



2012 Summary Report

for the

Town of Minto

PALMERSTON DRINKING WATER SYSTEM

TABLE OF CONTENTS

1.0	INTRODUCTION	1
1.1	Background.....	1
1.2	Objective	2
1.3	Description of Drinking Water System	2
2.0	SUMMARY OF UPGRADES	3
2.1	Upgrades Completed in 2012	3
2.2	Upgrades Scheduled to be Completed in 2013.....	3
3.0	OPERATION OF THE DRINKING WATER SYSTEM	3
3.1	Summary of the Quantities and Flow Rates of Water Supplied	3
3.2	Comparison of Actual Flow and Maximum Allowable Rates	7
3.3	Raw Water Quality and Required Treatment.....	7
3.4	Summary of Treatment Chemicals Used	9
4.0	COMPLIANCE	9
4.1	Assessment of Compliance	9
4.2	Summary of Compliance.....	10

LIST OF TABLES

Table 3.1	Palmerston Drinking Water System – Well #1.....	4
Table 3.2	Palmerston Drinking Water System – Well #2.....	5
Table 3.3	Palmerston Drinking Water System – Well #3.....	6
Table 3.4	Palmerston Drinking Water System – Well # 1 & 3 Combined.....	7
Table 3.5	Comparison of Flow Rates and Flow Capacities	8
Table 3.6	Comparison of Flow Rates (PTTW)	8
Table 3.7	Comparison of Flow Capacities (MDWL)	8
Table 3.8	2012 Maximum Water Usage Per Day by Month	9
Table 3.9	2012 Annual Summary of Raw Water Turbidity.....	10
Table 3.10	2012 Annual Summary of Treatment Chemicals Used	11
Table 4.1	Requirement the System Failed to Meet.....	13

**2012 Summary Report
for the
Town of Minto
PALMERSTON DRINKING WATER SYSTEM**

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 Summary Report for the Palmerston Drinking Water System 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 Town of Minto to assess the water work's capability to meet existing and future planned uses of the system.

1.3 Description of Drinking Water System

Palmerston is located in the Town of Minto within the northwest corner of Wellington County, along the route of Provincial Hwy. No. 23.

The Palmerston Drinking Water System services a permanent population of approximately 2,579, comprised of approximately 910 residential premises, as well as Industrial, Commercial, Institutional premises. The municipal water system is also used for fire protection.

Palmerston is currently serviced by a waterworks that consists of: three drilled bedrock wells, two wellhouses, an elevated 2500 m³ steel storage tank and a distribution network of watermains, ranging in diameter from 100 mm to 350 mm. There are approximately 102 fire hydrants in the Town of Palmerston. In the event of a prolonged power outage, a portable generator is available to either wellhouse to supply back-up power.

The bedrock wells are equipped with submersible pumps that discharge directly into the William Street Wellhouse (Wells #1 and #2) or the Whites Road Wellhouse (Well #3). 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 liquid 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 Palmerston Drinking Water System operates under MDWL 106-103, 106-103 Schedule C (proposed alterations), DWWP 106-203 and PTTW #8374-8HSPD5.

2.0 SUMMARY OF UPGRADES

2.1 Upgrades Completed in 2012

The disinfection treatment system in the Palmerston 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, \$258,000.00 was spent on the addition of well # 4, \$240.00 on well # 2 repairs, \$1,770.00 on water tower maintenance and \$1,500.00 on 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 connect the new well, drilled in 2010 to the drinking water system at an estimated cost of \$100,000.00. Valve replacements are also planned at an estimated cost of \$5,000.00 as well as \$20,000.00 to be spent on watermain replacement.

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 Palmerston'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. Wells #1 and #2 supply the William Street Wellhouse and the two wells alternate duties as primary supply. As such, Wells #1 and #2 are permitted as one and provide standby duty to each other. Well #3 supplies the White's Road Wellhouse.

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

Month	Raw Water Flow (Max Flow Rate = 22.83 L/s)			Chlorine Monthly Total (L)	Monthly Averages			Distribution System Disinfectant	
	Instantaneous Peak Flow (L/s)	Maximum Day Flow (m ³ /day)	Monthly Total (m ³)		Treated Water Turbidity No. of Samples Collected	Daily Average Turbidity	Treated Water Disinfectant No. of Treated Samples Collected	Average Residual (mg/L)	No. of Dis. Samples Collected
January	15.1	98	1,979	20	15	0.37	29	1.43	See Palmerston Well #2 Data
February	15.6	220	2,092	0	16	0.57	29	1.39	
March	15.4	218	1,843	40	17	0.55	30	1.44	
April	15.7	86	1,751	40	11	0.54	28	1.41	
May	15.5	91	1,703	20	17	0.47	30	1.33	
June	15.2	123	1,760	40	11	0.54	30	1.27	
July	15.0	100	1,944	40	13	0.50	32	1.17	
August	15.0	105	1,839	30	16	0.48	31	1.12	
September	14.9	98	1,530	40	15	0.52	30	1.19	
October	14.3	134	2,024	20	10	0.49	32	1.26	
November	14.5	171	1,774	50	11	0.37	29	1.33	
December	14.5	316	2,779	40	13	0.47	31	1.32	
Total			23,018	380	165		361		
Average			1,918			0.49		1.31	
Maximum	15.7	316							

Disinfectant Compound Used: **12% Sodium Hypochlorite**
 Form of Residual Displayed: **Free**
 Quantity of Disinfectant Used During 2012: **380 L**
 Distribution System Target Residual: **0.2 mg/L**

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

	Raw Water Flow (Max Flow Rate = 22.83 L/s)			Chlorine	Monthly Averages				Distribution System Disinfectant	
	Instantaneous Peak Flow (L/s)	Maximum Day Flow (m ³ /day)	Monthly Total (m ³)		Monthly Total (L)	Treated Water Turbidity		Treated Water Disinfectant		No. of Dis. Samples Collected
Month					No. of Samples Collected	Daily Average Turbidity	No. of Treated Samples Collected	Average Residual (mg/L)		
January	20.5	700.2	10,460	166	16	0.4	30	1.17	47	47
February	20.8	420	9,339	198	15	0.57	29	1.25	45	45
March	21.2	488	11,410	205	18	0.61	31	1.20	48	48
April	21.5	474	10,015	176	11	0.54	29	1.07	46	46
May	21.6	965	10,431	245	18	0.53	30	1.13	47	47
June	21.5	446	8,869	176	13	0.44	30	1.04	47	47
July	21.7	461.6	10,287	174	13	0.57	32	1.04	48	48
August	21.9	543	11,051	230	17	0.54	32	1.02	49	49
September	21.7	442.6	8,714	181	14	0.55	31	1.07	43	43
October	21.7	466	10,058	163	11	0.56	32	1.25	48	48
November	21.8	674	9,204	206	12	0.37	30	1.22	49	49
December	20.2	1063	14,564	330	12	0.33	30	1.24	44	44
Total			124,402	2,450	170		366		561	561
Average			10,367			0.50		1.14		
Maximum	21.9	1,063								

Disinfectant Compound Used: **12% Sodium Hypochlorite**
 Form of Residual Displayed: **Free**
 Quantity of Disinfectant Used During 2012: **2,450 L**
 Distribution System Target Residual: **0.2 mg/L**

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

Month	Raw Water Flow (Max Flow Rate = 26.67 L/s)			Chlorine Monthly Total (L)	Monthly Averages				Distribution System Disinfectant	
	Instantaneous Peak Flow (L/s)	Maximum Day Flow (m ³ /day)	Monthly Total (m ³)		Treated Water Turbidity		Treated Water Disinfectant		No. of Dis. Samples Collected	No. of Samples with Detectable Residual
January	23.2	677	18,359	294	14	0.40	30	1.30		
February	23.2	691	16,292	258	18	0.50	29	1.37		
March	23.1	776	15,095	264	18	0.54	30	1.29		
April	23.1	762	18,370	279	11	0.50	29	1.25		
May	23.2	961	19,508	367	18	0.48	31	1.29		
June	23.0	959	17,178	298	14	0.54	30	1.26		
July	22.9	988	20,131	353	14	0.60	32	1.24		
August	23.0	815	14,990	282	16	0.45	32	1.26		
September	22.5	717	16,563	316	13	0.41	31	1.29		
October	22.5	778	18,863	308	10	0.53	32	1.33		
November	22.6	727	16,061	313	11	0.48	30	1.28		
December	22.5	656	11,593	195	6	0.58	25	1.34		
Total			203,003	3,527	163		361			
Average			16,917			0.50		1.29		
Maximum	23.2	988								

Disinfectant Compound Used: **12% Sodium Hypochlorite**
 Form of Residual Displayed: **Free**
 Quantity of Disinfectant Used During 2012: **3,527 L**
 Distribution System Target Residual: **0.2 mg/L**

Table 3.4
Palmerston Drinking Water System – Well #1 & 2 Combined
Treated Water Flow
January 1, 2012 – December 31, 2012

Month	Treated Water Flow Max Daily Volume = 1964 m ³ /d Max Flow Rate = 22.83 L/s Well # 1 = 22.83 L/s Well # 2			Chlorine	
	Instantaneous Peak Flow (L.s)		Maximum Day Flow	Monthly Total	Monthly Total
	Well # 1	Well # 2	(m ³ /day)	(m ³)	(l)
January	15.1	20.5	700	12439	186
February	15.6	20.8	420	11431	198
March	15.4	21.2	488	13253	245
April	15.7	21.5	474	11766	216
May	15.5	21.6	965	12134	265
June	15.2	21.5	446	10629	216
July	15.0	21.7	462	12231	214
August	15.0	21.9	543	12890	260
September	14.9	21.7	443	10244	221
October	14.3	21.7	466	12082	183
November	14.5	21.8	674	10978	256
December	14.5	20.2	1063	17343	370
Total				147,420	2,830
Average				12,285	
Maximum	15.7	21.9	1,063		

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 Palmerston’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	Maximum Instantaneous Peak Flow	Percent of Maximum Allowable	MDWL Schedule C Maximum Daily Quantity	PTTW Maximum Daily Flow	Maximum Daily Flow	Percent of Maximum Allowable
	L/s	L/s	%	m ³ /day	m ³ /day	m ³ /day	%
Well #1	22.83	15.7	69	1,964	1,964	316	16
Well #2	22.83	21.9	96		1,964	1,063	54
Well #3	26.67	23.2	87	2,291	2,291	988	43

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.”

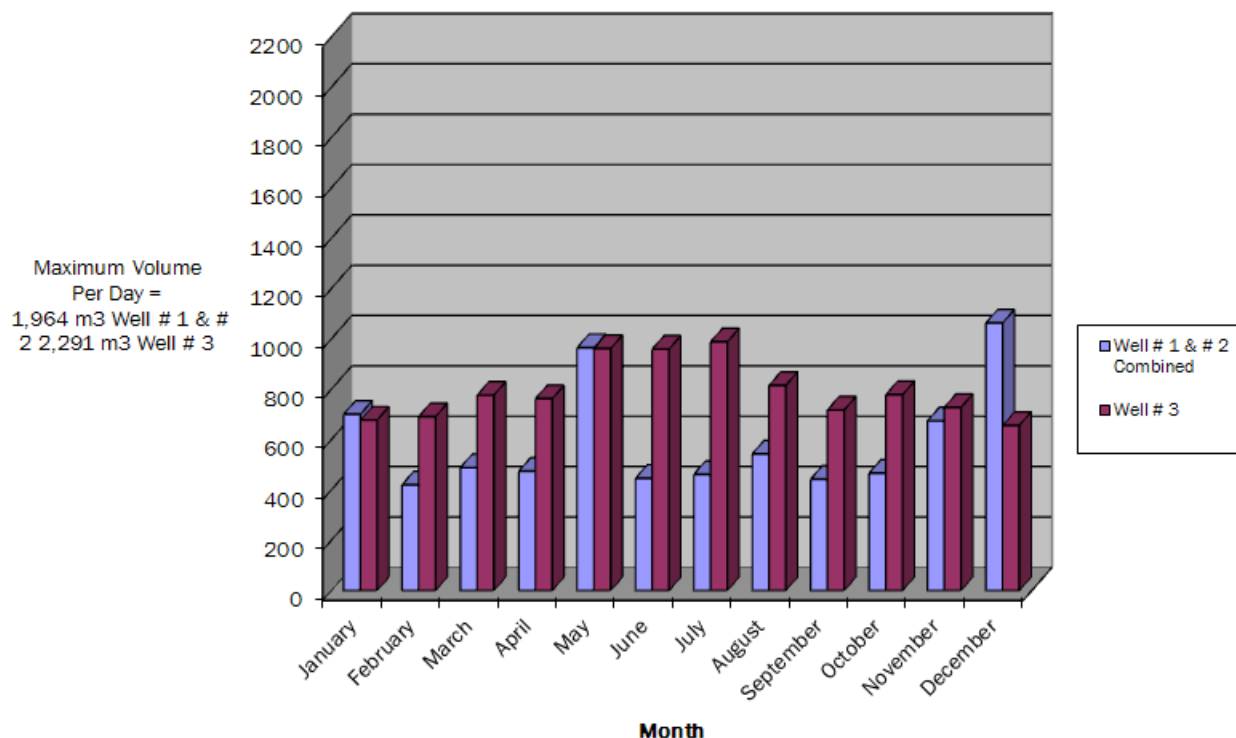
Table 3.6
Comparison of Flow Rates To Rated Flow Rate (PTTW)

Well Supply	PTTW Max. Flow Rate	Maximum Instantaneous Peak Flow	Percent of Maximum Allowable
	L/s	L/s	%
Well #1	22.83	15.7	69
Well #2	22.83	21.9	96
Well #3	26.67	23.2	87

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

Well Supply	MDWL Maximum	Maximum Daily Flow	Percent of Maximum Allowable
	m ³ /day	m ³ /day	%
Well #1 & 2	1,964	1,063	54
Well #3	2,291	988	43

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 Palmerston Drinking Water System.

3.3 Raw Water Quality and Required Treatment

The Palmerston Drinking Water System has no naturally occurring chemical parameters that exceed MAC or IMAC limits. The Palmerston 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 William Street Wellhouse (*Well #1 and #2*) and the Whites Road Wellhouse (*Well #3*) are equipped with continuous monitoring analyzers for measuring free chlorine residual. The chlorine analyzers are equipped with alarms. In the event of an adverse chlorine residual 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 in 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 0.68 mg/L and 1.99 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 with the distribution system, a free chlorine residual of 0.2 mg/L ...”. The Palmerston Drinking Water System meets both of these requirements.

Table 3.9
Palmerston Drinking Water System
2012 Annual Summary of
Raw Water Turbidity and Free Chlorine Residual

Location	Range	Raw Water Turbidity	Free Chlorine Residual at POE
		NTU	mg/L
Well #1	Minimum	0.36	0.86
	Maximum	0.89	1.77
	Average	0.59	1.31
Well #2	Minimum	0.32	0.66
	Maximum	0.88	1.64
	Average	0.59	1.14
Well #3	Minimum	0.25	0.68
	Maximum	0.98	1.62
	Average	0.50	1.29

3.4 Summary of Treatment Chemicals Used

The disinfectant chemical used in the Palmerston Drinking Water System is 12% Sodium Hypochlorite. Measurements of free chlorine residual are recorded on a continuous basis. In 2012, 6,357 L of 12% Sodium Hypochlorite was used. The average dosage rates are presented in Table 3.10.

In 2012, 5,494 L of PW1680 was used for the sequestering of iron. Wells #1 and #2 share a common tank of PW1680. The average dosage rates are presented in Table 3.10.

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

Treatment Chemical	Well	Volume Used	Mass Used	Annual Flow	Dosage Rate
		L	kg	m ³	mg/L
12% Sodium Hypochlorite	Well #1	380	45.6	23,018	1.98
	Well # 2	2,450	294.0	124,402	2.36
	Well # 3	3,527	423.2	203,003	2.08
	Total	6,357	762.8	350,423	2.18
PW1680	Well #1 & Well #2	2,739	3,807.2	147,420	25.83
	Well # 3	2,755	3,829.5	203,003	18.86
	Total	5,494	7,636.7	350,423	21.79

- Note:**
- Wells #1 and #2 share the same PW1680 storage container; 2,739 L is the combined PW1680 usage for both wells
 - 12% Sodium Hypochlorite = 120,000 mg/L = 120 kg/m³
 - 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 Palmerston 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.
- 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 Palmerston Water Work's MDWL 106-103, DWWP 106-203 and PTTW #8374-8HSPD5. 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
 Palmerston Drinking Water System
 Requirements the System Failed to Meet**

Compliance With	Description of Item the System Failed to Meet	Correction of This Situation How/When
MDWL # 106-103	<i>Palmerston Drinking Water System is in compliance with all of the requirements of the MDWL</i>	
DWWP # 106-203	<i>Palmerston Drinking Water System is in compliance with all of the requirements of the DWWP.</i>	
O. Reg. 170/03	<i>Palmerston Drinking Water System is in compliance with all of the requirements of O. Reg. 170/03.</i>	
SDWA	<i>Palmerston Drinking Water System is in compliance with all of the requirements of the SDWA.</i>	

Dated this 19th day of March 2013.

Brian Hansen
Public Works Director