Advisory Committee on Standards for Voting Technologies

Committee Report

Greg Essensa, Chief Electoral Officer for Ontario
26 Prince Andrew Place
Toronto, Ontario,
M3C 2H4

Dear Mr. Essensa,

It is with great pleasure that I submit the comprehensive set of Standards, as developed, and approved by the Advisory Committee on Standards for Voting Technologies (ACSVT) comprised of three Chief Electoral Officer appointees and seven political party appointees, as was prescribed in Ontario's *Election Act:*

- *ACSVT Final Report;*
- *Recommendations for Management Standards on Electronic Poll Books and Vote Tabulators;*
- *DGSI-119-1, Election and Voting Technologies – Part 1: Vote Tabulators;* and
- *DGSI-119-2, Election and Voting Technologies – Part 2: Electronic Poll Books.*

Since the ACSVT was established on August 20, 2021, it has worked diligently to draft and refine the Standards and provide recommendations. Completion of these Standards represents a significant milestone in the ongoing effort to enhance the integrity of the electoral process in Ontario. These Standards cover an array of aspects related to voting technology, including accessibility, security, transparency, and efficiency.
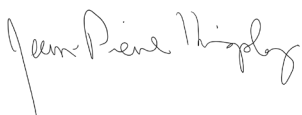
The ACSVT partnered with the Digital Governance Standard Institute (DGSI) to ensure that a wide range of technical expertise and perspectives were consulted during the development of these rigorous Standards. To achieve this objective, the DGSI formed a Technical Committee comprised of 94 volunteers including election administrators, policymakers, technical experts, vendors, academics, and advocacy groups. In addition, the DGSI managed a 60-day public review and consultation to ensure Ontarians were able to participate in the development of the Standards.

The ACSVT firmly believes that the Standards not only align with Elections Ontario's mission to facilitate a fair and accessible voting process, but also serve as a benchmark for excellence in the field of voting technology for other electoral management bodies who choose to adopt these Standards. The Standards reflect the collective expertise, insights, and dedication of our committee members, as well as the invaluable input received from stakeholders and subject-matter experts.

In our deliberations, the ACSVT strived to create a flexible framework that meets the immediate requirements of today's modern electoral landscape as well as the democratic environment of the future. The submission of these Standards represents the shared commitment to preserving the integrity of our electoral system while enhancing the democratic process for Ontario's electorate. We are confident that these Standards will contribute significantly to achieving such objectives.

We would like to express our gratitude for the opportunity to serve on this committee and to contribute to the improvement of Ontario's electoral voting process. We look forward to your review of the Standards.

Respectfully submitted,

Jean-Pierre Kingsley, Chair, Advisory Committee on Standards for Voting Technologies

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Executive Summary

Since 2011, the Chief Electoral Officer of Ontario has recommended to the Legislative Assembly that standards were needed to establish baseline requirements for the use of voting technology[1] in the province's elections. In 2021, the Legislative Assembly of Ontario amended the *Election Act* through provisions introduced in the *Protecting Ontario Elections Act, 2021.* These amendments granted the Chief Electoral Officer of Ontario the authority to establish an Advisory Committee on Standards for Voting Technologies (ACSVT). The Chief Electoral Officer established this committee in August 2021.

Under its Terms of Reference, the ACSVT was authorized to make recommendations to the Chief Electoral Officer of Ontario for standards on vote counting equipment and voting equipment used in Ontario provincial elections. As required by the legislation, the committee was composed of up to two members from each political party that had a seat in the Ontario Legislative Assembly. In addition, the Chief Electoral Officer of Ontario had the flexibility to appoint three other non-political members, including a non-partisan and independent Chair. The Chief Electoral Officer also chose to appoint two academic experts in the areas of standards development and in the use of voting technologies in elections.

To ensure the broadest range of technical expertise possible, the ACSVT partnered with the Digital Governance Standards Institute (DGSI), a Canadian accredited Standards Development Organization (SDO), to assist with the standards development process. The DGSI Technical Committee was comprised of 94 members including experts in cybersecurity, political science, public policy, election administration, and related subjects.

The DGSI Technical Committee developed through a rigorous iterative process. A total of 12 Technical Committee meetings were held to discuss the following voluntary Product Standards on electronic poll books and vote tabulators:

- *DGSI-119-1, Election and Voting Technologies – Part 1: Vote Tabulators* (commonly referred to as the "Vote Tabulator Product Standard" in this report); and

- *DGSI-119-2, Election and Voting Technologies – Part 2: Electronic Poll Books* (commonly referred to as the "Electronic Poll Book Product Standard" in this report).

The development of the Product Standards was carried out under the guidance of the ACSVT and was in accordance with the Standards Council of Canada's (SCC) *Requirements & Guidance – Accreditation of Standards Development Organizations.*

The DGSI also conducted a 60-day public review period to ensure interested members of the public had an opportunity to comment on the voluntary standards. Both the ACSVT and the DGSI Technical Committee gave close consideration to integrating the views expressed to achieve a balance between usability and security while maintaining the integrity of the electoral process.

The *Recommendations for Management Standards on Electronic Poll Books and Vote Tabulators* (commonly referred to as the "Management Standard" throughout this report) was developed by the ACSVT in parallel with the two DGSI Product Standards. The Management Standard sets out minimum requirements for electoral management bodies to use as a baseline for operational requirements when using voting technologies and is to be used in combination with the Product Standards.

This report provides a comprehensive overview of the activities that guided the drafting and approval processes of the Management Standard as well as the two Product Standards for Vote Tabulators and Electronic Poll Books.

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1 For the purposes of clarity, the term "voting technology" refers to all election technology unless explicitly stated.

Signatures of the ACSVT Members

X _(signature)_

Jean-Pierre Kingsley,
ACSVT Chair

X _(signature)_

Dr. Nicole Goodman,
Chief Electoral Officer Appointee

X _(signature)_

Dr. Mkabi Walcott,
Chief Electoral Officer Appointee

X _(signature)_

Michael Crase, Political Party Appointee, Progressive Conservative Party of Ontario

X _(signature)_

Dan Duncan, Political Party Appointee, Progressive Conservative Party of Ontario

X _(signature)_

Karla Webber-Gallagher, Political Party Appointee, New Democratic Party of Ontario

X _(signature)_

Donald Eady, Political Party Appointee, New Democratic Party of Ontario

X _(signature)_

Milton Chan, Political Party Appointee, Ontario Liberal Party

X _(signature)_

Christine McMillan, Political Party Appointee, Ontario Liberal Party

X _(signature)_

Craig Cantin, Political Party Appointee, Green Party of Ontario

Mandate of the Advisory Committee on Standards for Voting Technologies

The ACSVT was established in accordance with amendments to Ontario's *Election Act* introduced through Bill 254, *Protecting Ontario Elections Act, 2021[2]*. The ACSVT was mandated to provide recommendations, when consulted by the Chief Electoral Officer of Ontario, concerning standards for voting equipment and vote counting equipment, specifically vote tabulators and electronic poll books, used in Ontario provincial elections.

The Terms of Reference created by Elections Ontario for the conduct of the ACSVT ensured it would be an autonomous committee that developed its recommendations independently. The ACSVT was made of up to two individuals from each political party represented in the Legislative Assembly of Ontario. These representatives were chosen by each party respectively. Three other members were appointed by the Chief Electoral Officer of Ontario. The following section provides information about each of the ACSVT members.

Committee Members — Appointed by the Chief Electoral Officer

Jean-Pierre Kingsley, Committee Chair

Jean-Pierre Kingsley served as Canada's Chief Electoral Officer from 1990 to 2007. During his term, he ushered in reforms needed to comply with the *Canadian Charter of Rights and Freedoms* and led Elections Canada into the age of computerized election administration. His many achievements include the introduction of the 36-day election calendar and digitized electoral geography systems and products. Mr. Kingsley also established the National Register of Electors and helped expand the election financing regime to regulate third-party advertising and election financing of all political entities, making the electoral process fair and more transparent. On his watch, Elections Canada developed a new website that serves as a comprehensive tool for public information. In addition, following Mr. Kingsley's recommendations to Parliament, the *Canada Elections Act* was amended in 2006 to authorize the Chief Electoral Officer to appoint returning officers. During his tenure, Elections Canada assumed a frontline position in the international arena, particularly in Mexico and South Africa, leading the observation missions in 2006 in Haiti and Iraq.

After Mr. Kingsley left Elections Canada, he served as the President and Chief Executive Officer of the International Foundation for Electoral Systems in Washington, D.C. Previously, Mr. Kingsley had been the Chief Executive Officer of the Ottawa General Hospital, where under his management, construction concluded within budget and three months before schedule. Mr. Kingsley also served as Executive Director of Charles Camsell Hospital in Edmonton and as the Chairman of the Board of the Hôpital Montfort in Ottawa. Mr. Kingsley held posts at IBM, Travelers Assurance, Veteran Affairs Canada, Health and Welfare Canada, Canada's Public Service Commission, and the Secretariat of the Treasury Board of Canada. He was responsible for the code on conflicts of interest at the Cabinet of Prime Minister Brian Mulroney.

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2   Bill 254, *Protecting Ontario Elections Act,* R.S.O 2021, c 5, s 4.5.1

Dr. Nicole Goodman, Chief Electoral Officer Appointee

Dr. Nicole Goodman holds the Chancellor's Chair for Research Excellence and is an associate professor of Political Science at Brock University. Her research examines the impact of technology on civic participation and democracy. Her work has appeared in top journals and is frequently consulted by municipal, provincial/territorial, federal and Indigenous governments, not-for-profit organizations, parliamentary committees, and international governments. Through this work, she has become an internationally recognized authority on voting technologies. Nicole has designed and led large projects that have helped shape election policy in jurisdictions across Canada. She has also supported strategic policy change or stakeholder engagement in the areas of competition, open government, and election technologies. Her work has been supported by the Social Sciences and Humanities Research Council of Canada, Natural Sciences and Engineering Research Council of Canada, and Mitacs. Nicole currently represents Canada on the International Institute for Democracy and Electoral Assistance (International IDEA) Board of Advisers. She holds a Ph.D. in political science from Carleton University in Ottawa.

Dr. Mkabi Walcott, Chief Electoral Officer Appointee

Dr. Walcott's career has been marked by her remarkable contributions to the field of standardization and international relations. Most recently, she held the position of Vice President of Standards and International Relations at the Standards Council of Canada. In this role, Dr. Walcott exhibited her transformative leadership abilities by revitalizing the Standards and International Relations program. Under her stewardship, the national Standards and Quality Infrastructure (QI) system was strengthened which also resulted in enhancing Canada's global influence.

Her influence extended far beyond Canadian borders, as Dr. Walcott contributed to the evolution of the International Organization for Standardization (ISO). She served as a distinguished member of the ISO Technical Management Board from 2019 to 2022, demonstrating her commitment to shaping the world's largest developer and publisher of International Standards. Additionally, Dr. Walcott lent her expertise to the ISO Management System Standard Task Force (MSS TF) from 2020 to 2022 and the ISO Information Technology Advisory Group (ITSAG) from 2019 to 2021.

Further solidifying her position as a thought-leader, Dr. Walcott actively participated in other key committees and strategic initiatives. Her involvement in the IEC Council Board Strategic Plan Task Force (March 2020-2021), IEC Business Advisory Committee (2021-2022), ISO/DEVCO Chair's Advisory Group (2013-2017), and COPANT Board of Directors (2017 & 2018-2020) demonstrated her dedication to advancing international standards development. Notably, her contributions were instrumental in shaping the 2016-2020 ISO Action Plan for Developing Countries.

In a recent milestone, Dr. Walcott spearheaded the development of the Canadian National System Strategy, gaining approval in July 2022. This strategic blueprint outlines the direction and priorities for the National Standards ecosystem, setting the stage for future advancements.

Throughout her career, Dr. Walcott has generously shared her vast expertise through technical assistance initiatives, workshops, and collaborations with both public and private institutions. Her professional journey also encompassed independent consulting, in areas such as business process re-engineering, National Quality Infrastructure (NQI) development, standards implementation, organizational governance, management systems development, technical regulations, certification, and accreditation.

With over two decades of international leadership experience, Dr. Walcott is widely regarded as an expert and influencer in the realm of standardization. Her profound knowledge of ISO, IEC, and the broader international standardization ecosystem has left an indelible mark on the field, reflecting her enduring commitment to excellence and innovation.

Committee Members — Political Party Appointees

Michael Crase, Progressive Conservative Party of Ontario

Michael Crase is a political appointee for the Progressive Conservative Party of Ontario. Michael Crase was the former Executive Director for the Progressive Conservative Party of Ontario.

### Dan Duncan, Progressive Conservative Party of Ontario

Dan Duncan is a political appointee for the Progressive Conservative Party of Ontario. Dan currently serves as the Director of Infrastructure for the Progressive Conservative Party of Ontario.

Karla Webber-Gallagher, New Democratic Party of Ontario

Karla served as Principal Secretary to the Official Opposition at Queens Park from 2018 to 2022. Working directly with then Leader of the Party, Andrea Horwath, Karla is a senior strategist with a decade of experience in Ontario provincial and municipal politics, election campaigns, and the operation of a modern political party.

Karla has worked for the Ontario NDP in several capacities including as Provincial Director from 2015 to 2018. She has managed party operations, development, and outreach, and worked extensively with Elections Ontario in the lead-up to two General Elections and countless by-elections. Karla was the Ontario NDP's Deputy Campaign Director in the Party's breakthrough election in 2018.
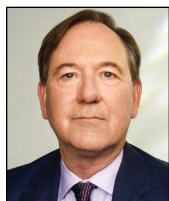
Donald Eady, New Democratic Party of Ontario

Don Eady practices union-side labour law, employment law, administrative law, and government relations. He has considerable experience in all aspects of labour relations, occupational health and safety, and workers' compensation. Don's clients are from a wide variety of industries and sectors including, the public service, the electrical sector, the construction industry, the education sector, the health sector, film and television production, mining and manufacturing, and professional athletics.

Don has also provided advice to various clients on election laws and election finance laws at the federal, provincial, and municipal levels. Over the years, Don has also been an inside and outside scrutineer on federal, provincial, and municipal campaigns.

Don has appeared before numerous administrative tribunals and trial and appellate courts in the Province of Ontario as well as the Supreme Court of Canada.

In 2005, Don co-authored a book entitled *Ontario Public Service Employment and Labour Law.* Don was counsel to the Ontario Public Service Employees Union with respect to the Walkerton Inquiry.

From 1991 to 1994, Don was Special Assistant to the Ontario Minister of Labour. He has been ranked by Chambers Global Canada, Lexpert, and named one of Canada's "Best Lawyers".

Christine McMillan, Ontario Liberal Party

Christine McMillan is a Partner at Crestview Strategy, based in Ottawa.

Christine brings over two decades of expertise in public affairs, having spent over ten years working with advising corporations and trade associations on government relations, stakeholder engagement, and issues management.

Recently, Christine served as the Ontario Liberal Party 2022 Campaign Director and was appointed Secretary-General to help run the 2020 Leadership Convention. Christine oversaw the 2013 Leadership process with the successful election of Premier Kathleen Wynne.

Prior to joining a public affairs firm in 2007, Christine spent just over a decade at Queens' Park, including playing a key role in Premier McGuinty's successful campaign as a member of his senior staff. In the successful 2007 election, Christine served as co-director of the Ontario Liberal war room.

Christine is a fellow at the Clayton H. Riddell Graduate Program in Political Management at Carleton University where she instructs graduate students in strategic communications.

Milton Chan, Ontario Liberal Party

Milton is currently the Chief of Staff and Corporate Secretary of the Toronto Region Board of Trade (TRBOT). Prior to joining TRBOT, he served as Chief of Staff to the Minister of Indigenous Relations and Reconciliation and as Director of Strategy and Operations in the Office of the Premier of Ontario. A lawyer by training, he practiced corporate law in private practice, and served as Enforcement Counsel at the Investment Industry Regulatory Organization of Canada, where he represented IIROC in regulatory, civil, and appeal proceedings at various levels of court and administrative tribunals in eight different provinces. He held public appointments as Chair of the Scarborough Property Standard Committee, and as a board member of the Condominium Management Regulatory Authority of Ontario.

In volunteer capacities, Milton serves as Ontario Liberal Party's honorary legal counsel, constitution committee chair, and chief returning officer for internal contests. Despite being a lawyer by training, his real partisan passions are data analytics, ground campaign operations, and field organization. A political activist since high school, he managed or played senior organizational roles in dozens of campaigns, earning a reputation as a data-driven, detail focused operative. He was a member of the National Board of Directors and National Platform Committee for the Liberal Party of Canada, and has volunteered in election campaigns in the US, Europe, and Asia.

Milton earned his law degree from Osgoode Hall Law School at York University and did undergraduate studies at the University of Waterloo and Ryerson University. He was called the bar of Ontario in 2008.

Craig Cantin, Green Party of Ontario

Craig has served in politics for over 30 years, including the past 18 years with the Green Party. This has included stints on Parliament Hill, with the federal party, and with the Green Party of Ontario.

Craig has spent time as the Deputy Executive Director and Interim Executive Director for the federal party, and as Deputy National Campaign Manager in 2008, 2011, and 2015. More recently, Craig has been the Director of Development for the provincial party over the past seven years.

Craig has worked on five national campaigns, three provincial campaigns, and countless local campaigns. He has been part of history in the making, electing Canada's first Green Member of Parliament in 2011, and Ontario's first Green Member of Provincial Parliament in 2018.

When not campaigning, Craig is outdoors planting permaculture orchards and going on hikes with his dog. Born and raised on the outskirts of Ottawa, Craig currently resides in Iroquois with his wife of 23 years after raising three wonderful daughters.

Background, Context, and Election Technology History

The implementation of voting technologies in elections has profoundly impacted electoral processes and administration. The use of voting technologies by governments and electoral management bodies has brought many benefits to voters, election administrators, political parties, and candidates. Voting technologies have also made voting easier by offering more voting choices, creating efficiencies in the electoral process, increasing the speed of election results reporting, and improving election integrity though reduction in administrative errors (Elections Ontario, 2018).

In recent years, the growth of technology in Canadian elections has increased significantly (Garnett, 2020). While the emergence of a digital era of elections is expanding and offering electors and administrators more opportunities, rising concerns and issues surrounding security, integrity, and scrutiny are also associated with these new developments. Considering these circumstances, jurisdictions around the world, such as the Council of Europe and the United States' Election Assistance Commission, have established standards and best practices to guide the use of voting technologies in election administration.

Since Elections Ontario began introducing election technology into the voting process in 2009, the agency has followed best practices to create policies and protocols to protect the integrity of Ontario's modernized elections. Throughout this innovation process, the Chief Electoral Officer understood that creating a uniform set of voting technology standards for Ontario to follow would help to protect the integrity of elections and uphold the trust of electors. Since 2011, Ontario's Chief Electoral Officer has recommended the establishment of standards for voting technologies. These standards would guide the province's election administrators as they consider adopting technology, evaluate technology used during electoral events, and consider future technologies (Elections Ontario, 2018).

In response, the Ontario Legislature amended the Ontario *Election Act* through Bill 254, *Protecting Ontario Elections Act, 2021* to develop standards for voting equipment and vote counting equipment used to administer Ontario's provincial elections. While the development of these standards focused on the legislative mandate outlined in Bill 254, it was understood by the ACSVT that these standards could be used as an initial foundation by other Canadian governments and electoral management bodies to build out broader frameworks for their own standards or regulation.

At times, it can be difficult for Canadian electors to decipher which specific electoral management body is responsible for administering elections in their jurisdiction. This creates reputational risks among electoral management bodies as they conduct elections in their respective jurisdictions at different levels (e.g., municipal, provincial, or federal). While electoral management bodies in Canada currently enjoy high levels of trust in the elections they administer, this trust needs to be renewed with each election cycle. The presence of inconsistent practices and uses of technology between jurisdictions increases the potential risk of using technology in elections and resulting incidents could compromise trust. As such, it is critical that a set of common, adaptable standards are developed to provide a framework for voting technologies, based on core democratic principles, to ensure elections are democratic, secure, transparent, and accessible to voters.

Election Technology: History of Use

Over the past several decades, voting technologies such as ballot marking devices, vote tabulators, direct-recording electronic (DRE) voting machines, and electronic poll books have been trialed and adopted in several countries around the world. The most widespread use of vote tabulators and electronic poll books has been in the United States. Voting technologies have generated much scrutiny and public concern despite their capacity to enhance voter accessibility and convenience and enhance efficiency. Voting technologies also enable election administrators to better serve electors faster, reduce the overall number of staff required, and reduce administrative errors.

In Canada, the use of voting technologies began in the 1980s when the City of Toronto introduced tabulators for the ward count (Goode, 1988). In subsequent years, other municipalities followed suit by using vote tabulators for their central count. Municipalities continued to modernize elections as different technologies were introduced to assist with electoral administration, such as the punch card system (Goode, 1976) used by East York in the 1980s (City of Toronto, 1999), and the introduction of online voting platforms in the early 2000s (Goodman, Pammett, & DeBardeleben, 2010).

In more recent years, several Canadian electoral management bodies have adopted the use of vote tabulators and electronic poll books into their elections based on their specific needs and circumstances. Pilots for vote tabulators and electronic poll books were conducted by Elections Ontario during two by-elections between the 2014 and 2018 general elections. The first was on election day during the 2016 Whitby—Oshawa by-election (Elections Ontario, 2016). The 2016 Scarborough—Rouge River by-election served as a second pilot of electronic poll books and vote tabulators, this time during the advance voting period (Elections Ontario, 2016). Introducing vote tabulators and electronic poll books iteratively during these pilots allowed for electors and lawmakers to provide valuable input into the proposed systems and processes. These pilots led to government approval of the use of voting equipment and vote counting equipment in Ontario's provincial elections.

During the 2018 provincial election, Elections Ontario launched 22,000 electronic poll books and 6,000 vote tabulators across the province. On election day in both 2018 and 2022, 50 per cent of polls were supported by vote tabulators and electronic poll books. A total of 90 per cent of electors were served in a poll with technology during both the 2018 and 2022 general elections (Elections Ontario, 2022). Both economic and logistical criteria determined where technology was deployed in those elections. Specific considerations that determined which polls were technology-enabled included:

- the level of connectivity;
- shipping costs and logistics; and
- the number of electors assigned to a poll.

Jurisdictions across Canada are moving towards introducing electronic poll books and vote tabulators. The modernization of elections has become prevalent and accelerated amongst local, provincial, federal, and territorial elections agencies, as well as within many Indigenous communities.

Standards for technology in elections are becoming increasingly common. The ACSVT looked at international precedents to better understand how standards on voting technologies were developed. Of relevance was the development of the *Voluntary Voting System Guidelines* (VVSG), created by the Election Assistance Commission in the United States, and the Council of Europe's standards for electronic voting, discussed in greater detail in the sections that follow.

The U.S. Election Assistance Commission: *Voluntary Voting System Guidelines*

As a result of the widespread use of voting technologies and the complexity of multi-choice ballots, the United States developed federal voting system standards. Specifically, the Federal Election Commission (FEC) established the *Performance and Test Standards for Punchcard, Marksense and Direct Recording Electronic Voting Systems* in January 1990 and these FEC standards were later updated in 2002.

Following the events and criticisms of the 2000 Presidential Election in Florida, the United States Congress passed the *Help America Vote Act of 2002* (HAVA) to modernize election administration for federal elections and address the concerns raised regarding the electoral process. Under that legislation, the U.S. Election Assistance Commission (EAC) was established. It is a bipartisan commission that develops and maintains voluntary voting system guidelines to meet HAVA requirements, manages a register for voting system manufacturers, oversees a national program for the testing and certification of voting systems, and provides information on election administration.

In 2005, with the assistance and guidance of its Technical Guidelines Development Committee (TGDC), and of the National Institute of Standards and Technology (NIST), the EAC developed the VVSG. These are a set of specifications and requirements against which voting machines can be tested to determine if the systems meet required standards. Some factors examined under these tests include basic functionality, accessibility, and security capabilities. The VVSG significantly increased security requirements for voting systems and expanded access, including opportunities for individuals with disabilities to vote privately and independently.

After adopting the 2005 VVSG, the EAC, TGDC, and NIST established public working groups to inform the EAC and NIST on the development of the next iteration of VVSG. In 2021, the EAC unanimously adopted the VVSG 2.0. which represented a major step toward improving the manufacturing and testing of voting machines and paved the way for the next generation of voting systems in the United States. The approved VVSG 2.0 documents include the *Principles and Guidelines and Requirements, the Testing and Certification Program Manual, and Voting System Test Laboratories (VSTL) Manual.*

Council of Europe

The Council of Europe, an international human rights organization with 47 member countries, has established guidelines for electronic voting that focus on legal, operational, and technical dimensions. Since 2002, the Council of Europe has compiled many resources addressing electronic voting, including a Handbook on the steps to follow during adoption, guidelines on certification and transparency (Driza Maurer, 2017), and electronic voting standards.

The creation of these guidelines (Rec, 2004) was the result of a multidisciplinary ad hoc group of specialists formed by the Council of Europe (CoE) in 2002 in response to a growing international interest in electronic voting. The goal of the group was to discuss standards for ''e-enabled voting'' as part of the Council's project, "Making Democratic Institutions Work" (Stein and Wenda, 2014). The Committee of the Ministers of the CoE adopted the standards in September 2004. It then held regular meetings to review the standards and the experiences of member states with implementation.

The CoE and the Ad Hoc Committee of Experts on Legal, Operational, and Technical Standards (CAHVE) was created in 2014 to update Rec (2004) standards in light of new technology and developments amongst CoE member states. The committee consisted of government appointed representatives from member states with direct experience with or knowledge of electronic voting (Driza Maurer, Volkamer, & Krimmer, 2022).

In April 2015, the Secretariat of the Council of Europe tasked the CAHVE with updating the standards. The update was pursued in two phases. In the first phase, CAHVE was asked to decide on issues of scope and the format of the updated standards. In the second phase, the Ad Hoc Committee proceeded to update the standards.

Following the recommendations of the CAHVE, the standards were updated, and a new version was created, CM/Rec (2017). The Committee of Ministers' deputies adopted the new recommendations on June 14, 2017.
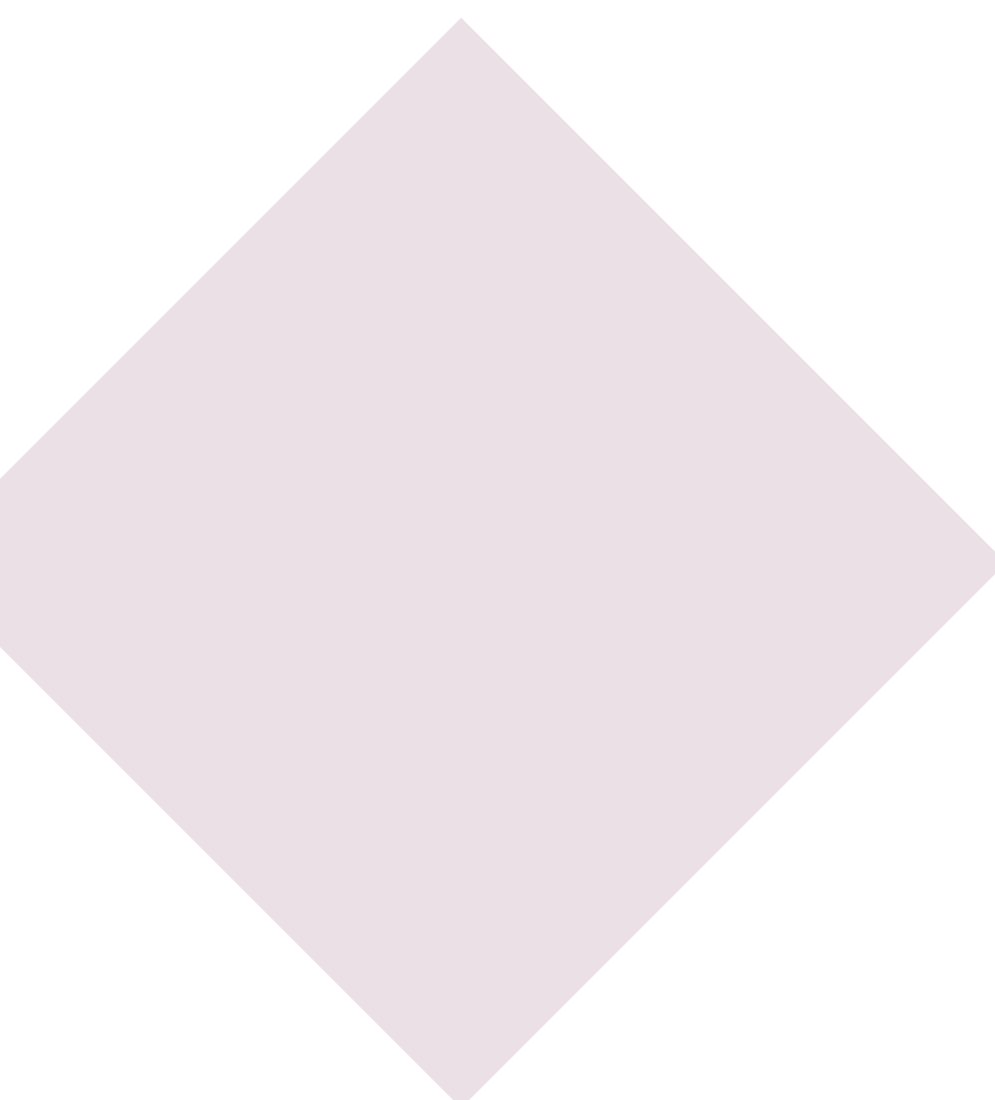
Approach

The ACSVT developed an approach for the development of standards on voting equipment and vote counting equipment used in Ontario provincial elections, as outlined in the ACSVT mandate. The ACSVT conducted comprehensive research and analysis on the current trends of voting technologies and standards, which consisted of reviews of academic and stakeholder commentary, reports, regulations and legislation, and environmental scans of relevant Canadian and international standards on voting technologies and democratic elections. Key to the ACSVT was balancing competing considerations, for example, security and usability. Such competing considerations were incorporated into the Committee's approach in the development of standards on voting equipment to ensure the integrity, security, and accuracy of the election process.

The ACSVT met with a wide range of stakeholders including Canadian electoral management bodies, municipal clerks, the EAC, the CoE, the Canadian Centre for Cyber Security (CCCS), the SCC, voting technology vendors, and academics from multiple disciplines who specialize in the study of voting technologies.

Research conducted on international standards for voting technologies revealed that these initiatives were undertaken with dedicated resources, with the required expertise, and were conducted over a multi-year process. Jurisdictions have undertaken standards initiatives by establishing multidisciplinary groups of specialists with legal, operational, and technical expertise.

Based on conversations with international experts, it was strongly recommended that Ontario leverage the substantial work already completed by technical experts in the United States through the EAC process and its partnership with NIST. The ACSVT developed an approach, which integrated the robust multi-year work done by the EAC, in establishing the benchmarks for voting technology, acknowledging that the ACSVT would still need to assess the differences and complexities faced by American electoral management bodies as compared to Ontario.

In addition, an overview was provided to the ACSVT on the legal framework around voting technology by reviewing Canadian case law. Key amendments to legislation and decisions by the courts under the *Canadian Charter of Rights and Freedoms* have developed election principles about how electoral management bodies must conduct elections.

Following the advice of Dr. Mkabi Walcott, the ACSVT consulted with the SCC to establish a standard process that would meet national and international best practices. After review and discussions by the ACSVT about national and international best practices for standards development, the ACSVT members determined that partnering with an accredited Canadian SDO would be the most effective path forward to support the standards development process. Accredited SDOs were well-positioned to educate and guide the ACSVT members on the process and options related to the development of the technical requirements for the vote tabulator and electronic poll book standards.

The SDO methodology and approach to standards development is a professional, and transparent process that follows the internationally recognized accreditation process. The process requires the use of experts, public/stakeholder consultation, and public-comment periods, to ensure inclusivity, transparency, and consensus on the standards. This process is explained in greater detail in the section of this report titled *The ACSVT Standards Development Process.*

To support the development of the Product Standards, the ACSVT entered a partnership with the DGSI, previously the CIO Strategy Council. The DGSI is an accredited SDO that assembled a Technical Committee to assist the ACSVT with developing standards for electronic poll books and vote tabulators. The Technical Committee was comprised of

94 volunteers, made up of electoral voting experts, election officials, academics, and technology vendors. The Technical Committee was supported by a Drafting Team (ACSVT and DGSI staff) to write the electronic poll book and vote tabulator standards. Additional information about the DGSI's standards development principles, process, and accreditation can be found in Appendix 2.

Due to complexities and differences between the technologies, the ACSVT determined that separate standards were required to guide the vendors of voting technologies, one for electronic poll books and the other for vote tabulators. These two Standards became known as the Vote Tabulator Product Standard (formally known as *DGSI-119-1, Election and Voting Technologies – Part 1: Vote Tabulators* and the Electronic Poll Book Product Standard (formally known as *DGSI-119-2, Election and Voting Technologies – Part 2: Electronic Poll Books).*

In addition to the two Product Standards, the ACSVT determined that electoral management body processes would be documented in a third standard. The Management Standard (formally known as the *Recommendations for Management Standards on Electronic Poll Books and Vote Tabulators)* outlines the best practices and administrative processes to follow when using voting technologies to deliver an election. Additional details about the Product and Management Standard development processes are outlined in the sections that follow.

Product Standards

The scope of the Product Standards specifies the minimum requirements for the technical design of vote tabulators and electronic poll books. These Standards outline the minimum design characteristics necessary to ensure operation for the intended purpose. The Standards are intended to be used by manufacturers of electronic poll book and vote tabulator products.

Management Standard

The scope of the Management Standard specifies the minimum requirements that an electoral management body should consider during the installation, operation, and maintenance of electronic poll books and vote tabulators. The Management Standard also suggests which aspects of a management system could be modified or added to ensure seamless implementation of technology while maintaining the integrity of electoral events for which they are used. Specifications on standardizing the implementation and use of equipment are outlined in the Management Standard and include:

- necessary resources for the operation of a compliance management system;
- competence and training;
- operational planning and controls;
- compliance monitoring, audit; and
- actions for non-conformance, non-compliance, and corrective actions.

The Management Standard is intended to ensure a reliable and trustworthy system is in place for the use of the electronic poll books and vote tabulators. It should be noted that while the language of the Standard is future oriented, the substantial content of the document has already been the baseline practice for Elections Ontario since its early pilots of electronic poll books and vote tabulators. Recommendations included in the Management Standard can already be found in Elections Ontario's directives, polices, procedures, and manuals for election officials.

The approach taken by the ACSVT was carried out in three phases:

- Phase One established core Democratic Election Principles and Technical Design Principles to balance the principles and values of democratic elections while instilling technical best practices for the use and operation of voting and election technology;

- Phase Two focused on understanding the Canadian standards development process and developing the Product Standards in partnership with the DGSI; and

- Phase Three focused on the development of a set of electoral Management Standard recommendations.

It is important to note that some phases, particularly two and three, were completed in parallel to meet project milestones.
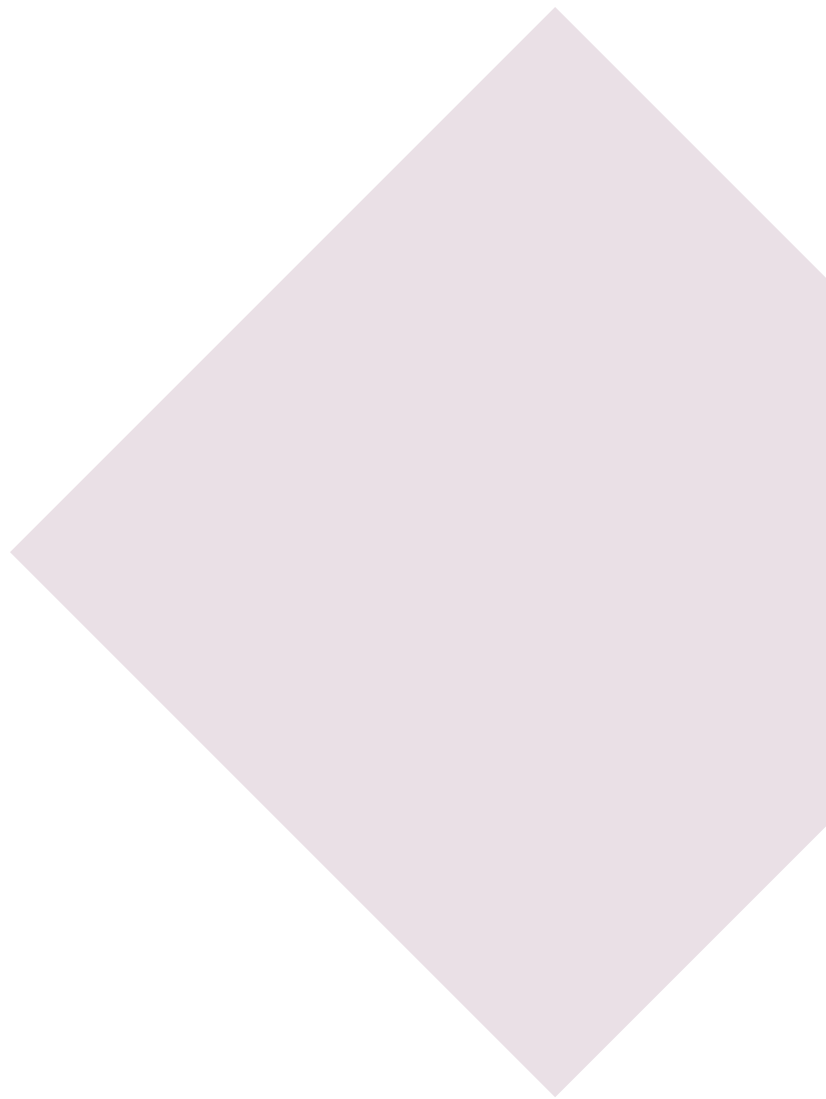
Phase One: Development of Core Principles

Following discussions with stakeholders and academics and reviewing relevant research, the ACSVT concluded that the use of voting technologies and the development of standards to govern them should comply with the principles of democratic elections and must be balanced with other core considerations such as security and accessibility for users. By focusing on principles first, the resulting standards could be evergreen and adaptable to new technologies. It was also important to require that key principles be broad enough to be independent of any specific technology, vendor, or electoral management body.

The ACSVT developed a set of principles based on the democratic voting principles for elections. These principles informed the Drafting Instructions for the DGSI Technical Committee. In addition, the ACSVT used these established principles to analyze and approve the Product Standards that were produced by the DGSI Technical Committee to ensure the Product Standards were compliant with the democratic norms and values of Canadian elections. See Appendix 1 for additional information on the Drafting Instructions.

Advisory Committee Democratic Election Principles

While election principles are not explicitly enshrined in legislation, they have become a convention based on court cases and electoral administration best practices. Based on expert feedback, ACSVT administrators compiled research on the history of principles in Canada, including a review of the democratic voting rights of Ontarians under the Ontario *Election Act,* the *Canadian Charter of Rights and Freedoms,* and the *Accessibility for Ontarians with Disabilities Act.*

The ACSVT also conducted environmental scans of principles from international standards on voting technologies, such as the VVSG, and other Canadian electoral management bodies. Further, the ACSVT reviewed relevant literature, academic reports, and articles on Canada's democratic principles. Finally, the ACSVT collaborated with and gathered expert feedback on its set of principles developed to guide the standards development process.

Based on international conventions and standards, Canadian case law, legislation, and an environmental scan of Canadian electoral management bodies' foundational principles and values, it was determined that such principles should be broad enough to be independent of any specific election technology or jurisdiction and be non-partisan. Adherence to these principles is crucial to maintain the trust, electoral integrity, and transparency of Canadian elections and to ensure public confidence is upheld.

The ACSVT developed its principles, reflecting the Canadian democratic electoral processes and core values, to support the work of the DGSI Technical Committee. These principles provided guidance to the Drafting Team, and technical experts including vendors, brought together on the DGSI Technical Committee, to develop the Product Standards. These principles were also used by the ACSVT to guide its work in developing the Management Standard. A comprehensive list of the ACSVT principles can be found in Appendix 3.

Phase Two:
Product Standards Development

Developing Standards in Canada: Standards Council of Canada

The SCC is a federal Crown Corporation reporting to the Minister of Innovation, Science, and Economic Development. The SCC was established in 1970 and is mandated by the *Standards Council of Canada Act* to "promote efficient and effective standardization" (Standards Council of Canada, 2023b). The SCC "leads and facilitates the development and use of national and international standards and accreditation services to enhance Canada's competitiveness and well-being" (Standards Council of Canada, 2023d).

The SCC is responsible for the accreditation and management of SDOs, the approval of National Standards of Canada, coordinating Canadian participation in international standardization activities, and collaborating with a variety of stakeholders. The SCC promotes "efficient, effective, voluntary standardization", and facilitates the use of standardization through the entire value chain: standards, conformity assessment, and accreditation (International Organization for Standardization, 2023).

Standards Development Organization

Within the Canadian context, SDOs are "bodies that specialize in the development of standards through the process of consensus and participate in regional and international standardization processes" (Standards Council of Canada, 2023a). Accredited SDOs adhere to the SCC standards development and adoption requirements. SCC accredited SDOs are expected to coordinate their work to "avoid duplication within the Canadian standards development environment and promote opportunities for harmonization wherever possible" (Standards Council of Canada, 2023e).

Digital Governance Standards Institute

The DGSI is a Canadian SDO accredited by the SCC that collaborates with public and private stakeholders on common technology and digital issues and has developed standards that focus on innovation and technology solutions. The DGSI is Canada's only accredited standards development body solely focused on digital technology and management. The DGSI is a neutral convenor bringing the public, private, and non-profit sectors together to address their members' most urgent challenges, validate ideas, explore solutions to identified problems, and prove out new technologies. The DGSI has experience with voting technology standards given their ongoing work in developing voluntary standards for electronic voting in Canada.

As an SCC-accredited SDO, the DGSI ensures that standards are developed in accordance with the *Requirements & Guidance – Accreditation of Standards Development Organizations.* Key requirements include, but are not limited to:

- "development by consensus from a balanced committee of stakeholders;
- public scrutiny;
- publishing in both of Canada's official languages;
- being consistent with (or incorporating) existing international and pertinent foreign standards; and
- not acting as a barrier to trade" (Standards Council of Canada, 2023c).

The ACSVT Standards Development Process

DGSI Collaboration with the ACSVT

The ACSVT determined that partnering with an accredited Canadian SDO with experience on electronic voting was the most effective path forward to support the ACSVT in developing Product Standards. The DGSI provided the right level of support and expertise to support the ACSVT in developing strong standards on vote tabulators and electronic poll books. The ACSVT procured the SDO in March 2022.

Since then, the ACSVT administrators have worked closely with the DGSI to prepare the Product Standards seed documents for the Technical Committee of experts to create a draft standard for public review using the process depicted below. Part of this process also included regular reviews by and consultations with the ACSVT.

Figure 1: Digital Governance Standards Institute Development Process

DEVELOPMENT PROCESS

Multi-Stakeholder Participation

- Governments, regulators, industry, civil society, academics, etc.
- Geographical representation

Concensus-Based Decision-Making

- Deliberate, rules-based process
- Balance of interests

Transparent and Open

- Drafts available 24/7 throughout entire project lifestyle for public input. No technical committee size restrictions; every stakeholder has a vote.

Current

- Specification at some point will be transitioned to a National Standard of Canada and follow the accredited Standards development process.

Preliminary Stage → Drafting Stage → Committee Stage → Committee Approval Stage → Second-Level Review Stage → Standards Council of Canada Approval Stage → Publication

Source: Digital Governance Standards Institute, 2023

DGSI Technical Committee

As part of their accredited requirements from the SCC, the DGSI is required to consult with a group of subject-matter experts who are invited to become members of a Technical Committee. Participants in these committees provide technical expertise, input, and guidance. The Technical Committee is responsible for creating, reviewing, approving, and updating the Product Standards.

To ensure the Technical Committee had the widest possible range of perspectives considered during the drafting process of the Vote Tabulator and Electronic Poll Book Product Standards, the ACSVT and the DGSI reached out to several groups of subject-matter experts. As mentioned earlier in this report, the DGSI Technical Committee consisted of 94 experts in cybersecurity, political science, public policy, election administration, and related subjects.

Technical committees operate by consensus and provide an open forum offering:

- equal access and participation by any interested party;

- respect for diverse interests and identification of those who should be provided access to offer the needed balance of interests; and

- a mechanism for dispute resolution.

Draft Standards were written based on Drafting Instructions provided by the ACSVT and released to the Technical Committee for review beginning in January 2023. Appendix 4 provides a comprehensive summary of all Technical Committee meetings and public consultations.

Balloting Approval Process

The DGSI Technical Committee canvassed for participation on its Balloting Approval Committees for both the Vote Tabulator Product Standard and the Electronic Poll Book Product Standard. Each of the two Product Standards had their own separate Balloting Approval Committee. A total of 12 subject-matter experts participated on each of the Balloting Approval Committees. The participants on each committee varied based on technology expertise. Participants from the following sectors were represented:

- General Interest;
- Producer;
- User; and
- Government/Regulator.

The DGSI ensured that these sectors were represented on the Balloting Approval Committees in a balanced manner.

The Balloting Approval Committee achieves consensus on a draft standard under the following conditions:

a. More than 50 per cent of the Balloting Approval Committee participants cast votes in favour;
b. A minimum of two-thirds majority of the votes cast by the Balloting Approval Committee are in favour;
c. Not more than one-quarter of the total number of votes cast are negative; and
d. Any changes arising from comments submitted by the Balloting Approval Committee during the voting process are agreed upon by the broader Technical Committee.

The voting process for DGSI-119-1, *Election and Voting Technologies – Part 1: Vote Tabulators* commenced on September 6, 2023, and passed on September 20, 2023. The voting process for DGSI-119-2, *Election and Voting Technologies – Part 2: Electronic Poll Books* commenced on October 2, 2023, and passed on October 13, 2023.

Phase Three: Management Standard Development

Management Standard Working Group

The development of the Management Standard was an integral aspect of ensuring that the ACSVT met the legislated mandate to make recommendations for standards on the use of voting equipment and vote counting equipment. The Management Standard was developed directly by the ACSVT with an opportunity for the DGSI Technical Committee to review and comment and did not receive a public comment period. Recommendations included in the Management Standard were built upon the comprehensive approach already laid out in Elections Ontario's current directives, policies, and operational guidelines.

The purpose of the Management Standard is to provide outcome-based recommendations that are intended to aid Elections Ontario as it sets out its operational activities executed under the Chief Electoral Officer's powers under the *Election Act.* The recommendations are applicable to the entire election period, including pre-election and post-election activities and processes. In the event of a conflict, inconsistency, or a discrepancy between the *Election Act* and these recommendations, the provisions in the *Election Act* are paramount as the governing law.

The ACSVT developed the Management Standard based on jurisdictional best practices, advice of experts, Elections Ontario's directives, policies, and procedures in place since their early pilots of voting technologies, and the drafting instructions developed by the ACSVT. A comprehensive summary of the Management Standard working group meetings can be found in Appendix 4.

Advisory Committee Recommendations

During the development of both the Management Standard and Product Standards, several key issues arose outside of the direct mandate of the ACSVT that would require changes to Ontario's *Election Act.* This led to the formulation of additional recommendations for the consideration of Ontario's Chief Electoral Officer. These additional recommendations are included in this report separate from the Management Standard and Product Standards either because they do not directly impact Elections Ontario's use of vote tabulators and electronic poll books and are therefore outside of the scope of the ACSVT's Terms of Reference or would require legislative change. The additional recommendations are outlined below.

Recommendation #1: The ACSVT recommends that the Chief Electoral Officer consider recommending that the Ontario Legislative Assembly establish an oversight body responsible for maintaining the Management and Product Standards for voting technology.

The responsibility of the ACSVT was to develop standards for voting equipment and vote counting equipment. However, once developed, there is no organization responsible for the overarching governance of the Standards. While the creation of the Management Standard and Product Standards by the ACSVT is an important step toward increasing the security of the electoral process, these Standards are intended to act as a foundation to be built on for years to come. The constant evolution of technology necessitates that the Standards drafted by the ACSVT will continue to be developed iteratively. A provincial oversight body would be assigned ownership of the Management Standard and Product Standards to ensure that both documents are updated regularly to align with the ever-changing environments in which elections are delivered.

Oversight bodies established in other western democracies include the U.S. Election Assistance Commission and the Council of Europe for its member states. Establishing a similar oversight body for Ontario would allow for both the Management Standard and Product Standards to stay current and encourage jurisdictions to follow best practices to deliver safe elections.

For the purposes of standards development relating to voting technologies, the oversight body should ensure broad representation including:

- A political advisory representative from each party that holds a seat in the Ontario Legislative Assembly; and

- A technical advisory committee including experts in standards development, accessibility, and the appropriate technology and security experts.

Chief Electoral Officers across Canada may wish to consider inter-agency collaboration to ensure best practices are adhered to across provincial and territorial governments.

Recommendation #2: The ACSVT recommends that the Chief Electoral Officer consider recommending that the Ontario Legislative Assembly establish a vendor registration program to monitor vendor corporate governance issues related to the security of the engineering lifecycle.

The ACSVT encourages Elections Ontario, in cooperation with other electoral management bodies in Canada, to develop an approach that sets out parameters for a complete engineering lifecycle approach with appropriate oversight, investigation, and compliance to cover issues relating to vendor, corporate governance, ownership structure, procurement, and supply chain management. This approach should align with the Vote Tabulator Product Standard and Electronic Poll Book Product Standard and should be created in consultation with other organizations such as Canadian Centre for Cybersecurity.

Further, Elections Ontario should identify an appropriate body to establish a cross-jurisdictional Canadian approach for certification of technology and registration for voting and election technology companies in Canada, with recognition of the size of the Canadian market in the global marketplace.

Recommendation #3: The ACSVT recommends to the Chief Electoral Officer that the future iterations of the Electronic Poll Book Product Standard continue to include provisions to ensure the continued integrity and security of elector data.

Bill 204, *Helping Tenants and Small Businesses Act, 2020* received Royal Assent in October 2020. This legislation created a single register of electors for both municipal and provincial elections in Ontario to make it easier for electors to register and update their information. It is from this single register that voters' lists are generated for use in all elections for Ontario. Elections Ontario was identified as the oversight body responsible for managing and provisioning elector information to its 444 municipal partners effective January 1, 2024.

Elections Ontario currently has safeguards in place to protect elector data. Elections Ontario should continue to ensure the security and integrity of elector data by:

- ensuring processes and business rules are followed at the municipal level are consistent and result in only qualified electors being added during municipal events;

- meeting Elections Ontario standards regarding online registration activities to protect against any vulnerabilities that could corrupt the quality of elector data through adequate protocols and coordination for online registration activities; and

- conduct regular consultations with municipal partners about ongoing changes made to the list.

Future iterations of the Electronic Poll Book Product Standard will formalize the practices and procedures related to elector data that Elections Ontario already has in place.

Recommendation #4: The ACSVT recommends that the Chief Electoral Officer consider recommending that the Ontario Legislative Assembly consult with municipalities to amend the *Municipal Election Act,* its regulations, or other documents, and processes for compliance with the Standards when using vote tabulators and/or electronic poll books.

The Ontario Legislature should take action to ensure consistency in legislation regulating provincial and municipal elections as it relates to use of vote tabulators and electronic poll books in Ontario. There is a risk to the current high level of public trust in our democratic processes at all levels if issues arise in any election, regardless of the size and sophistication of election administrative body. A problem at the municipal level can negatively impact public trust in the security of elections at all levels. Consistency in the election administration rules, including the use of vote tabulators and electronic poll books, at the two levels of government in Ontario, will help ensure consistency in the use of the technology and will achieve the appropriate balance in meeting the following three objectives:

- Bring consistency of the voting process for electors;
- Achieve administrative efficiencies; and
- Promote a higher level of integrity in the voting process.

Other governments have the provincial and territorial electoral management bodies responsible for some or all aspects of planning and delivering municipal elections, resulting in consistency in voting processes, including the use of voting technology.

Recommendation #5: The ACSVT recommends that the Chief Electoral Officer proactively offer to provide optional advisory support to municipalities using vote tabulators and electronic poll books as part of their Voting Technology Sharing Program (VTSP).

The *Election Act* (s. 4.0.3(1)) provides the authority for Elections Ontario to provide equipment as well as support and advice to Ontario municipalities using vote tabulators and/or electronic poll books. In addition to offering voting equipment through their VTSP, Elections Ontario should consider proactively offering technical and consulting support to municipalities to assist in meeting the Management and Product Standards.

Many Ontario municipalities would benefit from having direct access to Elections Ontario's expertise. Elections Ontario's support to municipalities would result in more consistency in all aspects of the use of voting technology in Ontario and would improve the overall security and integrity of elections at the municipal level. Examples of support include, but are not limited to, determining thresholds and rationales for where to implement technology, providing guidance on the placement of technology in a poll, and assisting with preparing technology for use (e.g., programming and imaging).

Recommendation #6: The ACSVT recommends that the Chief Electoral Officer consider recommending that the Ontario Legislative Assembly amend the *Election Act* to permit post-election Risk Limiting Audits.

There should be a benchmark process for ensuring transparency and trust in vote tabulators to conduct Risk Limiting Audits and ballot spot checks to confirm the accuracy of machine-tabulated results. The *Election Act* currently restricts performing Risk Limiting Audits, as it requires that cast ballots are returned to the Chief Electoral Officer secured and sealed. Current practice is that the seals should only be opened if there is an order by a judge (S. 86).

Within the current legislative framework, Elections Ontario is permitted to conduct a tabulator spot check which compares the vote tabulator results tape against ballot images from the vote tabulator memory cards. In this process, the election administrator records the result for each ballot image to match the tabulator results tape for a particular poll against the ballot image and confirm the accuracy and integrity of the tabulator results.

It is generally agreed that comparing real marked ballots to the results generated by the vote tabulator is a superior method to ensure the accuracy of results generated at the polls. Risk Limiting Audits are the most effective way to test the accuracy of vote tabulators. The *Election Act* should be amended to permit the opening of cast ballot envelopes solely for the purpose of facilitating a prescribed number of post-event Risk Limiting Audits. If permitted, procedures should identify the appropriate timing of the audits and the actions to be taken if the results of the audit are different from those generated by the vote tabulator. The province may also want to consider providing this discretion to municipal election administrators as part of ensuring the overall election integrity within the province.

Conclusion

As elections both within and outside of Ontario continue to modernize through the adoption of technology, it became evident that there was a need for formalized standards in Canada. The processes and protocols already put in place by Elections Ontario formed the basis of the Management Standard and Product Standards along with foundational documents developed by electoral agencies outside of Canada such as the U.S. Election Assistance Commission and the Council of Europe.

The Management Standard and Product Standards are an important first step in ensuring appropriate governance for the use of election and voting technologies. They are intended to be voluntary and act as a best practice guide for Ontario and other jurisdictions using voting equipment and vote counting equipment as well as those who are taking the first steps toward adoption.

As the technology landscape continues to evolve, the Management Standard and Product Standards will need to be adapted to future election landscapes in Ontario. The Standards are iterative and should be reviewed on a pre-determined cycle to allow gaps and new issues that emerge to be addressed in a timely manner.

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Appendix 1: Annotated Drafting Instructions

Explanatory Note: The Annotated Drafting Instructions were previously approved by the ACSVT and provided to the Technical Committee to assist with the development of the Product Standards.

While the Drafting Instructions reference "Management System Standards", the final term used was Management Standard to better reflect the scope of the Standard which is limited to voting technology only.

Additionally, the use of "voting technologies" (meaning vote tabulators) and "election technologies" (meaning electronic poll books) were used to differentiate between these two types of equipment. Since the creation of these instructions, it was determined two Product Standards would be developed, one for vote tabulators and one for electronic poll books. As such, the use of "voting technologies" and "election technologies" have been replaced with "vote tabulators" and "electronic poll books" throughout the Standards. The following Annotated Drafting Instructions for vote tabulators and electronic poll books set out the baseline content for the *Election and Voting Technologies – Part 1: Vote Tabulators* (DGSI-119-1) and *Part 2: Electronic Poll Books* (DGSI-119-2):

The technical standards for vote tabulators and electronic poll books for Ontario will be delivered as a three-part series: DGSI-119-1, DGSI-119-2, and the *Recommendations for Management Standards on Electronic Poll Books and Vote Tabulators,* see Figure 1. This separates the technical specifications and requirements that are producer facing into the categories of voting technology and election technology, as per the Technical Design Principles of the ACSVT. The Management Standard is user-focused and speaks to operational requirements for the electoral management body. The Management Standard is intended to complement directives already in place and not to duplicate existing frameworks such as government procurement directives, that already regulate the operations of the electoral management body.

Figure 1: Product versus Management System Standard

Product Standards	Management System Standard
Normative References – All standards in this series would reference one another which is intended to keep the numbering in alignment and indispensable with the other standards or represent a series of standards. **Terms and Definitions –** Terms and definitions will be defined in a standard provided they are used in the document and are necessary for the interpretation and conformity assessment of the standards.	
Scope – The scope of the Product Standards will specify the minimum requirements for the technical design of the equipment.	**Scope –** The scope of the Management System Standard will specify the minimum requirements for the installation, operation, and maintenance of the equipment.
Technical Design Requirements – The Standards will outline the minimum design characteristics necessary to ensure operation for the intended purpose. • Can follow the ACSVT technical design principles for vote tabulators and electronic poll books provided they can be achieved through a product standard.	**Content –** Standardizing the installation, operation, and maintenance of the equipment would be outlined in the Management System Standard. Could include: • necessary resources for the operation of a compliance management system; • competence and training; • operational planning and controls; • compliance monitoring, audit; and • actions for non-conformance, non-compliance, and corrective actions.
User – The Standards would be used for conformity assessment by manufacturers of products.	**User –** The standard would be used by Elections Ontario to ensure a reliable and trustworthy system is in place for the use of the equipment.

The proposed standard must specify minimum technical requirements for voting technology and equipment currently used in Ontario provincial elections: vote tabulators and electronic poll books and shall comply with the following requirements:

- Meet but not exceed the scope and mandate of the Advisory Committee on Standards for Voting Technologies as set out in section 4.3 of the *Election Act;*

- Meet but not exceed the scope and mandate set out by the ACSVT in its core Democratic Election Principles and Technical Design Principles (outlined in Appendix 3);

- Be informed by international best practices (including those of the Council of Europe and the Election Assistance Commission) for use of technology in the voting process;

- Comply with the *Accessibility for Ontarians with Disabilities Act* (AODA);

- Be available in French and English languages;

- Be drafted in plain language and include definitions of technical terms used;

- Be pragmatic and operationally implementable;

- Incorporate comments and feedback from the public and ACSVT and provides technical justifications for any feedback or comments not incorporated;

- Incorporate relevant research and reports as identified by the ACSVT; and

- Be transparent and inclusive in the standards development process and provide summaries of Technical Committee meetings and discussions that are sufficiently detailed to prevent duplication of effort by the ACSVT when it is reviewing the document for feedback or for acceptance.

The proposed Standard must consider the following categories established by the ACSVT:

I. **Technical Design Requirements – Vote Tabulators**
    i.   Design Qualities
    ii.   Transparency
    iii. Accessibility
    iv.   Privacy
    v.   Ballot Secrecy
    vi.   Auditability
    vii. Verifiability
    viii. Interoperability
    ix.   Security
    x.   System Integrity

II. **Technical Design Requirements – Electronic Poll Books**
    i.   Design Qualities
    ii.   Transparency
    iii. Accessibility
    iv.   Privacy
    v.   Authentication
    vi.   Auditability
    vii. Interoperability
    viii. Security
    ix.   System Integrity
    x.   Network Reliability

III. **Operational Requirements for Electoral Management Bodies**
    i.   Context of the Organization
    ii.   Legal Framework
    iii. Leadership
    iv.   Planning
    v.   Support
    vi.   Operation
    vii. Technology Analytics

Appendix 2: DGSI Standards Development
Principles, Process, and Accreditation

CONSEIL DE GOUVERNANCE NUMÉRIQUE | DIGITAL GOVERNANCE COUNCIL

PRINCIPLES

OPEN BY DEFAULT
no technical committee size restrictions and no fee to participate
every stakeholder has a vote
stakeholders can engage at any point int the standard development process

FULL TRANSPARENCY
draft standards available 24/7 throughout entire project lifecycle for public input and feedback

AGILE DEVELOPMENT
iterative standards development matches pace of innovation
standards published in months, not years
comments welcomed on a standard in development or published at any time

CONTINUOUS REVIEW CYCLE

COMMENT ANYTIME

CONSENSUS-BASED DECISION MAKING
deliberate; rules-based process
balance of interest, including producers, users, regulators and general interests

MULTI-STAKEHOLDER PARTICIPATION
non-discriminatory, equal access and participation
governments, industry, civil society, academics, consumers, etc.
geographical representation

CURRENT AND READILY AVAILABLE
standards available at no cost
standards are reviewed no later than 1 year post-publication

ACCREDITATIONS
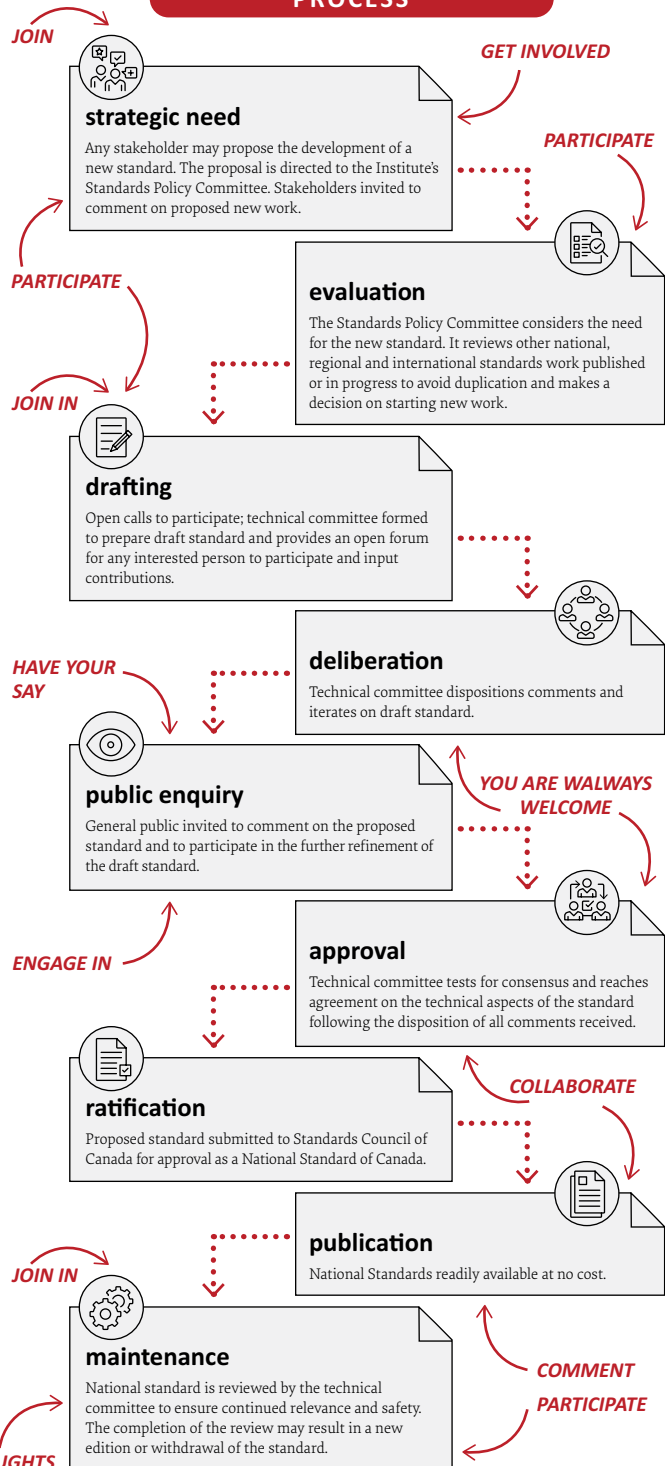
SCC Accredited SDO ™

STANDARDS COUNCIL OF CANADA ACCREDITATION
The Digital Governance Standards Institute received its accreditation as a Standards Development Organization by Standards Council of Canada March 23, 2019.

This accreditation is a testament to the rigour maintained in the Digital Governance Standards Institute's standards development process and authorizes the Digital Governance Standards Institute to drive the creation of national standards to advance Canada's digital economy.

PROCESS

JOIN — *GET INVOLVED*

strategic need
Any stakeholder may propose the development of a new standard. The proposal is directed to the Institute's Standards Policy Committee. Stakeholders invited to comment on proposed new work.

PARTICIPATE

evaluation
The Standards Policy Committee considers the need for the new standard. It reviews other national, regional and international standards work published or in progress to avoid duplication and makes a decision on starting new work.

PARTICIPATE — *JOIN IN*

drafting
Open calls to participate; technical committee formed to prepare draft standard and provides an open forum for any interested person to participate and input contributions.

deliberation
Technical committee dispositions comments and iterates on draft standard.

HAVE YOUR SAY

public enquiry
General public invited to comment on the proposed standard and to participate in the further refinement of the draft standard.

YOU ARE WALWAYS WELCOME

approval
Technical committee tests for consensus and reaches agreement on the technical aspects of the standard following the disposition of all comments received.

ENGAGE IN

ratification
Proposed standard submitted to Standards Council of Canada for approval as a National Standard of Canada.

COLLABORATE

publication
National Standards readily available at no cost.

JOIN IN

maintenance
National standard is reviewed by the technical committee to ensure continued relevance and safety. The completion of the review may result in a new edition or withdrawal of the standard.

COMMENT PARTICIPATE

SHARE YOUR THOUGHTS

To learn more, visit https://dgc-cgn.org/standards

Source: Digital Governance Standards Institute, 2023

Appendix 3: Advisory Committee on Standards for Voting Technologies Principles

Upon the development of the Democratic Election Principles, the ACSVT concluded that there are a subset group of principles that are complementary and interlinked to the Democratic Election Principles. In addition to the Democratic Election Principles, the ACSVT developed Technical Design Principles for both vote tabulators and electronic poll books. The Technical Design Principles are testable ways to ensure that any technology used in voting in Ontario provincial elections meets the processes set out in the *Election Act* and aligns with core Democratic Election Principles, as established by the ACSVT.

The ACSVT conducted an environmental scan of technical principles outlined in international standards on voting technologies, particularly in the United States' EAC *Voluntary Voting System Guidelines 2.0* (VVSG), the Council of Europe Recommendation CM/Rec (2017)5 of the Committee of Ministers to member States on standards for e-voting and the Council of Europe guidelines on the use of information and communication technologies (ICT) in the electoral processes. The ACSVT reviewed and analyzed relevant research and materials to determine the scope and framework of the Technical Design Principles, particularly in reference to the Canadian perspective. It is important to note that there are several jurisdictional differences that impact voting system guidelines and principles. Therefore, the Technical Design Principles and the Standards that are developed by international jurisdictions do not fully apply to the Canadian case.

Democratic Election Principles

I.   **Accessibility**

   i.   The election shall be accessible and consistent for all electors.

   ii. The election shall provide accessibility of the vote to all electors, including through accessible voting equipment and other election technology.

   iii. The election shall be inclusive of all electors, including through the deployment of voting equipment and other election technology.

II. **Equality of the vote**

   i.   All voters shall exercise their right to vote without influence or being prevented from participating in the voting process.

   ii.   One vote per voter.

   iii. The election process shall avoid duplication of voters' data.

   iv.   The election process shall authenticate each voter prior to issuing a ballot.

   v.   All voters shall receive the correct information about the election and voting process in time to exercise their right to vote.

   vi.   Elections shall be compliant with the democratic rights of citizens set out in the *Canadian Charter of Rights and Freedoms.*

   vii. All voters shall have equal opportunity to take part in the vote.

III. Ballot Secrecy

    i. The election process must protect the secrecy of the ballot.

    ii. The election process shall not contain nor produce information and records that can match a ballot to a given voter to ensure that all votes are cast anonymously.

    iii. Voters shall not be able to show proof of how they voted to anyone.

IV. Privacy

    i. All voters shall exercise their right to vote privately and independently.

    ii. Electors' personal information shall be gathered and used only for electoral purposes as authorized under the Ontario *Election Act.*

    iii. Electors' personal information shall be protected in all formats, including digital.

V. Transparency

    i. The election shall be conducted in a manner that is open, simple to understand, verifiable and accountable to electors, candidates, political parties, scrutineers, and other individuals as permitted under the Ontario *Election Act.*

    ii. Candidates, political parties, scrutineers, and other individuals as permitted under the Ontario *Election Act* shall have the opportunity to meaningfully observe, monitor and scrutinize the election.

    iii. The election administration body shall be accountable to electors through the legislature for the conduct of the election as directed under the Ontario *Election Act.*

VI. Integrity

    i. The election process and the results shall maintain the integrity of the election and the democratic rights of all electors.

    ii. The election process and the results shall be verifiable. The election results shall accurately reflect the valid votes cast.

    iii. The election process and the results shall be free from any unauthorized access, manipulation, fraud, or error.

    iv. The election shall be operated in a manner that demonstrates trustworthiness and confidence in the process.

    v. The election process shall be fair and non-biased and shall treat candidates and voters fairly and consistently.

VII. Verifiability

    i. The election process and the result shall allow for meaningful verification of paper ballots cast and tabulation to ensure the election outcome reflects the valid votes cast.

    ii. The voter shall be able to verify that the ballot they have marked is accurate.

    iii. The results of the election shall allow for timely audits and permit the possibility of recount to determine the results of the election.

    iv. The voting process must allow for meaningful and timely scrutiny and the ability to verify the accuracy and correctness of the voting process and the election results by candidates, political parties, scrutineers, and other individuals as permitted under the Ontario *Election Act.*

    v. Election results reporting shall be meaningfully detailed and contain a manageable number of electors for the purposes allowed under the Ontario *Election Act* by candidates, political parties, and other authorized entities.

VIII. Security

i. The election shall ensure the reliability and security of the voting process and results.

ii. The election process shall have mechanisms to detect problems and prevent or detect tampering with the vote.

iii. The election process shall ensure the protection of data and stored information, as required under Ontario privacy legislation.

Technical Design Principles: Voting Technologies

For greater clarity, the term "voting technologies" is an umbrella term associated with an array of voting methods that use technology. The term "voting technologies", referred to throughout this document, is speaking strictly to the use and operation of vote tabulators. Vote tabulators are single-function, purpose-built devices used to scan paper ballots, automatically count marked ballots, and record results.

In line with the Advisory Committee Democratic Election Principles, the Technical Design Principles for Voting Technologies can be summarized as follows:

Voting Technology Design

i. The voting technology is designed to carry out the election process accurately and securely.

ii. The voting technology is designed to align with election process procedures and regulations as set out in the Ontario *Election Act.*

iii. The voting technology is designed in a user-friendly manner that is accessible to all voters.

iv. The voting technology is designed to provide transparency and accountability.

v. The voting technology is designed to be operationally implementable.

vi. The voting technology is designed with materials that meet the requirements of a supply chain risk management framework.

vii. The design and implementation of technology in the facilitation of the election must maintain or improve the level of transparency; political entities' ability to scrutinize electoral proceedings; levels of detail of reporting; meaningful reporting of results; the public's ability to review and analyse the results and must uphold the Democratic Election Principles.

Simplicity and Ease of Use

i. The voting technology design and functions can be easily interpreted and understood.

ii. The voting technology can be used accurately.

iii. Voters, political parties, candidate representatives, scrutineers, and election staff can understand and interpret information, including instructions, messages from the system, and error messages.

Interoperability

i. The voting technology is designed to support interoperability in its interfaces to external systems, its interfaces to internal components, its data, and its peripherals.

ii. The voting technology data is in an interoperable format.

iii. The voting technology uses widely used hardware interfaces, formats, and communications protocols.

Verifiability

    i. The voting technology allows for paper ballots to be marked, verifiable, and cast as intended.

    ii. The source and integrity of electronic tabulation reports are verifiable.

Auditability

    i. The voting technology shall be auditable.

    ii. The voting technology software can be tested and verified by election staff, witnessed, or observed by party and candidate representatives at each machine before a vote is cast.

    iii. The voting technology records are resilient in the presence of intentional forms of tampering and accidental errors.

    iv. Both physical and digital aspects of the voting technology are available for inspection and testing.

    v. The voting technology shall report any irregularities or errors that were identified.

System Integrity

    i. The voting technology shall protect the integrity and confidentiality of sensitive data.

    ii. The voting technology maintains the integrity of software, firmware, and other critical components.

    iii. The voting technology shall support mechanisms to detect and prevent any unauthorized access, or tampering.

    iv. The voting technology authenticates administrative users before granting access to functions and restricts its services to unauthorized entities.

Technical Design Principles: Election Technologies

The term "election technologies" means technology that processes, stores, transmits, or receives election information digitally but is not directly involved in the casting or counting of ballots. "Election technologies" used throughout this document is strictly in reference to electronic poll books. Electronic poll books allow election officials to review and/or maintain voter register information and immediately identify and digitally strike-off of electors' names from the voters list.

In line with the Advisory Committee Democratic Election Principles, the Technical Design Principles for Election Technologies can be summarized as follows:

Election Technology Design

    i. The election technology is designed to carry out the election process accurately and securely.

    ii. The election technology is designed to align with election process procedures and regulations as set out in the Ontario *Election Act.*

    iii. The election technology is designed in a user-friendly manner that is accessible to all electors.

    iv. The election technology is designed to provide transparency and accountability.

    v. The election technology is designed to be operationally implementable.

    vi. The election is designed with materials that meet the requirements of a supply chain risk management framework.

vii. The design and implementation of technology in the facilitation of the election must maintain or improve the level of transparency; political entities' ability to scrutinize electoral proceedings; levels of detail of reporting; meaningful reporting of results; the public's ability to review and analyse the results and must uphold the Democratic Election Principles.

Simplicity and Ease of Use

i. The election technology design and functions can be easily interpreted and understood.

ii. The election technology can be used accurately.

iii. Voters, political parties, candidate representatives, scrutineers, and election staff can understand and interpret information, including instructions, messages from the system, and error messages.

Interoperability

i. The election technology is designed to support interoperability in its interfaces to external systems, its interfaces to internal components, its data, and its peripherals.

ii. The election technology data is in an interoperable format.

iii. The election technology uses widely used hardware interfaces, formats, and communications protocols.

Access Control

i. The election technology implements mechanisms to authenticate users and prevent unauthorized changes and manipulation.

ii. The election technology shall be configured in such a manner that the infrastructure is able to authenticate each user prior to access.

iii. The election technology shall be configured to ensure two-factor authentication is employed to access the device.

iv. The election technology authenticates users before granting access to functions and restricts its services to unauthorized entities.

Authentication

i. The election technology shall allow for the authentication of each voter prior to issuing a ballot.

ii. The election technology shall allow election staff to enter information regarding a voter who has appeared to vote to verify whether the voter is eligible to vote, and if so, whether the voter has already cast a ballot at the election or returned a special ballot.

Auditability

i. The election technology shall be auditable.

ii. The election technology records are resilient in the presence of intentional forms of tampering and accidental errors.

iii. Both physical and digital aspects of the election technology are available for inspection and testing.

iv. The election technology shall report any irregularities or errors that were identified.

System Integrity

    i.   The election technology shall protect the integrity and confidentiality of sensitive data, as required by privacy legislation in Ontario.

    ii.   The election technology maintains the integrity of software, firmware, and other critical components.

    iii.   The election technology shall support mechanisms to detect and prevent any unauthorized access, or tampering.

    iv.   The election technology shall protect electors' personal information in all digital formats.

    v.   The election technology must allow for meaningful testing and risk management evaluations.

Reliability

    i.   The election technology shall be reliable and available for use when needed.

    ii.   The election technology shall be functional and shall have preestablished system failure solutions and channels readily available, including solutions that do not rely on active connections.

Appendix 4: Summary of Meetings and Public Review

DGSI Technical Committee Summary of Meetings

The DGSI Technical Committee reviewed and provided thorough input through two commenting cycles, which included the review and disposition of just under 1,000 comments.

The Technical Committee approved of releasing the third draft for a 60-day public review period (during which the ACSVT and the Technical Committee were also able to review). Public review was initiated on April 11, 2023, and ended on June 11, 2023.

The DGSI Technical Committee met on the following dates:

- October 11, 2022: Initial onboarding session for DGSI Technical Committee members took place (note: onboarding of new members occurred regularly as new members joined).

- January 19, 2023: The DGSI Technical Committee announced the release of first drafts of the Vote Tabulator and Electronic Poll Book Product Standards, discussed expectations and deadlines for review, and held a question-and-answer session.

Initial draft/seed document input on the Vote Tabulator Product Standard and Electronic Poll Book Product Standard:

- February 27, 2023: The DGSI Technical Committee reviewed and dispositioned 158 comments for the Vote Tabulator Product Standard and a decision was made to proceed with another review.

- March 1, 2023: The DGSI Technical Committee reviewed and dispositioned 241 comments on- the Electronic Poll Book Product Standard and a decision was made to proceed with another review.

Review of second draft content of the Vote Tabulator Product Standard and Electronic Poll Book Product Standard:

- March 15, 2023: The DGSI Technical Committee reviewed and dispositioned 211 comments on the Vote Tabulator Product Standard and a decision was made to move to public review.

- March 21, 2023: The DGSI Technical Committee reviewed and dispositioned 72 comments on the Electronic Poll Book Product Standard and a decision was made to move to public review.

Prior to moving to the balloting approval stage of the Product Standards, four additional Technical Committee meetings were required to gain consensus on outstanding comments. These meetings took place on the following dates:

- August 1, 2023: The DGSI Technical Committee reviewed and dispositioned 111 comments on the Vote Tabulator Product Standard and the decision was made to proceed with another review.

- August 9, 2023: The DGSI Technical Committee reviewed and dispositioned 64 comments on the Electronic Poll Book Product Standard and the decision was made to proceed with another review.

- August 18, 2023: The DGSI Technical Committee reviewed and dispositioned 14 comments on the Vote Tabulator Product Standard and the decision was made to move the Vote Tabulator Product Standard to the balloting approval process.

- September 14, 2023: The DGSI Technical Committee reviewed and dispositioned hardware and software definitions in the Electronic Poll Book Product Standard. New definitions were proposed the week of September 25, 2023, and the decision was made to move the Electronic Poll Book Product Standard to the balloting approval stage on October 2, 2023.

At the balloting approval stage, the DGSI formed two Ballot Approval Committees (comprised of volunteers from the broader Technical Committee):

- Vote Tabulator Product Standard Balloting Approval Committee (12 members)
- Electronic Poll Book Product Standard Balloting Approval Committee (12 members)

The DGSI ensured that the following sectors were represented on the Balloting Approval Committees in a balanced manner:

- General Interest;
- Producer;
- User; and
- Government/Regulator.

Management Standard Summary of Meetings

The approval process for the Management Standards required input from both the DGSI Technical Committee as well as the ACSVT members:

- April 27, 2023: The first draft of the Management Standard was provided to the ACSVT members. A total of 16 comments were discussed.

- May 29, 2023: The second draft of the Management Standard was provided to the ACSVT members. A total of 57 comments were discussed.

- June 29, 2023: The third draft of the Management Standard was provided to ACSVT members. Members approved of sending the Management Standard to the DGSI Technical Committee for review.

- July 29, 2023: A review of the draft Management Standard was completed by the DGSI Technical Committee. A total of 92 comments were received.

- September 20, 2023: Comments on the Management Standard from the DGSI Technical Committee were reviewed by the ACSVT members for final approval of the Management Standard.

- October 25, 2023: ACSVT members reviewed the Management Standard and final comments were submitted by all members on November 16, 2023.

Product Standards Public Review Period

The Electronic Poll Book and Vote Tabulator Product Standards were made available for a 60-day public commenting period from April 12, 2023, to June 11, 2023. Both Product Standards were made available on the DGSI's website for review and comment.

Electronic Poll Book Product Standard Public Review Statistics:

- French and English media reach had good visibility on April 12, 2023, and was picked up by 24 outlets with a potential audience of 52,388,166 with 622 views and hits and 57 engagement actions.

- Social Media (LinkedIn) in French and English had over 200 impressions.

- There was a total of 459 views of this draft Standard online.

- A total of 127 comments were received.

Vote Tabulator Product Standard Public Review Statistics:

- French and English Media reach had good visibility on April 12, 2023, and was picked up by 24 outlets with a potential audience of 52,388,166 with 622 views and hits and 57 engagement actions.

- Social Media (LinkedIn) in French and English had over 200 impressions.

- There was a total of 609 views of this draft Standard online.

- A total of 92 comments were received.