical dept. for scheduling of repair

Operator's Daily PM Check List			
Employee / Vehicle Information			
Name:		Vehicle No.	
Jason Melanson		214	
Date:		Mileage:	
October 1, 2020		127869	
<i>Use separate form for towed equipment - Shut off all accessories prior to starting - Pull never push vehicles when stuck</i>			
Check all: Fire Extinguisher, First Aid kit, Registration, Insurance Card, Check MVI Date			
PM Check List			
Leaks, General			
Before Operation:	Repairs Required:	After Operation:	Repairs Required:
OK - No Complaint		OK - No Complaint	
Batteries			
Before Operation:	Repairs Required:		
OK - No Complaint			
Belts & hoses			
Before Operation:	Repairs Required:		
OK - No Complaint			
Engine Oil			
Before Operation:	Repairs Required:		
OK - No Complaint			
Engine Warm up			
Before Operation:	Repairs Required:	After Operation:	Repairs Required:
OK - No Complaint		OK - No Complaint	
Fuel			
Before Operation:	Repairs Required:	After Operation:	Repairs Required:
OK - No Complaint		OK - No Complaint	
Gauges & Instruments			
Before Operation:	Repairs Required:		
OK - No Complaint			
Lights & Signals			
Before Operation:	Repairs Required:		
	Yes		
Radiator			
Before Operation:	Repairs Required:		
OK - No Complaint			
Tires & Pressure			
Before Operation:	Repairs Required:	After Operation:	Repairs Required:
OK - No Complaint		OK - No Complaint	
Wheel Lugs			
Before Operation:	Repairs Required:	After Operation:	Repairs Required:
OK - No Complaint		OK - No Complaint	
Brakes			
Before Operation:	Repairs Required:		
OK - No Complaint			
Cleanliness inside			
Before Operation:	Repairs Required:	After Operation:	Repairs Required:
OK - No Complaint		OK - No Complaint	
Cleanliness outside			

Before Operation:	Repairs Required:	After Operation:	Repairs Required:
OK - No Complaint		OK - No Complaint	
Engine Operation			
Before Operation:	Repairs Required:		
OK - No Complaint			
Horn			
Before Operation:	Repairs Required:		
OK - No Complaint			
Steering			
Before Operation:	Repairs Required:		
OK - No Complaint			
Transmission Oil			
Before Operation:	Repairs Required:		
OK - No Complaint			
Windshield Wipers			
Before Operation:	Repairs Required:		
OK - No Complaint			
Unusual Noises			
Before Operation:	Repairs Required:	After Operation:	Repairs Required:
OK - No Complaint		OK - No Complaint	
Check Undercarriage			
Before Operation:	Repairs Required:	After Operation:	Repairs Required:
OK - No Complaint		OK - No Complaint	
Springs			
Before Operation:	Repairs Required:	After Operation:	Repairs Required:
OK - No Complaint		OK - No Complaint	

Mechanical Attention Required?	
yes	
Comments / details	
Passenger side headlight is broken	

Photo of damage / problems

Valve maintenance: closing the loop

Before...

- 4035 main valves to maintain out of 8234
- Work assigned using paper maps
- Crew efficiency
- Deficiencies sent to city dispatch
- Dispatcher creates service request
- Request sent to supervisor to assign work
- Information and requests got lost



MONCTON
10/26/2020 9:08:52 AM

Service Request - Moncton

Service Request		PRIORITY
Service Request #	5270003	MED
Request Type	UWWL	WATER VALVE
Request Date	13-Sep-2020 8:45 AM	
Call Date	13-Sep-2020 8:45 AM	
Taken By	[REDACTED]	
Inspector	[REDACTED]	
Resp. Scheduled		
Resp. Resolved/Code	17-Sep-2020 5:02 PM	COMP - COMPLETED

Customer Call

Call Time	Day Phone	Mobile Phone	EMAIL	Call
13-Sep-2020 8:47 AM	[REDACTED]			

Water coming out of the road, looks like a valve leaking

Request Location

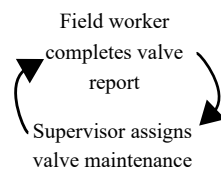
110 BREX WOOD DR
MONCTON NB

Location
Axe #
Parcel ID
Property ID



Now...

- Crews are assigned work via Workforce for ArcGIS
- Assignments are data driven (based off our up to date GIS)
- Real time progress (less duplicate work)
- Progress easily tracked by supervisors
- No need to call dispatch - freeing them up for customer service
- No paper = no lost data




Dashboard for viewing progress

Valve Maintenance Program Progress

Broken Valve Box

 ValveMaintenance

Leaks during operation

 ValveMaintenance

Remains leaking after operation

 ValveMaintenance


Valve needs cleaning

 ValveMaintenance

no self leveling top

 ValveMaintenance

Inoperable valves

 ValveMaintenance

ValveMaintenance

 ValveMaintenance

Broken Valve Box:

10

Last update: 3 minutes ago

Valve leaks during operation:

39

Last update: 3 minutes ago

valve remains leaking after

2

Last update: 3 minutes ago

Valve hard to operate:

26

Last update: 3 minutes ago

No self-leveling top:

376

Last update: 3 minutes ago

Valve inoperable:

121

Last update: 3 minutes ago

Total assignments completed: 1,415

63% complete

Remaining assignments: 843

Last update: 3 minutes ago



Benefits of going paperless

centralized and readily available data

easier reporting for compliance

eliminate data entry errors

more complete data

visualization tools

eliminate paper

reduced staff time / increased staff efficiency

reliable data

Other Paperless Projects in 2020

- Temporary water connections
- Hydrant maintenance
- Private Hydrant Inspections
- Liphook Restoration
- Valve Operating Plan



Any questions?



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