

LAWSS Flow Summary

LAWSS Member	Total Flows as of Dec 2018												Total Year To Date for:	% Total	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec			Jan - Dec
Sarnia	2018	847,619	716,829	792,231	722,416	903,800	1,090,866	1,140,761	992,451	914,117	808,898	717,749	743,262	10,390,999	58.34
	2017	776,483	685,895	750,769	714,123	919,630	1,049,710	1,158,839	1,231,485	1,025,836	864,631	761,653	798,034	10,737,088	61.58
Point Edward	2018	29,104	24,457	27,752	27,203	39,328	47,078	54,106	49,612	41,322	34,228	26,687	26,579	427,456	2.40
	2017	28,733	24,763	28,499	24,705	36,610	40,968	45,228	55,072	49,733	41,253	28,920	27,155	431,641	2.48
St. Clair	2018	420,890	328,358	381,560	356,736	416,692	475,796	604,876	568,576	499,609	420,941	409,299	420,293	5,303,627	29.78
	2017	362,717	319,880	350,263	293,977	395,382	453,007	465,312	454,512	371,800	349,732	374,823	369,656	4,561,060	26.16
Plympton/Wyoming	2018	63,990	52,511	56,621	60,990	83,851	102,062	116,025	89,396	74,865	66,964	58,463	61,040	886,779	4.98
	2017	64,819	59,130	59,639	55,856	76,574	91,406	93,017	98,076	74,762	68,835	57,215	61,891	861,219	4.94
Lambton Shores	2018	37,681	23,324	25,198	31,014	30,618	34,312	39,802	63,896	14,903	16,800	14,901	12,241	344,689	1.94
	2017	26,915	25,876	24,999	22,194	32,480	32,358	32,363	31,533	29,045	29,157	27,933	26,087	340,938	1.96
Watford/Warwick	2018	39,195	35,905	39,130	37,248	45,667	46,959	46,842	37,035	37,798	32,988	30,508	29,142	458,416	2.57
	2017	40,596	34,633	38,848	35,424	45,260	46,765	49,286	50,540	43,798	41,925	37,733	39,725	504,533	2.89
Others														2018	17811967
														2017	17436480
Alvinston	2018	10,209	6,415	7,160	7,177	7,951	7,484	7,326	5,996	6,317	6,411	6,293	7,174	85,913	0.48
	2017	6,651	7,332	6,614	6,901	8,064	8,140	7,418	7,447	7,032	7,078	6,812	7,511	87,000	0.49
Petrolia	2018	25,392	2,810	10,788	4,496	0	24,533	0	0	0	0	0	0	68,019	0.38
	2017	0	0	0	0	0	11,683	21,906	0	0	0	0	31,022	64,611	0.37
Chatham-Kent	2018	0	0	0	0	20,782	0	0	0	0	0	0	0	20,782	0.12
	2017	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
Totals	2018	1,474,080	1,190,611	1,340,440	1,247,280	1,548,690	1,829,090	2,009,738	1,806,962	1,588,930	1,387,230	1,263,900	1,299,730	17,986,681	
	2017	1,306,914	1,157,510	1,259,630	1,153,180	1,514,000	1,734,036	1,873,369	1,928,665	1,602,008	1,402,610	1,295,090	1,361,080	17,588,091	



Note:

Work Sheet Revision Date: 16-Jan-2018

Current Year 2018													Year to Date
Last month entered Dec													Total
LAWSS Members	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan - Dec
City of Samial:	847,619	716,829	792,231	722,416	903,800	1,090,866	1,140,761	992,451	914,117	808,898	717,749	743,262	10,390,999
Point Edward:	29,104	24,457	27,752	27,203	39,328	47,078	54,106	49,612	41,322	34,228	26,687	26,579	427,456
St. Clair Township:	420,890	328,358	381,560	356,736	416,692	475,796	604,876	568,578	499,609	420,941	409,299	420,293	5,303,627
Plympton/Wyoming:	63,990	52,511	56,621	60,990	83,851	102,062	116,025	89,396	74,865	66,964	58,463	61,040	886,779
Lambton Shores:	37,681	23,324	25,198	31,014	30,618	34,312	39,802	63,896	14,903	16,800	14,901	12,241	344,689
Watford/Warwick:	39,195	35,905	39,130	37,248	45,667	46,959	46,842	37,035	37,798	32,988	30,508	29,142	458,416
	1,438,479	1,181,386	1,322,492	1,235,607	1,519,957	1,797,073	2,002,412	1,800,966	1,582,613	1,380,819	1,257,607	1,292,556	17,811,967
Others													
Town of Alvinston:	10,209	6,415	7,160	7,177	7,951	7,484	7,326	5,996	6,317	6,411	6,293	7,174	85,913
Town of Petrolia:	25,392	2,810	10,788	4,496	0	24,533	0	0	0	0	0	0	68,019
Chatham-Kent:	0	0	0	0	20,782	0	0	0	0	0	0	0	20,782
	1,474,080	1,190,611	1,340,440	1,247,280	1,548,690	1,829,090	2,009,738	1,806,962	1,588,930	1,387,230	1,263,900	1,299,730	
	1,474,080	1,190,611	1,340,440	1,247,280	1,548,690	1,829,090	2,009,738	1,806,962	1,588,930	1,387,230	1,263,900	1,299,730	17,986,681
Last Years Data 2017													
LAWSS Members													
City of Samial:	776,483	685,895	750,769	714,123	919,630	1,049,710	1,158,839	1,231,485	1,025,836	864,631	761,653	798,034	10,737,088
Point Edward:	28,733	24,763	28,499	24,705	36,610	40,968	45,228	55,072	49,733	41,253	28,920	27,155	431,641
St. Clair Township:	362,717	319,880	350,263	293,977	395,382	453,007	485,312	454,512	371,800	349,732	374,823	369,656	4,561,060
Plympton/Wyoming:	64,819	59,130	59,639	55,856	76,574	91,406	93,017	98,076	74,762	68,835	57,215	61,891	861,219
Lambton Shores:	26,915	25,876	24,999	22,194	32,480	32,358	32,363	31,533	29,045	29,157	27,933	26,087	340,938
Watford/Warwick:	40,596	34,633	38,848	35,424	45,260	46,765	49,286	50,540	43,798	41,925	37,733	39,725	504,533
	1,300,263	1,150,178	1,253,016	1,146,279	1,505,936	1,714,213	1,844,045	1,921,218	1,594,975	1,395,532	1,288,278	1,322,547	17,436,480
Others													
Town of Alvinston:	6,651	7,332	6,614	6,901	8,064	8,140	7,418	7,447	7,032	7,078	6,812	7,511	87,000
Town of Petrolia:	0	0	0	0	0	11,683	21,906	0	0	0	0	31,022	64,611
Chatham-Kent:	0	0	0	0	0	0	0	0	0	0	0	0	0
	1,306,914	1,157,510	1,259,630	1,153,180	1,514,000	1,734,036	1,873,369	1,928,665	1,602,008	1,402,610	1,295,090	1,361,080	
	1,306,914	1,157,510	1,259,630	1,153,180	1,514,000	1,734,036	1,873,369	1,928,665	1,602,008	1,402,610	1,295,090	1,361,080	17,588,091

Work Sheet Revision Date: 16-Jan-2018

LAWSS Water used by the

Lambton Area Water Supply System

1215 Fort St. Sarnia, On N7V 1M1

Phone:(519)344-7429

Fax: (519)344-4337

City of Sarnia

For the Month of: December 2018

Meter num	Meter Location	Read date	Last Read date	Difference	Calibration Adjustments	X	Flow
		31-Dec-18	30-Nov-18		As Found	As Left	
15	HighL High Net Flow Totalizer	1,675,127.6	1,675,127.6	0			0
13	HighL Low Net Flow Totalizer	173,520,190.0	172,220,460.0	1,299,730			1,299,730

Entering Sarnia: 1,299,730

Members Monthly % Used

Leaving Sarnia to LAWSS Members:

Village of Point Edward - Grand Total:	26,579	2.1
St. Clair Township - Grand Total:	420,293	32.5
Plympton/Wyoming - Grand Total:	61,040	4.7
Lambton Shores - Grand Total:	12,241	0.9
Village of Watford/Township of Warwick - Grand Total:	29,142	2.3

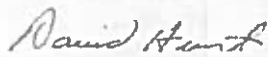
Leaving Sarnia to Others:

Town of Alvinston - Grand Total:	7,174
Town of Petrolia - Grand Total:	0
Chatham-Kent Area Water - Grand Total:	0

Metered Consumption: 743,262

Adjustments:

Reason for Adjustment:



Dave Hunt (Operations Manager)

City of Sarnia - Total Consumption:	743,262	
Leakage rate adjustment 0%	0	
City of Sarnia - Grand Total:	743,262	57.5
Overall Grand Total:	1,299,730	100.0

LAWSS Water used by the
Village of Point Edward

Lambton Area Water Supply System
 1215 Fort St. Sarnia, On N7V 1M1
 Phone:(519)344-7429
 Fax: (519)344-4337

For the Month of: December 2018

Meter num	Meter Location	Read date	Last Read date	Difference	Calibration Adjustments		X	Flow	%
					As Found	As Left			
CH01	Venetian Vill (Mag)	31-Dec-18	30-Nov-18	5,756			1	5,756	22.5
CH02	Ven & Exmouth (Mag)	34,776.0	33,975.2	801			1	801	3.1
CH03	Michigan & Monk (Mag)	800,170.4	782,924.1	17,246			1	17,246	67.5
CH04	Michigan & Front (Mag)	115,969.0	114,215.2	1,754			1	1,754	6.9

Reason for Adjustment:

Metered Consumption: 25,556 100.0
Adjustments:

Village of Point Edward - Total Consumption: 25,556
 Leakage rate adjustment 4% 1,022
Village of Point Edward - Grand Total: 26,579



Dave Hunt (Operations Manager)

LAWSS Water used by the

Lambton Area Water Supply System

1215 Fort St. Sarnia, On N7V 1M1

Phone:(519)344-7429

Fax: (519)344-4337

St. Clair Township

For the Month of: December 2018

Meter num	Meter Location	Read date	Last Read date	Difference	Calibration Adjustments		X	Flow	%
					As Found	As Left			
WL-O	WL High Net Flow - West Lambton	31-Dec-18	30-Nov-18	403,804				403,804	99.9
3100	Plank Road (3/4)	435	110	325				325	0.1

Back to Sarnia

1100	LaSalle & Parkway	7,783	7,782	1			1	1	0.0
1090	LaSalle & Tashmoo	3,970	3,970	0			1	0	

Entering St. Clair Township: 404,129 100.0

Leaving St. Clair Township

Back to Sarnia: 1 0.0

Chatham-Kent Area Water - Total Consumption: 0

Metered Consumption: 404,128 100.0

Adjustments:

Reason for Adjustment:

St. Clair Township - Total Consumption: 404,128

Leakage rate adjustment 4% 16,165

St. Clair Township - Grand Total: 420,293



Dave Hunt (Operations Manager)

LAWSS Water used by the
Township of Plympton / Village of Wyoming

Lambton Area Water Supply System
 1215 Fort St. Sarnia, On N7V 1M1
 Phone:(519)344-7429
 Fax: (519)344-4337

For the Month of: December 2018

Meter num	Meter Location	Read date	Last Read date	Difference	Calibration Adjustments		X	Flow	%
		31-Dec-18	30-Nov-18		As Found	As Left			
Entering Plympton									
5001	Ch05 Low Net Flow - Maundaumin	57,801.3	57,801.3	0			1	0	
5002	Ch05 High Net Flow - Maundaumin	16,407,928.0	16,302,271.0	105,657			1	105,657	
Village of Wyoming									
8001	Wyoming	432,670	432,670	0			1	0	
8002	Wyoming	6,007	5,145	862			10	8,620	
Back to Sarnia									
1005	Brights Grove (Sarnia)	610	610	0			0.1	0	
1006	Brights Grove (Sarnia)	81,540	81,540	0			10	0	

Entering Plympton:	105,657
Leaving Plympton	
Village of Wyoming:	8,620
Back to Sarnia:	0
Lambton Shores - Total Consumption:	11,770
Watford/Warwick - Total Consumption:	28,021
Town of Alvinston - Total Consumption:	7,174
Town of Petrolia - Total Consumption:	0
Metered Consumption For Plympton:	50,072
Village of Wyoming:	8,620
Adjustments:	

Reason for Adjustment:

Dave Hunt

Dave Hunt (Operations Manager)

Plympton/Wyoming - Total Consumption:	58,692
Leakage rate adjustment 4%	2,348
Plympton/Wyoming - Grand Total:	61,040

LAWSS Water used by the

Lambton Area Water Supply System

1215 Fort St. Sarnia, On N7V 1M1

Phone:(519)344-7429

Fax: (519)344-4337

Lambton Shores

For the Month of: December 2018

Meter num	Meter Location	Read date	Last Read date	Difference	Calibration Adjustments		X	Flow	%
					As Found	As Left			
7003	Ch07 High Net Flow - Townsend	31-Dec-18	30-Nov-18	11,204			1	11,204	
7004	Ch07 Low Net Flow - Townsend	232,670.8	232,105.0	566			1	566	

Reason for Adjustment:

Metered Consumption: 11,770
Adjustments:



Dave Hunt (Operations Manager)

Lambton Shores - Total Consumption: 11,770
Leakage rate adjustment 4% 471
Lambton Shores - Grand Total: 12,241

LAWSS Water used by the
Village of Watford/Township of Warwick

Lambton Area Water Supply System
1215 Fort St. Sarnia, On N7V 1M1
Phone:(519)344-7429
Fax: (519)344-4337

For the Month of: December 2018

Meter num	Meter Location	Read date	Last Read date	Difference	Calibration Adjustments		X	Flow	%
					As Found	As Left			
Entering Watford/Warwick									
9001	Ch10 High Net Flow - London Line	6,079,123.5	6,035,350.0	43,774			1	43,774	
9002	Ch10 Low Net Flow - London Line	582,403.1	578,777.9	3,625			1	3,625	
9003	Ch11 High Net Flow - Confederation	1,011,186.6	1,000,743.1	10,444			1	10,444	
9004	Ch11 Low Net Flow - Confederation	60,699.6	62,524.8	-1,825			1	-1,825	
Leaving Watford/Warwick									
5013	Ch09 High Net Flow - Egremont	2,467,477.0	2,446,655.0	20,822			1	20,822	
AF	Alvin High Net Flow Totalizer	1,398,728.9	1,391,554.6	7,174			1	7,174	

<u>Entering Watford/Warwick:</u>	56,017
<u>Leaving Watford/Warwick:</u>	27,996
<u>Metered Consumption:</u>	28,021
Adjustments:	

Reason for Adjustment:

Watford/Warwick - Total Consumption:	28,021
Leakage rate adjustment 4%	1,121

Village of Watford/Township of Warwick - Grand Total: 29,142

Dave Hunt

Dave Hunt (Operations Manager)

LAWSS Water used by the

Lambton Area Water Supply System

1215 Fort St. Sarnia, On N7V 1M1

Phone:(519)344-7429

Fax: (519)344-4337

Town of Alvinston

For the Month of: December 2018

Meter num	Meter Location	Read date	Last Read date	Difference	Calibration Adjustments			Flow	%
					As Found	As Left	X		
AF	Alvin High Net Flow Totalizer	31-Dec-18	30-Nov-18	7,174			1	7,174	

Metered Consumption: 7,174
Adjustments:

Reason for Adjustment:



Dave Hunt (Operations Manager)

Town of Alvinston - Total Consumption: 7,174
Leakage rate adjustment 0% 0
Town of Alvinston - Grand Total: 7,174

LAW55 Water used by the

Lambton Area Water Supply System

1215 Fort St. Sarnia, On N7V 1M1

Phone:(519)344-7429

Fax: (519)344-4337

Town of Petrolia

For the Month of: December 2018

Meter num	Meter Location	Read date	Last Read date	Difference	Calibration As Found	Adjustments As Left	X	Flow	%
PF	Petrolia Flows	31-Dec-18	30-Nov-18	133,549	133,549	0	1	0	

Reason for Adjustment:

Metered Consumption: 0
Adjustments:



Dave Hunt (Operations Manager)

Town of Petrolia - Total Consumption: 0
Leakage rate adjustment 0% 0
Town of Petrolia - Grand Total: 0

LAWSS Water used by the

Lambton Area Water Supply System

1215 Fort St. Sarnia, On N7V 1M1

Phone:(519)344-7429

Fax: (519)344-4337

Chatham-Kent Area Water

For the Month of: December 2018

Meter num	Meter Location	Read date	Last Read date	Difference	Calibration Adjustments		X	Flow	%
					As Found	As Left			
CKF	Chatham-Kent Flows	31-Dec-18	30-Nov-18	3,459	3,459	0	1	0	

Reason for Adjustment:

Metered Consumption: 0

Adjustments:

Chatham-Kent Area Water - Total Consumption: 0

Leakage rate adjustment 0% 0

Chatham-Kent Area Water - Grand Total: 0



Dave Hunt (Operations Manager)



To: LAWSS Joint Board of Management
From: Clinton Harper
Date: Thursday, January 31, 2019
Subject: Operational/Capital Updates – Information Only

a) Admin HVAC Rebuild

At the December regular meeting the LAWSS Board awarded TSM Ltd. the LAWSS Admin HVAC Replacement project. A kick-off meeting was held at the LAWSS WTP on January 3, 2019. A schedule will be provided to the Board in February.

b) Twenty-Year Conceptual Engineering Design Options and Cost Estimate:

In October, OCWA had identified a possible issue with assumptions that were used to develop the twenty-year conceptual engineering design plan. AECOM provided a quote to re-open that part of the project. In November, the Board agreed that it was important that the new LAWSS model best match with what is observed in operations.

Additionally, AECOM was originally directed to include Petrolia demands within the new LAWSS model. As per discussions with the various member municipalities, AECOM was directed to provide a quote to separate out Petrolia data. In November, the Board agreed that the data needed to be reviewed separately.

Work is progressing. Attached is an updated schedule. Nothing further to report at this time.

c) Electrical Reliability Study

No update in January. OCWA-LAWSS has provided EXP with all relevant materials. EXP completed a site survey of all distribution related electrical components on January 17, 2019. Study is underway and is expected within next few weeks.

d) 900mm (36") dia. Ross Valve Rebuild at West Lambton Pumping Station

No update in January. As reported in December, the 900mm (36") dia. Back Pressure Sustaining "Ross" Valve located at West Lambton Pumping Station is leaking and needs to be rebuilt. A budget of \$70,000 was established in 2018 to complete. Corix is the Provincial supplier for Ross Valve and was asked to provide a quote to LAWSS for full valve replacement. OCWA is currently assisting LAWSS with determining how the valve can be successfully isolated from the facility's operation without affecting LAWSS Members. LAWSS will approach three local mechanical Contractors to satisfy procurement procedures. Project details will be provided to the Board in a future report. Project commencement is anticipated for February 2019.

This report was prepared by Clinton Harper, LAWSS General Manager

Attachment(s): AECOM Revised Schedule

ID	Task Name	Duration	Start	Finish	January							February							March							April					May					Ju	
					12/16	12/23	12/30	1/6	1/13	1/20	1/27	2/3	2/10	2/17	2/24	3/3	3/10	3/17	3/24	3/31	4/7	4/14	4/21	4/28	5/5	5/12	5/19	5/26									
1	Project Award	1 day	Fri 9/29/17	Fri 9/29/17																																	
2	Project Management	352 days	Thu 12/21/17	Wed 5/15/19																																	
3	Ongoing project management (4 Months)	207 days	Thu 12/21/17	Fri 10/19/18																																	
4	Project Initiation Meeting	1 day	Tue 1/9/18	Tue 1/9/18																																	
5	Report to LAWSS Board Meeting	1 day	Wed 5/15/19	Wed 5/15/19																																	
6	BASE DATA REVIEW AND MODELLING	269 days	Wed 1/10/18	Mon 2/4/19																																	
7	Model and Base Data Review	54 days	Wed 1/10/18	Tue 3/27/18																																	
8	Review of Models Provided	5 days	Wed 1/10/18	Tue 1/16/18																																	
9	Review of Operational Data including SCADA	5 days	Thu 1/11/18	Wed 1/17/18																																	
10	Identify Data Gaps & Measures to Address	4 days	Mon 1/15/18	Thu 1/18/18																																	
11	Establish Evaluation Criteria	3 days	Thu 1/18/18	Mon 1/22/18																																	
12	Establish 2016 Demands	2 days	Wed 1/17/18	Thu 1/18/18																																	
13	Project Future Demands	3 days	Tue 1/23/18	Thu 1/25/18																																	
14	TM1 - Data Gaps, Evaluation Criteria & Demands	5 days	Fri 1/26/18	Thu 2/1/18																																	
15	TM1 - Meeting (Conference Call)	1 day	Tue 3/27/18	Tue 3/27/18																																	
16	Modeling - Existing Scenario	10 days	Thu 4/5/18	Wed 4/18/18																																	
17	Add Portion of Lambton Shores Model to LAWSS Model	3 days	Thu 4/5/18	Mon 4/9/18																																	
18	Update 2016 Demands	5 days	Tue 4/10/18	Mon 4/16/18																																	
19	Existing System Evaluation & Summary	2 days	Tue 4/17/18	Wed 4/18/18																																	
20	Modeling - Future Scenarios & Upgrade Alternatives	61 days?	Tue 4/17/18	Thu 7/12/18																																	
21	Create Future Scenarios	3 days	Tue 4/17/18	Thu 4/19/18																																	
22	Future System Evaluation & Upgrade Options	5 days	Fri 4/20/18	Thu 4/26/18																																	
23	Identify Upgrade Requirements & Alternatives	5 days	Fri 4/27/18	Thu 5/3/18																																	
24	Progress Review and Discussion with Board Technical	1 day?	Fri 6/15/18	Fri 6/15/18																																	
25	Finalize Model	10 days	Mon 6/18/18	Fri 6/29/18																																	
26	TM2 - Upgrade Requirements & Alternatives	5 days	Tue 7/3/18	Mon 7/9/18																																	
27	TM2 - Meeting (Conference Call)	1 day	Thu 7/12/18	Thu 7/12/18																																	
28	Additional Modeling	42 days	Tue 12/4/18	Mon 2/4/19																																	
29	EVALUATION OF UPGRADE/EXPANSION ALTERNATIVES	32 days	Tue 2/5/19	Wed 3/20/19																																	
30	Evaluation of Alternatives	26 days	Tue 2/5/19	Tue 3/12/19																																	
31	Develop Design Concepts and Cost Estimates for Each	10 days	Tue 2/5/19	Mon 2/18/19																																	
32	Evaluate Alternatives and Select Preferred Alternative	10 days	Tue 2/19/19	Mon 3/4/19																																	
33	TM3 - Evaluation of Alternatives	5 days	Wed 3/6/19	Tue 3/12/19																																	
34	LAWSS Upgrades Workshop (Webex)	1 day	Wed 3/20/19	Wed 3/20/19																																	
35	FINANCIAL PLANNING	32 days	Mon 3/25/19	Tue 5/7/19																																	
36	Financial Plan	20 days	Mon 3/25/19	Fri 4/19/19																																	
37	Model Financial Impacts of Expansion Options	10 days	Mon 3/25/19	Fri 4/5/19																																	
38	Develop Financial Plan for Expansion Options	10 days	Mon 4/8/19	Fri 4/19/19																																	
39	Resource Allocation Model	5 days	Thu 4/18/19	Wed 4/24/19																																	
40	TM4 - Financial Plan	5 days	Thu 4/25/19	Wed 5/1/19																																	
41	TM4 - Meeting (Conference Call)	1 day	Tue 5/7/19	Tue 5/7/19																																	

Report to LAWSS Board Meeting **May 15, 2019**

TM4 - Meeting (Conference Call) **May 7, 2019**

LAWSS Upgrades Workshop (Webex) **March 20, 2019**

Date: Tue 12/18/18	Task	Project Summary		Inactive Milestone	▲	Manual Summary Rollup	—————	Deadline	↓
	Split	External Tasks	Inactive Summary		Manual Summary	—————	Progress	—————
	Milestone	External Milestone	◆	Manual Task	—————	Start-only	—————	Manual Progress	—————
	Summary	Inactive Task	—————	Duration-only	—————	Finish-only	—————		



To: LAWSS Board
From: Clinton Harper
Date: Thursday, January 31, 2019
Subject: Generator Replacement Project

Recommendations:

It is recommended that;

1. the project budget be increased to include replacement of the 4160V Switchgear and,
2. that EXP be authorized to incorporate replacement of 4160V Switchgear, as outlined in the attached Fee Proposal 18-131(S5), into Generator Replacement Project.

Background:

Original Project Scope LAWSS Generator Replacement Project

In July 2018, LAWSS awarded EXP with RFP 18-131 for engineering design and services related to new emergency generators at LAWSS WTP. A budget of \$4,000,000 was established in 2019 for the replacement of the LAWSS Generators. Original RFP 18-131 scope is outlined below:

Development and Design

- a) Identification and review of acceptable generator brands and model for replacement that can meet pad and physical limitations of the facility. This shall include at a minimum the following:
 - a. Warranty of the Generator components;
 - b. Warranty of the Engine components;
 - c. Parts availability through expected life cycle;
 - d. Diagnostic requirements for troubleshooting and repairs;
 - e. Equipment Staging and delivery co-ordination.

- b) Engineering design including electrical, SCADA, and mechanical for generator and switch gear including the required panel in the MCC;
- c) Engineering design for civil work including pad construction and completion of containment area;
- d) Identify and recommend one repair option and one replacement option for the existing louver system.

Compliance Documentation and Tendering

- a) Complete all regulatory requirements related to air, licence, and permit updates;
- b) Prepare tender documents including all requirements and comprehensive 5-year maintenance contract;
- c) Include complete disposal of existing equipment off site;
- d) Provision to maintain uninterrupted power of at least 2MW throughout replacement project.

Project Administration

- a) Provide complete project oversight and management;
- b) Review weekly with LAWSS Representative(s) regarding project construction status;
- c) Review weekly with LAWSS Representative(s) regarding project budget management;
- d) Provide review of contractor progress payments for approval by City Representatives;
- e) Address all Environmental requirements with the Ministry of Environment and Climate Change as required;
- f) Provide Form 6 for notice of substantial completion.

Project Closeout

- a) Provide complete "as built" drawings for all equipment and changes completed;
- b) Provide manuals, maintenance guidelines, and part sources for all equipment installed as part of the project;
- c) Provide a 5-year Maintenance plan that encompasses all aspects of the project and the equipment installed.

Amendment #1

In June 2017, LAWSS elected to become a Class A energy customer. Electing into Class A was ideal for LAWSS because of the facility's relative flexibility of operation. During the July 1, 2017 to June 30, 2018 pricing period, an electrical savings of \$268,655.61 was realized. In September 2018, the

Board authorized a "Peak Shaving Analysis" to explore the potential for using the new standby generators for non-standby applications. An analysis was presented in a follow-up memo to the Board in November. The Board motioned for non-standby provision to be built into the design.

EXP estimates \$250,000/generator unit +\$50,000 in capital construction cost to build the system with the provision to take advantage of ICI Program as outlined in a previous memo to the Board dated September 27, 2018.

Additional Cost:	X3- 1.5MW
Capital	\$900,000
Fuel*/year	\$160,499
Maintenance Contract/year	\$0
Warranty/year	\$0
Total \$\$ 1 st year operation	\$1,060,499
Potential ICI Savings (2017)	\$907,655

**Estimated average, 100hr@ 100% loading @ 1.099/L (20days at 5hrs/day)*

Options for providing a financial incentive to our Operator for maximum savings under the ICI program are being explored. If OCWA is able to maintain its effectiveness at identifying and reacting to provincial energy usage, there is a potential to see an energy cost savings equivalent to the generator replacement project, as a whole, within the next 6-7 years.

Schedule Update:

EXP expects to have a formal tender to Genset manufactures by mid-February. This will allow for a review and selection of the system in March and is in-line for late August early September delivery.

Comments:

November 2018 Meeting Discussion- EXP Standby Generator Replacement Report- Section 5.4 Incoming Emergency Section of main 4160V Switchgear.

LAWSS WTP in-door sub-station contains the Plant's 4160V Switchgear. This gear is the critical point where the incoming feed ties into the plant's motor control and the plant's emergency power supply control. The original scope for this project included the retrofit of the emergency power supply control portion of the 4160V Switchgear only.

At the November Board meeting a Standby Generator Replacement Report was presented to the Board. The report explored a retrofit versus the idea of the full replacement of the 4160V Switchgear. At that time it was believed a full replacement of the gear would require an unacceptable amount of

“vulnerable time”. Subsequent meets with switchgear suppliers, who are familiar with equipment at LAWSS, has revealed that this was not correct. Based on these meetings it is believed that the amount of “vulnerable time” required for a full replacement is comparable with that of a retrofit.

The retrofit of the emergency power supply portion of the gear, that includes labour and material, is estimated at \$300,000. The engineering, equipment, and construction costs are included in the project’s original \$4,000,000 budget.

A full replacement of the entire gear, that includes labour and material, is estimated closer to \$1,600,000. The engineering, equipment and construction costs are not included in the project’s original budget.

A full replacement of the 4160V switchgear is the proper long-term solution for the gear and is the better option than a retrofit for the following reasons:

1. The existing Gear is original to the Plant and of critical importance to its operation. It is expected that the ongoing Plant electrical reliability study, while not complete, will place the Gear high on its priority list for replacement. The 10-year plan is expected to be adjusted to include the entire Gear.
2. Designing to accommodate a previously retrofitted emergency supply control reduces efficiencies and may limit options for replacement in the future. A retrofit may need to be abandoned and replaced entirely as part of a new build.
3. Building a new Switchgear in coordination with the replacement of the emergency generating system will allow for an overall, and integrated approach, to the Plant’s entire power system.

Consultation:

This report was prepared in consultation with Eaton Electrical, Schneider Electrical, EXP, and LAWSS-OCWA staff.

Financial Implications:

If the Board wishes to replace the Plant’s 4160V Switchgear as part of the 2019 Generator Replacement Project, a \$1.61million increase to the budget will be needed. EXP has provided a quote in the amount of \$115,000+H.S.T. to incorporate the switchgear’s replacement in its entirety into the generator project. EXP quote attached.

This report was prepared by Clinton Harper, LAWSS General Manager

Attachment(s): EXP- Fee Proposal for Engineering Services Supplement S5-
4160V Main Switchgear Replacement

Schneider Electric Modernization Options: New Switchgear
solution vs. Retrofit Solution



December 11, 2018

EXP Ref: 18-051

VIA EMAIL ONLY DECEMBER 11, 2018
(clinton.harper@lawss.org)

Lambton Area Water Supply System
1215 Fort Street
Sarnia, ON N7V 1M1

Attention: Clinton Harper
Water System Engineering Technologist

Dear Clinton,

Request for Proposal No. 18-131
Engineering Design for Replacement of Emergency Generators
FEE PROPOSAL FOR ENGINEERING SERVICES
SUPPLEMENT S5 – 4.16kV MAIN SWITCHGEAR REPLACEMENT

As requested, we are pleased to offer this supplemental fee proposal to provide engineering services for the design and construction administration of the replacement of the existing main 4.16kV Federal Pioneer Switchgear.

UNDERSTANDING OF PROJECT

The Switchgear dates back to the original installation from 1972. Due to the age of the gear, it has been a challenge to find replacement parts and service options for the existing Switchgear. The replacement of the Switchgear has to be very carefully planned and executed in order to keep the downtime of the gear to the very minimum, as it provides power to all of the critical equipment in the facility.

SCOPE OF ENGINEERING SERVICES

Our scope of services includes the following:

Schematic Design Phase

- Perform detailed site investigation to review the existing Switchgear equipment and associated cabling, room dimensions, clearance requirements, structural constraints.
- Review As-Built drawings and existing equipment Shop drawings.
- Investigate feasibility of extending conduits and cables from existing terminations to new location of Switchgear.
- Meet with LAWSS to confirm specific requirements related to the Switchgear, such as HMI interface, SCADA, remote operations.

- Coordinate with equipment suppliers to determine the optimum demolition sequence for replacement of the existing Switchgear, while minimizing the downtime.
- Request quotations for supply of Switchgear, controls, engineering support and commissioning of the Switchgear.
- Prepare a report listing all the concerns with the existing Switchgear and benefits of replacing the Switchgear vs. Retrofitting.
- Analyze the various sequencing options of replacing the Switchgear as proposed by different manufacturers.
- Summarize the findings in a report, with a proposed schedule of demolition and installation of new Switchgear.
- Prepare order of magnitude construction costs for the supply and installation of the new Switchgear.

Design Development / Construction Documents Phase

- Prepare Single Line Diagram, layouts, sections, and specifications with schematics and sequence of operations.
- Detail transfer scheme between normal and emergency power supply, using existing scheme in-place and sequence of operations.
- Provide drawings to indicate scope of work related to modification to existing service cables and cables from the Generator synchronization panel.
- Coordinate with LAWSS the acceptable downtime sequence and incorporate into demolition and construction schedule.
- Update order of magnitude construction costs for the supply and installation of the new Switchgear.
- Provide drawings and specifications, suitable for pre-selection of Switchgear supplier through a letter of intent.
- Drawing will be prepared using AutoCAD 2016.

Award and Pre-Construction Phase

- Respond to Requests for Information (RFI's), questions and concerns raised during pre-selection of equipment supplier stage.
- Discuss with LAWSS the bids received from pre-selected Switchgear suppliers and provide recommendations.
- Select the preferred supplier & provide a letter of intent for the supply, engineering support and commissioning of the new Switchgear.
- Engage with the selected equipment supplier's execution team and coordinate delivery, scheduling and sequence of demolition and construction.
- Project milestone dates and update proposed construction schedule.

Construction Phase

- Shop Drawing review and mark-up.
- Respond to Requests for Information (RFI's), questions and concerns raised during construction.
- Organize periodic coordination meetings with the General Contractor and its sub-trades, the equipment supplier's execution team and LAWSS.
- Attend site meetings to coordinate progress of construction by sub-trades to ensure cabling and



conduits are in-place before equipment replacement.

- Prepare a site report for each site visit.
- Assist with scheduling issues, and update construction schedule on a weekly basis.
- Update LAWSS for any change in delivery dates and/or construction roadblocks.
- Coordinate testing and commissioning schedule with equipment supplier's execution team.
- Assist with coordination of submission of O&M manuals and as-built drawings with the equipment supplier and electrical contractor.
- Provide deficiency review after completion of construction and issue a report to address deficiencies.
- Upon completion of the work, provide confirmation that the general review has been carried out in accordance with the requirements of the Professional Engineers Act.

Our scope of engineering services does not include the following:

- An in-person presentation of the report.

PROJECT TEAM

The project team shall remain the same as per the original bid proposal. All services will be provided out of our London office. Additional staff may be assigned as required.

FEEES FOR ENGINEERING SERVICES

Our fee to provide the above scope of engineering services is **\$115,000 + HST**.

All disbursements (travel, printing, courier costs) are included in the fee proposal.

Our hourly rate fee structure for changes to the work including revisions required due to site plan modifications are as follows:

- Principal **\$190**
- Senior Staff **\$140**
- Intermediate Staff **\$110**
- Junior Staff **\$ 85**
- Clerical Staff **\$ 65**

Additional Site Visits **\$600/Visit**

AUTHORIZATION

We will proceed with the work upon receipt of your written approval. Please forward an updated or new Purchase Order for our records.

We trust that this proposal meets your immediate needs. Please contact me if you require additional information or clarification.

EXP 18-051

Request for Proposal No. 18-131
Engineering Design for Replacement of Emergency Generators
FEE PROPOSAL FOR ENGINEERING SERVICES
SUPPLEMENT S5 – 4.16kV MAIN SWITCHGEAR REPLACEMENT



Sincerely,

EXP Services Inc.

A handwritten signature in black ink that reads "B. Deneau".

Brad Deneau, P.Eng.
Manager, MEP Services

A handwritten signature in black ink that reads "Arka Mukherjee".

Arka Mukherjee, P.E., P.Eng.
Manager of Electrical Engineering

August 15, 2018

Modernization Options: New Switchgear solution vs. Retrofit solution

Dear Mr. Mukherjee of EXP,

While proper circuit breaker maintenance will preserve reliability and functionality, upgrading offers benefits that maintenance alone cannot provide, such as renewed access to spare parts, extended warranties, and new features. Modernization with a retrofit design is a cost-effective way to upgrade by selectively replacing obsolete, worn out devices, while retaining infrastructure that is still useful. An alternative option is to consider Modernization by replacing the entire switchboard with a Newly designed switchboard. This approach differs from a retrofit solution as all the gear is new and will have a new start to the longevity of the electrical infrastructure.

Circuit breakers are electro-mechanical devices that provide protection for both equipment and personnel. Internally, electricity is controlled by movable contacts that have the ability to stop tens of thousands of amps of current, and whose design ensures arcs are minimized and quickly extinguished. Both the contacts and the arc-chutes can wear based on the number and intensity of cycles they have been exposed to, and the remainder of the product, the mechanical switching mechanisms, can deteriorate due to environmental conditions, over-use, or even under-use. Switchgear, the "big grey boxes" in the electrical cabinet, typically house a number of circuit breakers per section, but are not electro-mechanical and do not serve as switch points. They house and conduct power, while the circuit breakers provide control and protection. In a Modernization retrofit, circuit breakers are replaced, while the switchgear is retained. This selective approach to upgrading ensures only the required components are replaced, saving time and money. The exterior frame design of the new breaker fits directly into the older switchgear and the actual breakers are brand new, off the shelf units, with an improved design and enhanced mechanical endurance.

Replacing the existing switchboard with a completely new switchboard will provide all the same benefits as a retrofit but also have enhanced benefits with new bussing, footprint & design & possible upsizing. Also start the longevity of the infrastructure from day 1 once properly installed & commissioned. As the existing switchboard at LAWSS is of age (45 years) and properly provided overcurrent protection to the loads for all this time. This option may have added costs over the retrofit and longer outages for a qualified electrical contractor to install & coordinate but would provide the greater long-term solution.

We recommend you consider both options with their benefits in reviewing closely with your consulting engineer & Schneider Electric Sales Representatives to learn more & execute the Modernization options of your electrical distribution equipment.

Regards,



Peter Topolovec
Service Sales Representative
Schneider Electric

Schneider Electric

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