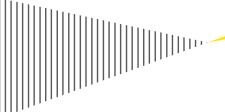# Specified Procedures Report
Electronic Voting System

Halifax Regional Municipality

2016 Municipal and School Board Elections

Advanced polling Specified Procedures

18 October 2016

EY
Building a better
working world

Report on results of applying Specified Procedures on the electronic voting system used during the advanced polling period for the Halifax Regional Municipality 2016 Municipal and School Board Elections

To the Returning Officer
Halifax Regional Municipality

As specifically agreed, Ernst & Young LLP ("we" or "EY") have performed the procedures detailed in Appendix A (the "Specified Procedures") in connection with the electronic voting system used during the advanced polling period for the Halifax Regional Municipality ("HRM") 2016 Municipal and School Board Elections.

The results of applying the Specified Procedures are set out in Appendix A. The Specified Procedures performed do not constitute an audit or review engagement and, accordingly, no assurance is expressed. Had we performed additional procedures, an audit or review engagement, other matters might have come to light that would have been reported. The sufficiency and appropriateness of the Specified Procedures described in this report are solely the responsibility of the Returning Officer. Consequently, we make no representation regarding questions of legal interpretation or regarding the sufficiency and adequacy of the Specified Procedures described in Appendix A, either for the purpose for which this report has been requested, or for any other purposes.

This report is intended solely for the purpose of assisting the Returning Officer in evaluating the electronic voting system used in the HRM 2016 Municipal and School Board Elections during the advanced polling period. Any use that a third party makes of our report, and any reliance or decisions made based on it, are the responsibility of such third party. We accept no responsibility for any loss or damages suffered by any third party as a result of decisions made or actions taken based on our report.

Ernst & Young LLP

Halifax, Canada
18 October 2016

Chartered Professional Accountants

Overview

Background

The Halifax Regional Municipality ("HRM") engaged a third party, Intelivote Systems Inc. ("Intelivote" or the "software service provider"), to support the electronic voting process during the advanced polling period of the 2016 Municipal and School Board Elections. EY was engaged by HRM to perform Specified Procedures before, during and after the electronic voting portion of the advanced polling period.

Electronic voting was available during the advanced polling period (between 8:00 a.m. on 04 October 2016 and 7:00 p.m. on 13 October 2016).

Definition of terms used in this report

For ease of reading, certain terms, acronyms and abbreviations are used within the body of the report. These are explained below:

► **.csv** (Comma Separated Values) and **.sql** (Structured Query Language) – format of the files obtained for the performance of the Specified Procedures.

► **Active** – a state of the electronic voting system where the system is active and actual electronic voting is performed. Audit votes cast via Internet and IVR systems during the advanced polling period were cast at this state of the electronic voting system.

► **Audit PIN/PINs** – PINs that were generated using the electronic voting system's Auditor Module, which were separately identified and segregated from the Voter PINs, used to perform the Specified Procedures.

► **Audit votes** – votes that were generated and segregated from the electronic voting system so that they can be monitored and are used to perform the Specified Procedures.

► **Auditor Module** – a module in the electronic voting system that is used to generate Audit PINs, cast audit votes before the advanced polling period and generate electronic voting results before, during and after the advanced polling period.

► **Auditor Module Zero Vote Count report** – Vote Count Summary and Vote Count Summary (No Audit Votes) reports which contains the electronic voting results. The reports were generated just before the start of the advanced polling period to validate that no votes were recorded.

► **CSAP** - Conseil scolaire acadien provincial School Board

► **Electronic voting** – voting via telephone or via computer.

► **Internet system** – a component of the electronic voting system used to support computer-based voting through www.hrm.isivote.com website. Audit PINs were used in this system to cast audit votes during the advanced polling period.

► **ISI modules** – Intelivote System Inc.'s electronic voting system modules.

► **IVR** (Interactive Voice Response) **system** – a component of the electronic voting system used to support telephone-based voting through the 1-888-357-3435 toll free number. Audit PINs were used in this system to cast audit votes during the advanced polling period.

► **Loaded** – a state of the electronic voting system where audit votes can be cast via Internet and IVR systems before the advanced polling period. Audit votes were cast during this state of the electronic voting system process.

► **Municipal Election Management System** – the electronic system used to store data of the voters within the Halifax Regional Municipality.

► **Oracle** – Oracle database management system of the electronic voting system.

► **PIN/PINs** (Personal Identification Number) - this number, along with the date of birth, is used to login and vote in the electronic voting system.

► **USB** (Universal Serial Bus) – storage media used to store the encrypted file extract containing the election results from the electronic voting system database.

Data files used in executing the Specified Procedures

HRM and Intelivote provided the following data files from their information systems to support certain Specified Procedures.

Organization	File name	File contents	As referenced in the Appendix A Specified Procedures
HRM	2016-09-02_045012_CsvExport_EvotingVendor.csv	The HRM voter information recorded in the HRM system	Elector data extract HRM data extract
	2016CandidateList.pdf	List of candidates from https://www.halifax.ca/election/CandidateList.php	Listing of all acclaimed and non-acclaimed candidates
Intelivote	electorsPipeD.csv	The HRM voter information generated from Intelivote (that were already loaded in the electronic voting system)	Software service provider data extract
	pinExtract.sql	Structured Query Language commands to generate the PINs and to identify duplicate PINs	Intelivote's Oracle script test

Organization	File name	File contents	As referenced in the Appendix A Specified Procedures
Intelivote	ISIPINFIleExtract.csv	List of all PINs in the electronic voting system (assigned to voters and unassigned)	PINs
	OID_UserGroup_HRM_event2719_Sep 29.xls	List of user IDs (excluding those that were assigned to candidates) and the corresponding group membership/access to different modules of the Intelivote's electronic voting system	System users who can access the electronic voting system (application)
	OID_CandidaterGroup_HRM_event2719_Sep 29.xls	List of user IDs that were assigned to candidates that have access to the candidate module of the Intelivote's electronic voting system	System users who can access the electronic voting system (application)
	serverInfo.zip	Zip file containing 25 files of system-generated lists of users at the operating system and database levels of Intelivote's electronic voting system	System users who can access the electronic voting system (operating system and database)

We relied on HRM and Intelivote to provide us with complete, accurate and reliable data files, as described above, on which we performed the Specified Procedures. We did not verify the completeness, accuracy or integrity of this data against any independent source other than as described in the Specified Procedures.

Appendix A – Specified Procedures on the electronic voting system used during the advanced polling period for the HRM 2016 Municipal and School Board Elections and the results of the Specified Procedures

	Specified Procedures	Results	Timing and occurrence of Specified Procedures[1]		
			Before	During	After
1	Obtain the elector data extract and the software service provider data extract.		X		
	Sub-procedure A – Compare the total number of records (including totals for Name, Address, Date of Birth and District) for all records in the two data extracts.	Sub-procedure A — The total number of records for the elector data extract was 304,652, and the total number of records in the software service provider data extract was 304,652.			
	Sub-Procedure B – Enquire with the Halifax Regional Municipality Returning Officer as to the reason for any discrepancies.	Sub-procedure B — No discrepancies were noted in the total number of records (including totals for Name, Address, Date of Birth and District) in the two data extracts.			

---

[1] Note – Electronic voting was available between 8:00 a.m. 04 October 2016 and 7:00 p.m. 13 October 2016. The "Before" period is defined as the period between 01 September 2016 and the start of the electronic advanced voting period. The "During" period is defined as the period where electronic voting was available. The "After" period is defined as the period between the end of the electronic advanced voting period and 18 October 2016. The Specified Procedures were carried out at various times during these periods, as indicated in the Results tables and the results apply only to the particular time(s) indicated.

	Specified Procedures	Results	Timing and occurrence of Specified Procedures		
			Before	During	After
2	Using the HRM data extract noted in Procedure 1, randomly select a sample of 25 records and visually compare on screen that the Name, Address, Date of Birth, and District are consistent with the data in the municipal election management system.	Name, Address, Date of Birth and District were consistent between the HRM data extract and the HRM Municipal Election Management System for the sample of 25 records selected.	X		
3	Identify whether duplicate PINs exist in the data extract by reviewing the output of Intelivote's Oracle script test. As the PIN is the main index in the database and the index must be unique, the load will fail if each PIN is not unique.	There were no duplicate PINs noted.	X		
4	Obtain a listing of all system users who can access the electronic voting system (application, operating system and database). Note – ISI modules are included. Obtain representation from the Returning Officer (application layer) and software service provider System Representative (database and operating system layers) that those listed users are appropriate.	Representations from the HRM Returning Officer and Intelivote System Representative indicated that all listed system users of the ISI electronic voting system (application and module access; operating systems; and database layers) were appropriate.	X		

	Specified Procedures	Results	Timing and occurrence of Specified Procedures		
			Before	During	After
5	Obtain a listing of all non-acclaimed candidates and their districts from the municipality. Using Audit PINs: Sub-procedure A – Visually inspect that all candidate names are set up in the Internet system and are assigned to the correct district. Sub-procedure B – Listen and validate that the candidate names are audible/set up in the IVR system and are assigned to the correct district.	Sub-procedure A – All non-acclaimed candidate names were set up and assigned to the correct district in the Internet system. Sub-procedure B – All non-acclaimed candidate names were audible/set up and assigned to the correct district in the IVR system.	X		
6	Attempt to log on to the electronic voting system via telephone to cast votes prior to the polling period.	Attempted to log on to the electronic voting system via telephone (1-888-357-3435) and noted that access was denied for the following indicated times: ► 4 October 2016 at 7:30 a.m. ► 4 October 2016 between 7:55 a.m. and 7:59 a.m.	X		

	Specified Procedures	Results	Timing and occurrence of Specified Procedures		
			Before	During	After
7	Attempt to log on to the electronic voting system via the Internet to cast votes prior to the polling period.	Attempted to log on to the electronic voting system via the Internet (www.hrm.isivote.com) and noted that access was denied for the following indicated times: ► 4 October 2016 at 7:30 a.m. ► 4 October 2016 between 7:55 a.m. and 7:59 a.m.	X		
8	Attempt to log on to the IVR and the Internet system with a PIN that is set to "disabled" status.	Access to the electronic voting system via the IVR and the Internet systems using a PIN that was set to "disabled" was denied.	X	X	

	Specified Procedures	Results	Timing and occurrence of Specified Procedures		
			Before	During	After
9	In the loaded and active environments, perform pre-defined voting selections[2] and attempts for a population of audit voters.		X	X	
	Validate that the results match those that were expected from the pre-defined voting selections for the population of audit voters.	Election results matched those that were expected from the pre-defined voting selections for the population of audit votes.			
	Validate that the cast blank ballots did not enter into the election results as valid votes, but as spoiled ballots.	For all races, except the CSAP race, the Internet and the IVR systems did not allow for casting blank ballots.			
		For the CSAP race, the Internet and the IVR systems allowed for casting blank ballots. Cast blank ballots did not enter into the election results as valid votes, but instead were recorded as spoiled ballots.			
	View the details of each audit ballot using the Auditor Module to verify the audit vote was counted as cast.	973 audit votes were cast and 973 votes were counted as cast.			

---

[2] Please reference procedures 10-1 to 10-6 below for the pre-defined voting selections.

	Specified Procedures	Results	Timing and occurrence of Specified Procedures		
			Before	During	After
10-1	Using Audit PINs, cast a vote for each non-acclaimed candidate using the Internet and the IVR systems. Observe that a vote could be cast for each non-acclaimed candidate.	A vote could be cast for each non-acclaimed candidate in the electronic voting system via the Internet and the IVR systems.	X	X	
10-2	Using an Audit PIN that has already been used to cast a vote, observe whether additional votes can be cast and recorded in the electronic voting system with the same Audit PIN. Sub-procedure A – Attempt to log on and vote for the same candidate as the original vote. Sub-procedure B – Attempt to vote for a different candidate in the same matter.	 Sub-procedure A – Additional votes for the same candidate as the original vote could not be cast in the electronic voting system via the Internet or the IVR systems for an Audit PIN that had already been used to cast a vote. Sub-procedure B – Additional votes for a different candidate could not be cast in the electronic voting system via the Internet or the IVR systems for an Audit PIN that had already been used to cast a vote.	X	X	

	Specified Procedures	Results	Timing and occurrence of Specified Procedures		
			Before	During	After
10-3	Using a computer that was already used to cast a complete electronic voting session, conduct two additional complete electronic voting sessions from the same computer using unused audit voter credentials. Observe whether the Internet system will record the electronic votes from three unique Audit PINs using the same device.	The electronic voting system via the Internet system recorded the unique electronic votes from the six audit voter credentials using the same device. Three audit voter credentials were used before the advanced voting period, and three audit voter credentials were used during the advanced voting period.	X	X	
10-4	Sub-Procedure A: Using an Audit PIN, complete an electronic voting session by voting in all eligible matters using the IVR system. Sub-Procedure B: Using the same Audit PIN, attempt to use the Internet system to conduct an additional complete electronic voting session by voting for the same candidates as voted for using the IVR system. Observe whether additional votes can be cast for those candidates.	The Audit PINs that were used for a completed electronic voting sessions in the electronic voting system via IVR could not be used to log on to the electronic voting system via the Internet system.	X	X	

	Specified Procedures	Results	Timing and occurrence of Specified Procedures		
			Before	During	After
10-5	Begin a voting session, using an Audit PIN vote for each eligible race and obtain confirmation of that vote. Disconnect from the system (disconnect access, hang up). Log back into the system using the same credentials and observe whether the Audit PIN is able to vote for each eligible race. Observe whether only one vote has been cast for each eligible race.	Obtained confirmation of the vote for each eligible race in both the Internet and the IVR systems; then upon disconnecting and logging back into the Internet and the IVR systems using the same Audit PIN, the systems provided messages indicating that voting had already been completed and would not allow a new vote, with only one vote being cast for each eligible race.	X	X	

	Specified Procedures	Results	Timing and occurrence of Specified Procedures		
			Before	During	After
10-6	Begin a voting session (Internet or IVR). Keep the session active. Using a different physical computer or IVR, attempt to log on to the system using the same set of credentials and observe whether the system will allow the log on. If allowed, attempt to cast a vote in each session. Observe whether only one vote has been counted.	The electronic voting session via the Internet system was denied using the same set of credentials used for the active electronic voting session via the IVR system. The electronic voting session via the IVR system was denied using the same set of credentials used for the active electronic voting session via the Internet system.	X	X	
11	Obtain the pre-election Auditor Module Zero Vote Count report from Intelivote's electronic voting system and observe whether there are any votes recorded. The timing of this procedure is to occur within five minutes prior to the advanced polling period start time.	No votes were recorded in the Vote Count Summary Reports prior to the advanced polling period start time.	X		

	Specified Procedures	Results	Timing and occurrence of Specified Procedures		
			Before	During	After
12	Attempt to log on to the IVR system to cast votes after the electronic polling period has ended.	Attempted to log onto the electronic voting system via the IVR system on 13 October 2016 at 7:00 p.m. and noted a message indicating, "I'm sorry. The electronic voting period has ended. Please refer to your voter instruction letter for further information. Thank you."			X
13	Attempt to log on to the Internet system to cast votes after the electronic polling period has ended.	Attempted to log onto the electronic voting system via the Internet system and noted for the following messages at the following indicated times: ► 13 October 2016 at 7:00 p.m. "Sorry, this Event has concluded." ► 13 October 2016 after 7:00 p.m. "Electronic advance voting has ended. Paper voting will be available on Election Day, Saturday, October 15th. Please refer to your voter instruction letter for more details."			X

	Specified Procedures	Results	Timing and occurrence of Specified Procedures		
			Before	During	After
14	At the close of the electronic advanced polling period (13 October 2016, 7:00 p.m.), observe the following:				X
	1. Intelivote will create an extract file from their database containing the election results. This file will be encrypted and written to two separate USB flash drives. Obtain one copy and observe that the other copy has been provided to the Returning Officer. The password will only be provided to the Returning Officer.	Observed that the extract file containing the election results was encrypted and written to two separate USB flash drives. Observed that the Returning Officer entered the password during encryption and the password was not shared with anyone. Obtained one of the USB flash drives and observed that the other copy had been provided to the Returning Officer.			
	2. Intelivote will create a printed report of the election results and will place this in a sealed envelope. Signatures of the Returning Officer and EY will be applied to the seal area. This report will be provided to the Returning Officer.	Observed that Intelivote generated the printed report of the election results and provided the report facing down to EY. Validated that there were vote counts for each non-acclaimed candidates in the report and placed the report in the sealed envelope without revealing the results to the Intelivote personnel and Returning Officer. Signed the sealed area of the envelope and then observed the Returning Officer signing the same sealed area. Observed that the sealed envelope was provided to the Returning Officer.			

	Specified Procedures	Results	Timing and occurrence of Specified Procedures		
			Before	During	After
15	Election Close (15 October 2016, 7:00 p.m.): After the close of the election. EY, using the Auditor Module, will print off the election results using their ID, and compare the electronic voting results they just printed with the electronic voting results from the Returning Officer's report printed earlier at the close of the advanced voting on 13 October 2016. The vote counts should be equal, demonstrating no additional votes were added to the system since the advanced voting period ended.	Using the Auditor Module, generated and printed the election results using the EY's ID on 15 October 2016 at 7:01 p.m. Observed the Returning Officer open the sealed envelope. Compared the electronic voting results from the sealed envelope with the electronic voting results printed at the close of the advanced voting and noted that the vote counts were equal, demonstrating no additional votes were added to the system since the advanced voting period ended.			X