



## 2012 Summary Report

for the

Town of Minto

**HARRISTON DRINKING WATER SYSTEM**

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## **1.0 INTRODUCTION**

### **1.1 Background**

In December 2002, the Safe Drinking Water Act (SDWA) was enacted. Subsequently, on June 1, 2003, under the SDWA, a new *'Drinking-Water Systems Regulation'*, Ontario Regulation 170/03 (O. Reg. 170/03), was enacted. In addition, several supporting regulations and procedures were also enacted to assist with the administration of O. Reg 170/03. The list of relevant drinking-water legislation is presented in Appendix A.

The SDWA identifies the responsibilities of owners and operating authorities of municipal drinking water systems (SDWA, Sections 11 and 19). Their duties include ensuring that:

- All water provided by the drinking-water system meets prescribed drinking-water quality standards;
- The drinking-water system is operated in accordance with the Act and regulations and is kept in a good state of repair;
- All facilities are appropriately staffed and supervised;
- All sampling, testing and monitoring requirements are complied with;
- All reporting requirements are complied with; and
- Only persons holding valid operator's certificates operate the drinking-water-system.

O. Reg. 170/03 establishes the standard for protection of drinking water. It includes sets of Schedules, specific to municipal residential systems, that define requirements for:

- Minimum treatment levels;
- Operational checks;
- Chemical and microbiological sampling and testing;
- Adverse results reporting;
- Corrective procedures; and
- Report documentation and retention.

The system's Municipal Drinking Water Licence (MDWL) and Drinking Water Works Permit (DWWP) imposes system specific rules and conditions applicable to the standards set out in O. Reg. 170/03.

## 1.2 Objective

This Harriston Drinking Water System Summary Report is being prepared in fulfillment of Schedule 22 of O. Reg. 170/03, and will be given to Members of the Municipal Council. It covers the period from January 1, 2012 to December 31, 2012.

This Summary Report lists any requirements of the Act, the regulations, the MDWL, DWWP and any order that the system failed to meet, during the period of this report. For any such failure, the measures that were taken to correct the failure are detailed. The report also includes relevant information that will assist the members of the Municipal Council for the Town, to assess the water work's capability to meet existing and future planned uses of the system.

## 1.3 Description of Drinking Water System

Harriston is a community with a population of approximately 2108 persons, located within the Town of Minto within the northwest corner of Wellington County, at the intersection of Provincial Hwy. No. 9 and Hwy. No. 89.

Harriston is currently serviced by a waterworks that consists of: three drilled bedrock wells, three wellhouses, an elevated 1915 m<sup>3</sup> steel storage tank and a distribution network of watermains, ranging in diameter from 100 mm to 300 mm. There are approximately 77 fire hydrants in the Town of Harriston. In the event of a power outage, Wellhouse #3 is equipped with automatic back-up power supply.

The bedrock wells are equipped with submersible pumps or vertical lineshaft pumps. Water from Wells #1 and #3 discharge into Wellhouse #3, and water from Well #2 discharges into Wellhouse #2, respectively, for flow measurement and treatment. In the wellhouse, the raw water supply is injected with 12% sodium hypochlorite for disinfection and the chemical PW1680, for iron sequestering.

The wells are controlled (*start/stop*) automatically, based on elevated storage tank water levels and pressures in the distribution system. Each wellhouse is equipped with alarms for chlorination system failure (*and corresponding lockout of well pumps*), low water level and intrusion. Each wellhouse has continuous monitoring analyzers for chlorine.

The treated water leaves the wellhouse and enters an underground contact pipe and is discharged into the distribution system after adequate contact time is achieved.

The Harriston Drinking Water System operates under the MDWL 106-102 and DWWP 106-202 and PTTW #8430-85KS2X.

## **2.0 SUMMARY OF UPGRADES**

### **2.1 Upgrades Completed in 2012**

The disinfection treatment system in the Harriston Drinking Water System meets all of the standards imposed by O. Reg. 170/03 and the MOE's "*Procedures for Disinfection of Drinking Water in Ontario*".

Typically, maintaining the system includes repairs and/or replacement of individual components as necessary. In 2012, \$4,200.00 was spent on panel view upgrades, \$3,500.00 on racking for storage and \$10,300.00 on preparations for the Queen St. watermain replacement.

Preventative maintenance measures are being followed to ensure proper operation of the Drinking Water System.

### **2.2 Upgrades Scheduled to be Completed in 2013**

In 2013, the Town of Minto is planning to upgrade the flow controls in the pumphouse for an estimated cost of \$10,000.00, as well as replace watermain on George St for approximately \$150,000.00 and watermain installation on Queen St. behind Murphy's at an estimated cost of \$25,000.00. Valve replacements at an estimated cost of \$5,000.00 will also be done.

In 2013 the following will be purchased to be shared within the water department.

Two new vehicles will be purchased for approximately \$90,000.00. Upgrades will be made to the SCADA system at an estimated cost of \$30,000.00. Water meters will start being installed in homes at an estimated cost of \$500,000.00.

## **3.0 OPERATION OF THE DRINKING WATER SYSTEM**

### **3.1 Summary of the Quantities and Flow Rates of Water Supplied**

O. Reg. 170/03 stipulates that a summary of the quantities and flow rates of the water supplied from each of Harriston's wells be included in the Summary Report. Tables 3.1, 3.2 and 3.3 provide a summary of quantities and flow rates supplied during 2012 for Wells #1, #2 and #3 respectively, on a monthly basis. Well #1 is located in the Young Street Wellhouse, but the raw water is directed to the King Street Wellhouse for treatment. As such, raw supplies from Well #1 and Well #3 are treated in the King Street Wellhouse, and raw water supply from Well #2 is treated in the John Street Wellhouse.

**Table 3.1**  
**Harriston Drinking Water System – Well #1**  
**Treated Water Flow, Turbidity, and Disinfectant Residual**  
**January 1, 2012 – December 31, 2012**

	Raw Water Flow (Max Flow Rate = 11.3 L/s)			Chlorine	Monthly Averages				Distribution System Disinfectant	
					Treated Water Turbidity		Treated Water Disinfectant			
Month	Instantaneous Peak Flow (L/s)	Maximum Day Flow (m <sup>3</sup> /day)	Monthly Total (m <sup>3</sup> )	Monthly Total (L)	No. of Samples Collected	Daily Average Turbidity	No. of Treated Samples Collected	Average Residual (mg/L)	No. of Dis. Samples Collected	No. of Samples with Detectable Residual
January	9.6	83	1,236	47	8	0.55	30	1.28	See Harriston Well #3 Data	
February	9.5	149	1,080	20	6	0.50	29	1.27		
March	9.6	178	1,272	27	7	0.70	30	1.23		
April	9.5	87	1,234	40	2	0.59	28	1.19		
May	9.5	187	1,299	14	6	0.44	30	1.17		
June	9.5	140	1,205	40	2	0.53	30	1.14		
July	9.5	88	1,286	0	6	0.34	32	1.12		
August	9.5	88	1,351	31	7	0.5	30	1.15		
September	9.5	104	1,128	20	5	0.43	30	1.16		
October	9.6	80	1,352	40	3	0.37	32	1.21		
November	9.6	90	1,107	38	9	0.38	29	1.24		
December	9.7	90	1,392	20	2	0.38	30	1.24		
<b>Total</b>			<b>14,942</b>	<b>337</b>	<b>63</b>		<b>360</b>			
<b>Average</b>			<b>1,245</b>			<b>0.48</b>		<b>1.20</b>		
<b>Maximum</b>	<b>9.7</b>	<b>187</b>								

Disinfectant Compound Used: **12% Sodium Hypochlorite**  
 Form of Residual Displayed: **Free**  
 Quantity of Disinfectant Used During 2012: **337 L**  
 Distribution System Target Residual: **0.2 mg/L**

**Table 3.2**  
**Harriston Drinking Water System – Well #2**  
**Treated Water Flow, Turbidity, and Disinfectant Residual**  
**January 1, 2012 – December 31, 2012**

	Raw Water Flow (Max Flow Rate = 23.9 L/s)			Chlorine	Monthly Averages				Distribution System Disinfectant	
	Average Day Flow	Maximum Day Flow	Monthly Total		Monthly Total	Treated Water Turbidity		Treated Water Disinfectant		No. of Dis. Samples Collected
Month	(L/s)	(m <sup>3</sup> /day)	(m <sup>3</sup> )	(L)	No. of Samples Collected	Daily Average Turbidity	No. of Treated Samples Collected	Average Residual (mg/L)		
January	18.6	469	11,099	297	8	0.79	30	1.11	See Harriston Well #3 Data	
February	18.6	797	12,859	306	8	0.73	29	1.24		
March	18.7	797	13,262	331	7	0.86	31	1.11		
April	18.7	870	12,585	484	2	0.71	28	1.1		
May	18.8	862	13,512	394	5	0.67	32	1.1		
June	18.7	843	12,429	262	3	0.49	30	1.18		
July	18.7	661	13,156	394	6	0.66	32	1.24		
August	18.7	599	13,143	572	6	0.65	32	1.17		
September	18.5	576	10,769	351	5	0.68	31	1.26		
October	18.7	804	14,608	453	4	0.62	32	1.23		
November	18.7	725	11,446	322	8	0.53	30	1.2		
December	18.7	725	11,888	348	4	0.66	30	1.21		
<b>Total</b>			<b>150,756</b>	<b>4,514</b>	<b>66</b>		<b>367</b>			
<b>Average</b>			<b>12,563</b>			<b>0.67</b>		<b>1.18</b>		
<b>Maximum</b>	<b>18.8</b>	<b>870</b>								

Disinfectant Compound Used: **12% Sodium Hypochlorite**  
 Form of Residual Displayed: **Free**  
 Quantity of Disinfectant Used During 2012: **4,514 L**  
 Distribution System Target Residual: **0.2 mg/L**

**Table 3.3**  
**Harriston Drinking Water System – Well #3**  
**Treated Water Flow, Turbidity, and Disinfectant Residual**  
**January 1, 2012 – December 31, 2012**

	Raw Water Flow (Max Flow Rate = 18.9 L/s)			Chlorine	Monthly Averages				Distribution System Disinfectant	
	Instantaneous Peak Flow (L/s)	Maximum Day Flow (m <sup>3</sup> /day)	Monthly Total (m <sup>3</sup> )		Treated Water Turbidity		Treated Water Disinfectant		No. of Dis. Samples Collected	No. of Samples with Detectable Residual
Monthly Total (L)				No. of Samples Collected	Daily Average Turbidity	No. of Treated Samples Collected	Average Residual (mg/L)			
January	16.1	661	20,492	433	8	0.37	30	1.26	49	49
February	16.5	859	16,340	280	6	0.49	29	1.24	43	43
March	16.3	780	17,357	404	6	0.47	31	1.27	49	49
April	16.4	820	16,834	320	2	0.34	28	1.26	47	47
May	16.3	872	15,930	340	7	0.37	30	1.26	46	46
June	16.5	811	17,061	380	3	0.33	30	1.12	45	45
July	16.7	977	22,326	473	5	0.34	32	1.09	50	50
August	16.7	1070	20,336	502	3	0.52	31	1.24	48	48
September	16.6	759	14,904	353	5	0.49	31	1.20	42	42
October	16.7	755	16,320	322	4	0.33	32	1.21	46	46
November	16.8	1185	17,511	365	8	0.36	30	1.16	50	50
December	16.7	651	14,671	332	4	0.33	29	1.16	39	39
<b>Total</b>			<b>210,082</b>	<b>4,504</b>	<b>61</b>		<b>363</b>		<b>554</b>	<b>554</b>
<b>Average</b>			<b>17,507</b>			<b>0.40</b>		<b>1.21</b>		
<b>Maximum</b>	<b>16.8</b>	<b>1,185</b>								

Form of Residual Displayed: **Free**  
 Quantity of Disinfectant Used During 2012: **4,504 L**  
 Distribution System Target Residual: **0.2 mg/L**



**Table 3.4**  
**Harriston Drinking Water System – Well #1 & 3 Combined**  
**Treated Water Flow**  
**January 1, 2012 – December 31, 2012**

Month	Treated Water Flow Max Daily Volume = 1309 m <sup>3</sup> /d Max Flow Rate = 11.3 L/s Well # 1 = 18.9 L/s Well # 3				Chlorine
	Instantaneous Peak Flow (L/s)		Maximum Day Flow	Monthly Total	Monthly Total
	Well # 1	Well # 3	(m <sup>3</sup> /day)	(m <sup>3</sup> )	(l)
January	9.6	16.1	661	21,728	480
February	9.5	16.5	859	17,420	300
March	9.6	16.3	780	18,629	431
April	9.5	16.4	820	18,068	360
May	9.5	16.3	872	17,229	354
June	9.5	16.5	811	18,266	420
July	9.5	16.7	977	23,612	473
August	9.5	16.7	1,070	21,687	533
September	9.5	16.6	759	16,032	373
October	9.6	16.7	755	17,672	362
November	9.6	16.8	1,185	18,618	403
December	9.7	16.7	651	16,063	352
<b>Total</b>				<b>225,024</b>	<b>4,841</b>
<b>Average</b>				<b>18,752</b>	
<b>Maximum</b>	<b>9.7</b>	<b>16.8</b>	<b>1,185</b>		

### 3.2 Comparison of Actual Flow and Maximum Allowable Rates

O. Reg. 170/03 stipulates that a summary of the quantities and flow rates of the water supplied from each of Harriston's wells be included in the Summary Report and compared against the rated capacity and flow rate for the system. As such, a comparison of the instantaneous peak flow to the PTTW's rated capacity is included and a comparison of the maximum daily flow to the MDWL's rated capacity is included in Table 3.5. Table 3.4 reflects the comparisons between the PTTW and MDWL.

**Table 3.5**  
**Comparison of Flow Rates and Flow Capacities**  
**To**  
**Rated Flow Rate (PTTW) and Rated Capacity (MDWL)**

Well Supply	PTTW Max. Flow Rate	Instantaneous Peak Flow	Percent of Maximum Allowable	MDWL Schedule C Maximum Daily Quantity	PTTW Maximum Daily Flow Allowed	Maximum Daily Flow	Percent of Maximum Allowable
	L/s	L/s	%	m <sup>3</sup> /day	m <sup>3</sup> /day	m <sup>3</sup> /day	%
Well #1	11.33	9.7	85	2,613	979	187	19
Well #3	18.92	16.8	89		1,634	1185	73
Well #2	23.90	18.8	78	2,065	2,065	870	42

The MDWL stipulates, “The maximum daily volume of treated water that flows from the treatment subsystem to the distribution system shall not exceed the value identified as the rated capacity in Schedule C Table 1.”

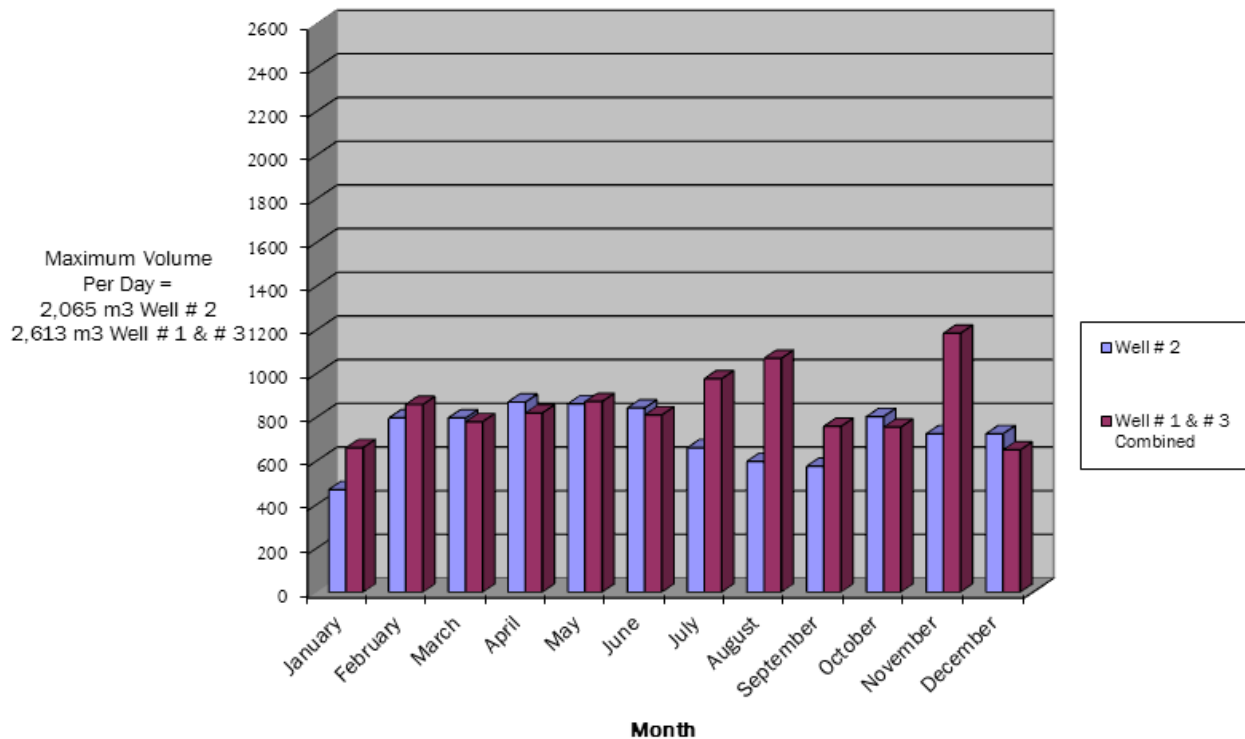
**Table 3.6**  
**Comparison of Flow Rates To Rated Flow Rate (PTTW)**

Well Supply	PTTW Max. Flow Rate	Maximum Instantaneous Peak Flow	Percent of Maximum Allowable
	L/s	L/s	%
Well #1	11.33	9.7	86
Well #3	18.92	16.8	89
Well #2	23.90	18.8	78

**Table 3.7**  
**Comparison of Flow Capacities To Rated Capacity (MDWL)**

Well Supply	MDWL Maximum	Maximum Daily Flow	Percent of Maximum Allowable
	m <sup>3</sup> /day	m <sup>3</sup> /day	%
Well #1 & # 3	2,613	1,185	45
Well #2	2,065	870	42

**Table 3.8**  
**Maximum Water Usage Per Day by Month**



Short-term peaks, in excess of permitted values, may occur at pump start up, while doing specific maintenance procedures or during emergency demand situations. An occurrence of this nature is not considered an exceedance.

The time and duration of any flow exceedance is recorded for each event along with the reason for the occurrence. There were **no exceedances** of the allowable flow rates in the Harriston Drinking Water System.

### 3.3 Raw Water Quality and Required Treatment

The Harriston Drinking Water System has one naturally occurring chemical parameter that exceeds MAC or IMAC limits; it is iron. The Harriston Drinking Water System uses PW1680 to improve the disinfection process by controlling corrosion in water that is considered very hard and or contains high levels of iron.

The Harriston Drinking Water System utilizes continuous monitoring analyzers for free chlorine residual. The chlorine analyzer is equipped with an alarm. In the event of an adverse chlorine residuals reading, a signal is sent to the SCADA system, which in turn, shuts down the respective well pump. The average monthly turbidity and free chlorine residual measurements for treated water are presented in Tables 3.1, 3.2 and 3.3 for Well #1, Well #2 and Well # 3, respectively.

There were no high turbidity readings ( $>1.0$  NTU) experienced during 2012. The minimum, maximum and average turbidity readings for raw water from each well are presented in Table 3.9.

12% sodium hypochlorite is the disinfectant used. Free chlorine residual is monitored continuously at the “Point of Entry” (POE) into the distribution system. Additional “grab samples” are taken daily (*excluding weekends and holidays*) within the distribution system and tested for the free chlorine residual. The minimum, maximum and average values of free chlorine residual at the POE are presented Table 3.5. Also included in Table 3.5 is the range of free chlorine residual within the distribution system.

The free chlorine residual in the distribution system ranged between 0.40 mg/L and 1.50 mg/L. O. Reg. 170/03, Schedule 1-2 stipulates that the free chlorine residual can never be less than 0.05 mg/L. In addition, O. Reg. 170-03, Schedule 1-4 stipulates that the water treatment equipment must be “...capable of achieving, at all locations within the distribution system, a free chlorine residual of 0.2 mg/L ...”. The Harriston Drinking Water System meets both of these requirements.

**Table 3.9**  
**2012 Annual Summary of**  
**Raw Water Turbidity and Free Chlorine Residual**  
**for Harriston Drinking Water System**

Location	Range	Raw Water Turbidity	Free Chlorine Residual at POE
		NTU	mg/L
Well #1	Minimum	0.00	0.73
	Maximum	0.87	1.86
	Average	0.43	1.20
Well #2	Minimum	0.09	0.02
	Maximum	0.84	1.51
	Average	0.38	1.18
Well #3	Minimum	0.01	0.73
	Maximum	0.86	1.81
	Average	0.42	1.21

### 3.4 Summary of Treatment Chemicals Used

The disinfectant chemical used in the Harriston Drinking Water System is 12% Sodium Hypochlorite. Measurements of free chlorine are recorded on a continuous basis. In 2012, 4,851 L of 12% Sodium Hypochlorite was used. The average dosage rates are presented in Table 3.10.

In 2012, 482 L of PW1680 was used for the sequestering of iron. Wells #1 and #3 share a common tank of PW1680. The average dosage rates are presented in Table 3.10.

**Table 3.10**  
**2012 Annual Summary of**  
**Treatment Chemicals Used**  
**for Harriston Drinking Water System**

Treatment Chemical	Well	Volume Used	Mass Used	Annual Flow	Dosage Rate
		L	kg	m <sup>3</sup>	mg/L
12% Sodium Hypochlorite	Well #1	337	40.4	14,942	2.71
	Well # 2	4,514	541.7	150,756	3.59
	Well # 3	4,504	540.5	210,082	2.57
	<b>Total</b>	<b>4,851</b>	<b>582.1</b>	<b>375,780</b>	<b>1.55</b>
PW1680	Well #1 & Well #3	285	395.6	225,024	1.76
	Well # 2	198	274.5	150,756	1.82
	<b>Total</b>	<b>482</b>	<b>670.2</b>	<b>375,780</b>	<b>1.78</b>

**Note:**

- 12% Sodium Hypochlorite = 120,000 mg/L = 120 kg/m<sup>3</sup>
- PW1680 has a specific gravity = 1.4

## 4.0 COMPLIANCE

### 4.1 Assessment of Compliance

The objective of the Summary Report is to list any requirements of the Act, the regulations, the MDWL, the DWWP and any MOE order that the system failed to meet from January 1, 2012 to December 31, 2012, and the corresponding corrective measure(s) taken. Compliance was assessed as follows:

- There were **no MOE Orders** issued to the Harriston Drinking Water System in 2012.
- The MDWL imposes the specific rules and conditions governing the standards set out in O. Reg. 170/03. It is an important instrument in defining the requirements of

compliance of a Drinking Water System. A detailed 'checklist' was developed, based on the terms and conditions of the MDWL and DWWP for the Harriston Drinking Water System.

- O. Reg. 170/03 establishes the standard for protection of drinking water; specifically, through 12 schedules that municipal residential drinking systems must follow to meet the requirements of the regulation.
- The SDWA identifies the responsibilities of owners and operating authorities of municipal drinking water systems. It places a recommended statutory standard of care on those who have oversight of municipal drinking-water systems. In essence, the standard of care has two themes: be informed and exercise diligent oversight.

#### 4.2 Summary of Compliance

To the best of our knowledge and ability we are in, or diligently working towards, compliance with all of the requirements of the SDWA, O. Reg. 170/03, as well as the Harriston Water Work's MDWL 106-102, DWWP 106-202 and PTTW #8430-85KS2X. Every attempt has been made to ensure this document is an accurate representation of how the Drinking Water System is operated.

To the best of our knowledge, Table 4.1 identifies all of the requirements of the SDWA, the regulations, the MDWL, the DWWP and the PTTW.

**Table 4.1  
 HARRISTON DRINKING WATER SYSTEM  
 Requirements the System Failed to Meet**

<b>Compliance With</b>	<b>Description of Item the System Failed to Meet</b>	<b>Correction of This Situation How/When</b>
<b>MDWL # 106-102</b>	<i>Harriston Drinking Water System is in compliance with all of the requirements of the MDWL</i>	
<b>DWWP # 106-202</b>	<i>Harriston Drinking Water System is in compliance with all of the requirements of the DWWP</i>	
<b>O. Reg. 170/03</b>	<i>Harriston Drinking Water System is in compliance with all of the requirements of O. Reg. 170/03</i>	
<b>SDWA</b>	<i>Harriston Drinking Water System is in compliance with all of the requirements of the SDWA</i>	

Dated this 19<sup>th</sup> day of March 2013.

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Brian Hansen  
Public Works Director