



# MODERNIZED ELECTIONS SYSTEM FOR WASHINGTON STATE

Response to RFI No. No. 16-04

Date: December 23, 2015

**Submitted by:**

PCC Technology Group  
100 Northfield Drive, Suite 300A  
Windsor, CT 06095

**Proposal Contact:**

Greg Amato  
greg.amato@pcctg.com  
860.559.6354

PCC TECHNOLOGY GROUP, LLC  
100 Northfield Drive, Suite 300A • Windsor, CT 06095  
860.242.3299  
www.pcctg.com

December 23, 2015

Stephanie Goebel  
Washington Secretary of State  
801 Capitol Way South  
Olympia WA 98504

RE: Request for Information No. 16-04

Dear Ms. Goebel:

PCC Technology Group, LLC (PCC) is the developer and integrator for our proprietary *ElectioNet* solution that is currently being used in 11 state-wide jurisdictions, including Texas, Georgia, and Alaska. *ElectioNet* is a comprehensive and functionally rich solution to manage and administer the Voter Registration process while being HAVA, NVRA, and MOVE compliant. The system is focused on the security and integrity of the election process and is designed to automate virtually every aspect of election office operations to maximize productivity, increase efficiency, and standardize election workflow. It is one of the only true internet-based, thin client solutions that is HAVA-compliant and currently operational statewide, and the industry leader for voter registration and election systems management.

In addition to a solution that meets the needs of the State, PCC's project team completes the package; they have the expertise and experience to keep the project on schedule and within budget. Our proven methodologies have been used time and time again, allowing us to continue our 100 percent success rate on implementations.

Sincerely,



Jerry Long  
Chief Executive Officer

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# PCC TECHNOLOGY GROUP

Incorporated in Connecticut in 1995 as a limited liability company, PCC Technology Group (PCC) was started with the goal of enabling state agencies with improved technology solutions. Twenty years later and a client base of agencies from 25 states, PCC has grown to provide **“large company capabilities with small company culture and value”**—our motto that reminds us that every client is our greatest asset.

Our first voter registration system, developed in 2000-2001, was HAVA-compliant before HAVA was even a law and won the digital government award in 2002 for the State of Connecticut. In addition to our implementation in Connecticut, we have successfully implemented our solution in ten additional state-wide jurisdictions across the country.

## PCC Technology Group:

- **More State-wide Election-based Implementations Than Any Other Vendor**
- **Eleven States use our Voter Registration and Election Management Solutions.**
- **100 Percent Project Success**
- **Experts in Election Management Solutions**

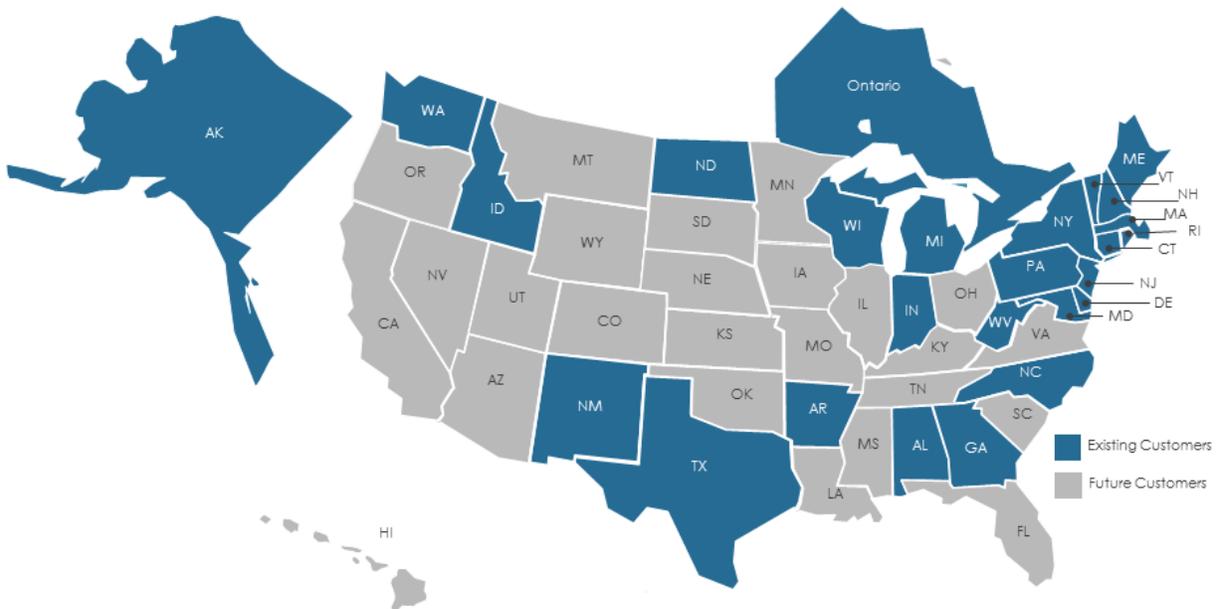


Figure 1. **Locations Where PCC has a Presence.** *PCC has a presence in 25 states and one Canadian province.*

PCC’s *ElectionNet* solution is a comprehensive and functionally rich solution to manage and administer the elections process that is not only Help America Vote Act (HAVA)-compliant but also National Voter Registration Act (NVRA) and Military and Overseas Voter Empowerment (MOVE) compliant. From voter file management to absentee voting, the system is focused on the security

and integrity of the election process. We designed it to automate virtually every aspect of election office operations in order to maximize productivity, increase efficiency, and standardize election workflow. It is the only true Web-based, thin client solution that is HAVA-compliant and currently operational statewide, making it the industry leader for voter registration and elections management solutions.

Table 1. **ElectioNet in the 11 States.** *ElectioNet is currently deployed in 11 states and used by as few as four geographically-separated jurisdictions in rugged Alaska and as many as 512 jurisdictions in Maine, as well as by 259 county jurisdictions in Texas, which was a unique hybrid of bottom-up and top-down requirements.*

State	# of Jurisdictions	# of Users	# of Voters
State of Maine	512	1,200	1,000,000
State of Connecticut	169	1,500	2,500,000
State of Rhode Island	39	200	700,000
State of New Hampshire	234	500	900,000
State of West Virginia	55	300	1,100,000
State of New Jersey	21	1,200	5,200,000
State of Georgia	159	2,000	5,700,000
State of Vermont	400	800	470,000
State of Texas	259	3,000	13,000,000
State of Alaska	4	100	100,000
State of Idaho	45	200	750,000

ElectioNet is designed to be intuitive to navigate and easy to use with the objective of increasing the effectiveness of election officials using the system and to augment the voter registration process. The user interface is built around industry-accepted context for user interaction with Web-based applications. Functions and data are presented as pull-down menu items, pick lists, and radio buttons while the user interface is organized to mirror the process of voter registration, incorporating workflow driven rules. In order to facilitate the users' ability to efficiently navigate and work with the proposed solution, context sensitive help is provided to guide the user.

Our solution also supports various industry popular relational database management systems (RDBMs), such as Oracle, IBM DB2, and MS SQL Server. Its front-end design provides ease of use, allowing end users who have secure access, a username and password, and an Internet connection to quickly process, report and retrieve information.

PCC has simplified the process of change. As State and Federal elections laws are changed, authorized users can adjust the business rules because the rules are externalized from the actual code.

# RESPONSE TO REQUIREMENTS

1. Exhibit B contains business requirements for the Washington State Modernized Elections System. (Note the scope of requirements excludes ballot creation and Tabulation.) Vendors are requested to validate and proof the business requirements to identify any requirements they believe have overlooked. Please provide a list of additional business requirements you recommend we consider for inclusion in a future RFP.
  
2. Also pertaining to business requirements in Exhibit B, please identify any requirements you believe to be exotic. In other words, identify any requirements that you believe are uncommon, difficult to fulfill, or for any other reason contribute significant cost and/or time to the Modernized Elections System? Please identify which, if any, of the identified requirements are exotic and why.

For both Questions 1 and 2, PCC provides our comments, concerns, additions, and assessments for the following requirements.

1	System must update data real time (although some updates may have a "pending" status until approved).	This would need to be considered if the State, as indicated at the Pre-bid, intends to entertain solutions that allow different or current third-party or stand-alone County systems to continue to operate in the new environment. "Real-time" may be subject to the integration capabilities of those systems or the new State Solution.
4	System must operate as a single, integrated, synchronous whole with all data changes accessible in real time from all sub-systems and components by any authorized user.	As with number 1, this is potentially more difficult to ensure unless the State selects a truly centralized State-wide solution with real-time access directly by the County users.
6	System must provide the capability for UI configuration, including data field suppression, to be configured to individual county specifications.	While we understand the unique position WA SOS is in with stakeholders that currently have total flexibility in customizing their third-party solution (to the extent offered by the vendors), it is standard practice in a modern solution to limit certain configurations such as ability to turn-off fields, to the administrators at the State level. While certain changes can and should be allowed for County configuration, others are critical to the State's statutory requirements or internal vision for

		the election process, so may not be available for the County role to change.
7	System must allow centralized support to login and edit within each county-specific configuration.	PCC highly recommends an approach where these "county-specific" configurations are driven by the database or content library of a complete solution and NOT one-off instances of code or applications specific to a County. We believe the amount of configuration necessary to satisfy and exceed County needs for unique requirements can be met by a truly centralized application with built-in County configurability. The alternative is a continued disparate environment with complexity, high costs of maintenance, and potential non-compliance.
8	At a minimum, system must support mobile device access for those portions of the system that are public-facing or used in voting centers for issuing ballots and crediting voters. System might support mobile device access for all portions of the system.	Highly recommend that the State further flesh out the exact requirements for these tools, especially where native device integration may be required (GIS, Photos, etc.). The difference in cost between "Responsive Design" (Style Sheets), "Cross-Device Compatibility" (HTML 5), and "Native Apps" (iOS, Android etc.) can be significant.
9	System must support current versions of major modern web browsers in use at the time of system delivery. Vendor support must include ability to keep current with major browser enhancements.	This is a given for all public-facing functionality, but please specify in the RFP if this requirement necessarily has to apply to the Administrator back-end. At the time of this response there is no real barrier to this requirement within the PCC solution, but depending on the types of unique functionality (signature verification and scanning/OCR may be examples) to be implemented, the cross-browser compatibility for internal admins may be affected by third-party tools.

11	System must be compliant with state and federal ADA requirements Section 508 as well as the Web Content Accessibility Guidelines (WCAG) 2.0. Detail all accessibility standards to which your system complies.	While a standard requirement for all external-facing components and general workflow requirements of the internal admin module, the State should allow for the caveat that some robust administrator configuration tools may not comply. If there is a requirement for Rich Text or Microsoft Word integration, for instance, to configure letters and templates, the State should know these tools are not 100 percent compliant.
12	System must support multiple language translations without necessitating recompilation or recoding of the system	We typically recommend that the State take ownership of the actual translation services (stating this will reduce cost estimates), but the system should support easy entry or upload of those translations and provide capability for user profile change to select available languages as default.
13	System must maintain an audit log tracking all system actions. Describe how your solution makes audit log data available to a state and/or county user.	Showing large amounts of history and/or audit data on the front-end is a user-experience issue and potentially costly when the need for the data may be limited. We recommend the inclusion of an ad-hoc reporting mechanism as an administrator module, which will provide access to all data, including that stored in history/audit tables or fields to authorized users.
17	System must provide database individual and bulk delete capabilities with a change log	Would add "for authorized users"
18	System must provide the capability to remove cancelled voter records after the statutory three-year retention period has expired and a report must be generated of removed records.	Please specify "automatic" versus "user initiated" purge requirements.
19	System must consolidate voter UI functions with candidate UI functions (offices open for election, candidate filing, candidate statement submission) for a single point of interface; with appropriate workflows in place for candidate activities (must be filed as candidate with fee paid in full before statement can be submitted)	Candidate functions may be one of the more unique attributes of the WA SOS solution, so any insight into detailed requirements and business rules would help.

20	System must integrate programmatically with third party election management data such as the Office of Financial Management's fiscal impact tables.	Any further details regarding the integration types available for this and other interfaces would reduce estimates (Web Services, File Transfer etc.). Any specifics on the shared fields and rules for these interfaces would also help.
21	System must allow for the creation of public webpages with county branding	The ability to allow a county splash page with content and links specific to their needs is not a major issue, but since voters can move often we recommend that the core portal for the voter be driven by generic login capabilities (State-wide) and specific data and content that reflects their current county of residence as appropriate once logged in.
22	System must allow for county and state users to create, edit, and publish changes to webpages in a graphical user interface (GUI)	This may imply to some respondents that the State is seeking a full Content Management Solution (CMS) as part of the solution.
30	System must provide the capability to interface with a payment processing system.	Please expand on the modules/capabilities to be supported.
32	System must include robust support for metadata.	Please provide examples.
41	Please describe how your solution can leverage VIP APIs and/or an alternate solution.	Please further define VIP.
73	System must provide the capability to send text messages to on-line users confirming receipt of on-line transactions.	Depending on the text functionality, there could be additional fees for third-party licenses and software, as well as configuration.
74	The online voter registration application must authenticate user real-time using DOL data when registering to vote online.	In light of the disenfranchising issue PCC recommends requiring an alternative path for those that do not have the required identification to verify in real time but still provides some streamlined options for submitting a manual or provisional registration through the OLVR module.
75	System must provide county transfer capabilities to address when an online voter registration application is sent to an incorrect county.	County transfer capabilities exist, but vendors should be asked how OLVR prevents this type of issue before that is necessary.

85	System must provide the capability to release queued registrations after registration re-opens flagging possible conflicting updates for individual voters.	In addition to this scenario, vendors may be asked to expand on the work queuing capabilities of the system in general, whereby users are alerted to and/or process a variety of use cases where user intervention and/or approval may be required.
93	System must provide integration between functions carried out by the counties and functions carried out by state.	Even better if they are facilitated by the same consolidated application to avoid the need for integration, which introduces a potential point of failure.
94	System must provide the capability for county to access the statewide list of registered voters.	Even better if they are facilitated by the same consolidated application to avoid any timing issues through true real-time processing across the State.
110	System must provide a means to resolve potentially incapacitated voters.	What does "resolve" mean in this context?
123	The system must notify the user if a residential address has been identified as an invalid delivery point and preclude the use of that address as a residential address.	Does the State have any requirements around the use of "rural addresses"?
143	System must be designed with current geographic information system (GIS) data and/or real-time calls to GIS(s) for address validation.	State should clearly identify and detail any GIS services or solutions for which the SVRS can/must integrate to support this function. This could include additional costs or license fees and additional configuration time.
171	System must include the ability to perform automated signature verification.	If possible please expand on any rules/thresholds etc. that would be required to support truly "automated" verification. This could include additional costs or license fees and additional configuration time.
173	System must include the capability to standardize residential and mailing addresses against USPS standards.	What is the difference between and need for both this and GIS integration mentioned above?
192	System must allow a scanned document to be updated.	Assume "replaced" is more applicable than "updated"?
198	System must provide the capability to redact information on scanned documents.	Does this require "custom" redaction or will the fields in question always be in the same place? If custom is required, would the State want in-process redaction using SVRS tools or would they be open to using desktop software such as Adobe

		and then re-attaching image after redaction is done?
2T. Correspondence Maintenance		Vendors should be asked to expand on how their system supports user-configurable correspondence to meet unique County needs.

3. Exhibit A contains the WA OCIO IT Security policies. Within Exhibit B, there is a worksheet titled "Critical Election Periods". Washington State Elections Officials desire a solution that balances the provision of uninterrupted services during critical election periods with cost. Please provide a recommendation for high availability.

PCC would recommend a system and network infrastructure that is based on a high availability design with redundant firewalls, routers, switches, intrusion detection system, and load-balanced or clustered services.

4. Exhibit A contains the WA OCIO IT Security policies. Within Exhibit B, there is a worksheet titled "Critical Election Periods". Washington State Elections Officials desire a solution that balances the provision of uninterrupted services during critical election periods with cost. Please provide a recommendation for disaster recovery.

PCC recommends a disaster recovery site with real-time data replication using SQL Server Mirroring in order to ensure that the solution is available at all times, especially during critical election periods.

5. Please provide a recommendation for system integration approach and methodology, which most effectively supports the specified business requirements and other concerns mentioned in the Background and Objective section.

PCC recommends a horizontal integration through the use of an enterprise service bus (ESB) because of the several disparate systems that can integrate with a voter registration solution, whether it is with the Department of Corrections for the felons list, the Department of Licensing for driver's licenses and signature comparison, or a political party that is looking for a list of registered voters for a mass mailing campaign. The ESB reduces communication redundancy while confirming the delivery of data.

We also recommend both built-in form-based integration into an active directory (AD) or similar lightweight directory access protocol (LDAP) environment or hybrid, where by public users are services using form-based authentication and state users use existing AD, thereby supporting single sign-on (SSO).

For security integration, communication should be achieved by SSL digital certifications with 1024-bit encryption between the browser clients and the Web server.

6. Please provide a recommendation for project management approach and methodology, which most effectively supports the specified business requirements, other concerns mentioned in the Background and Objective section and project values of transparency and collaboration amongst the state's 40 separately elected Elections Officials.

PCC focuses on the use of proven industry-standard processes and best practices for project-level activities. By aligning the project plan with the Project Management Institute's (PMI's) Project Management Body of Knowledge (PMBOK®) guidelines, as well as Carnegie Mellon's Software Engineering Institute's (SEI's) Capability Maturity Model Integration (CMMi), for management of project scope, schedule, cost, quality, staffing, communications, risk, integration and deployment, we ensure the on-time delivery of a system that meets all requirements in the RFP. We work closely with the project managers who represent our clients, subject matter experts (SMEs), and other project stakeholders in every aspect of the project in order to ensure project success.

With PMBOK and CMMi as a basis for our framework, we use these factors in our implementations:

- Best practices in software development.
- Clearly defined critical success factors and a phased project lifecycle that addresses each success factor.
- Understanding of the unique elements of the particular engagement that must be managed to ensure success.
- Risk mitigation by implementing industry best practices to guide each phase of the project.
- Delivery model that meets the client's implementation schedule as well as conforms to the client's organizational structure.
- Communication plan designed to focus on free and open horizontal and vertical communication across the client's organization and the project team.
- Utilization of tools to help track, control, and report on project tasks and schedule.
- Management processes that are easy to use and implement and that focus on quality.
- Availability of best resources to bring success to the project.

While following the five standard phases of project management, we also follow an industry standard Implementation Plan, which runs concurrently. Implementation plans can be proposed using either a traditional waterfall methodology, a highly flexible agile approach, or some hybrid that utilizes the best benefits of each. Given that there are COTS solutions in the marketplace that provide an extremely high degree of fit to Washington requirements out-of-the-box, PCC would recommend a hybrid approach to maximize a lean and focused implementation while still recognizing the advantages of an iterative development approach. Standard waterfall analysis and testing phases provide the ability to

rapidly complete and validate requirements based on Gap Analysis, but if coupled with an iterative configuration phase prevent the risks associated with “big bang” development.

More than the standard name or approach of one methodology versus another, the OSOS should put significant weight on the experience of the vendor in using their proposed plan in real-life, comparable projects for like clients. Vendors who reflect a careful mind for the operational change management challenges of a project of this type, a respect for the potential risks of data conversion and integration points with multiple stakeholder systems, and bring a proven track record of preventing issues for their clients on Election Day will make for a far more compelling partner than those who can provide a brilliant dissertation of a Waterfall or Agile approach.

7. Please provide a recommendation for funding approach and cost distribution, which most effectively supports the specified business requirements, other concerns mentioned in the Background and Objective section and project values of transparency and collaboration amongst the state's 40 separately elected Elections Officials. Please include citations of the recommended approach in place throughout state and local governments.

PCC utilizes a simple costing model that calculates total costs for the implementation and configuration of the proposed solution based on the number of resources and weeks of effort. A reasonable license fee is added to the PCC COTS solution on a one-time, unlimited user basis per industry standards. PCC has extensive experience in working with separate elections officials and counties. In Maine, we worked with 512 remote and often inaccessible stakeholder jurisdictions in order to manage and facilitate user buy-in. The client-preferred implementation model that may include additional efforts for ensuring the participation, communication and training for these extended stakeholders or complex organizations are typically just factored into our resource costs according to the timeline and passed on through traditional deliverable-based pricing.

In PCC's experience the State typically acts as the funding source and distribution hub for the project and related costs. If there are flow-downs to Counties or Towns to recoup costs for implementation, operations or maintenance, these would typically be managed within the internal environment at the State and not something PCC has significant insight into. We can certainly provide itemized billing based on stakeholder or user location or role to allow the State to allocate costs to various cost centers as necessary.

The PCC approach, which will focus on a Top-down, single solution that provides a high level of configurability for County and external stakeholders, should minimize the cost concerns of out-of-control custom solutions while still providing the functionality necessary for unique County operations. In this model all stakeholders share a pool of maintenance, but as indicated we can itemize the usage to support planning or distribution activities for the State.

8. Please provide a recommendation for data conversion and migration, which most effectively supports the specified business requirements, other concerns

mentioned in the Background and Objective section and project values of transparency and collaboration amongst the state's 40 separately elected Elections Officials.

PCC recognizes data conversion and migration as one of the most risky and potentially costly aspects of any implementation where States are transitioning from multiple, different legacy systems. We highly recommend that the State provide as much detail as possible into the types of database platforms, structures and size of databases, and any known data issues in any upcoming RFP to help vendors understand the complexities and ensure lowest costs are proposed.

PCC's approach to data conversion is iterative and goes through various phases of the software development lifecycle (SDLC), such as data acquisition, analysis, transformation, and loading. The design and approach for the data conversion plan must be approved by the client prior to the full data conversion commencing. The conversion effort goes through a three-pull strategy. This involves extracting the data from the current databases in three pulls with each subsequent pull resulting in cleaner converted data.

**Initial pull:** We use this data extracted to analyze the current data structure and format and develop conversion routines as well as other management scripts. These management scripts are used to reconcile record counts between the source data and the converted data. *Exit point/Milestone:* Data Mapping Document.

**Interim pull:** During the second pull, extracted data is used as the source data for the conversion routines that have been developed. The converted data is analyzed for structure and format and its adherence to the target data model.

Errors reported during this pull are resolved by one or more of the following methods:

- Change the data type or structure of the error fields.
- Assign default values while converting for nonexistent fields in the source.

Conversion scripts go through an iterative process of refining and testing the data that is run through them. This iterative process results in high accuracy of the converted data. After the client accepts the converted data, this pull is complete. We recommend a user acceptance test of the converted data by connecting it to the testing/staging application to make sure that the converted data flows seamlessly through the application. *Exit point/Milestone:* Production ready converted data.

**Final pull:** Extraction of the data in the third pull happens after successful user acceptance testing (UAT) and before the go-live of the new application. Once the data is pulled, we recommend that the existing system be taken down to prevent loss of data that might be entered while converting the pulled data. After populating the production database, additional cleanup scripts and management scripts are run to reconcile the source and the converted data. *Exit point/Milestone:* Population of production system with converted data.

Conversion-related activities occur over a large percentage of the life of the implementation cycle. These tasks are designed to clearly define conversion scope, provide ample opportunity to test routines and results, and allow for an optimum amount of time to validate conversion for "go-live."

**Table: Data Conversion Roles and Responsibilities.**

Role	Responsibilities
State IT Department	<ul style="list-style-type: none"> <li>• Provide the data extracts and resources to identify conversion data elements in a standard format.</li> <li>• Review data mapping, data dictionary, and exception reports.</li> <li>• Test conversion results.</li> </ul>
State Subject Matter Expert (SME)	<ul style="list-style-type: none"> <li>• Provide conversion business rules and data specification rules.</li> <li>• Review exception reports.</li> <li>• Perform manual data correction.</li> </ul>
PCC Conversion Lead	<ul style="list-style-type: none"> <li>• Develop data mapping and data dictionary documents.</li> <li>• Document business rules for data conversion.</li> <li>• Test and conversion results.</li> </ul>
PCC Senior Conversion Developer	<ul style="list-style-type: none"> <li>• Strategizes data conversion approach and leads the team from design to implementation.</li> <li>• Develops conversion scripts and gates.</li> <li>• Leads data conversion activities (Extract, Transform, and Load).</li> <li>• Transformation of legacy data to target database.</li> <li>• Coordinate data conversion activities.</li> <li>• Works closely with the project manager and technical lead.</li> </ul>
PCC Developer	<ul style="list-style-type: none"> <li>• Develop transformation and load scripts.</li> <li>• Works with data conversion lead to retrieve data using batch extracts from the different automated and manual applications/systems.</li> </ul>

9. Please provide a recommendation for user experience design approach and methodology, which most effectively supports the specified business requirements, maximum stakeholder usability and adoption and project values of transparency and collaboration amongst the state's 40 separately elected Elections Officials.

PCC’s design methodology was co-developed through a partnership with UI experts around the country including a top professor in UI/UX design from Carnegie Mellon University. Our approach centers on several key concepts:

- ✓ Consistency – Common or similar actions should be performed in exactly the same way throughout the application, and elements should always appear in familiar formats and locations.
- ✓ Hold the User’s Hand – Completing a complex online transaction, much like assembling a new bicycle, comes much easier when step-by-step instructions are included. By breaking down information and actions into manageable, logical steps, and using visual cue’s and alerts that ensure users know exactly where they are and can see the path ahead, ensures a successful, unattended transaction.
- ✓ One-click Organization – Modern information systems contain a wealth of data, and the patience level of today’s user in finding what is important to them has decreased. No longer will pressing F-keys 12 times or scrolling through pages of information elicit a positive user experience. PCC’s design utilizes dashboards personalized to the user, and a highly organized tab-based screen flow that allows the user to find and access all related data only one-click away.
- ✓ Familiarity – PCC did not pioneer the concept of efficient user experience, so our experts know that “if it ain’t broke, don’t fix it.” We used research compiled across some of the most well-used, and well-liked applications on the Web, to incorporate the most familiar structures and actions into our designs. With the large percentage of external users in a system such as this, where formal training is highly unlikely, an intuitive, recognizable core design will result in the highest number of unattended transactions.

To achieve most of this, PCC utilizes “user-controls” and style-sheets within the solution to ensure uniformity and ease of maintenance across similar operations. We have rich experience in designing not only cutting edge user interfaces, but user interfaces that are 100 percent applicable to the business and functional requirements of any election-related solution.

10. Please provide a recommendation for system support, including service and maintenance, service level agreements and helpdesk, which most effectively supports the specified business requirements, other concerns mentioned in the Background and Objective section and project values of transparency and collaboration amongst the state's 40 separately elected Elections Officials.

In order to keep costs low, PCC recommends a Level-2 Help Desk that supports calls from agency users and extended hours of operation during early voting periods and on Election Day.

11. Please provide a recommendation for contract vehicles and strategies in support of your recommended approach to system support and system integration.

PCC recommends a state-wide implementation with a standard support and maintenance agreement entered into by the Secretary of the State and available for use by all stakeholders of the top-down solution. As mentioned above, PCC can itemize usage of the maintenance options by stakeholders to

support inter-agency cost distribution. In the event the SOS opts for a solution that allows counties to continue to contract for and support separate third-party solutions, the statewide support agreement would cover only those features related to the integration and synchronization of data between those solutions and the centralized database. However, PCC will be open to other hybrid scenarios presented by the SOS based on requirements of any future RFP.

## 12. Please provide a recommendation for testing, complete through final acceptance testing and to include a mock election.

PCC outlines the Test Plan in order to show our clients our approach and strategy through the development of each software release. We provide details on the deliverables, the types of tests we conduct, resources, assumptions, and risks. PCC uses the Test Plan to verify that the solution performs as expected before we move it into the production environment. Our objectives are to:

- Identify the strategy for completing testing tasks on schedule.
- Define the testing organization, tools, and environment.
- Identify the roles and responsibilities to support testing.
- Provide a common understanding of the testing approach.

With the assistance of the client, we finalize our Test Plan during the UAT phase of implementation.

### Testing Principles

PCC's successful testing strategy encompasses the following key principles:

- **The right-size approach to test cases** – Too many cases is time consuming and costly, while too few introduces too much risk. We aim to define the right number of test cases, ensuring that the solution meets the requirements, but also test for what it should not do. The Test Team tries to find as many defects as early as possible to prioritize fixes appropriately and avoid unnecessary rework. Because no amount of testing will ensure a defect-free implementation, the PCC test lead manages expectations and executes plans to ensure the right mix of resources, quality, and risk.
- **Meticulously and clearly defined plans** – Comprehensive documents that are easy to understand and simple-to-execute processes ensure consistent and thorough testing.
- **A well-managed, tried and tested approach** – Frequently scheduled communication and progress checks with testing staff, clearly defined and monitored scope, extensive knowledge and practice with our selected testing tools and methods, and a strong focus on quality drive the approach. The PCC test lead is highly experienced in ensuring communication and coordination of events and resources; this also entails set-up and maintenance of a stable test environment and collaboration with all members of the test team to establish an effective schedule to support all testing, minimizing downtime and resource impacts.
- **Clearly defined acceptance criteria for each phase of testing** – Acceptance/exit criteria is agreed to with the client's UAT team and each phase of testing concludes with a meeting between

the PCC test lead and identified stakeholders to confirm the decision to approve and conclude the phase of testing. Where appropriate, official signoff is also secured.

- **Thorough test plans** – PCC establishes test plans and cases with necessary detail to produce schedules that can be effectively adhered to and managed. Final test plans include details that include data conditions, number of test cycles/iterations, specific test cases, and timing. The details of the test plan drive the region/environment set-up, refresh rate and timing of other key activities.

The UAT Phase should result in the following:

- Tools and clear processes to document, report, and manage defects and issues related to the solution.
- A set of test cases that can be used for future releases.
- Confidence in the hardware and software supporting the solution and the defined code migration process.
- An acceptable level of risk, minimizing the likelihood of defects in production that significantly impact the business.
- Evidence to support acceptance of the application and a decision to move the solution into a production environment.
- Confirmation that the solution design will enable acceptable productivity of job tasks in production, including appropriate coverage of functionality, and availability, performance and responsiveness of the solution.

## PCC's Testing Approach

Our testing approach entails eight steps:

1. **Review and finalize the Test Plan** – The PCC and client project managers, PCC test lead, the SMEs and UAT teams from the client, any independent contractors, and other necessary resources as defined by the client or PCC meet as needed to finalize and approve the Test Plan, including approach, resources, exit criteria, and tools, during the Development Phase.
2. **Create detailed test cases** – The PCC test lead coordinates development of test cases with the testing team. This includes documenting the requirements, including a Requirements Traceability Matrix (RTM), as well as test cases/scripts and all activities to support the testing activities. In addition, we will coordinate the review and approval, where necessary, of test cases, the revised test plan, and the RTM. Test cases for unit, functional, operational, and regression testing are updated based on existing test cases from the solution. Existing test cases are used for modules that are not modified. For any new or modified components, PCC creates or updates new test cases. Test cases will be defined based on new requirements and use cases as defined in the gap analysis and Functional Requirements Document (FRD). User acceptance use and test cases will be driven by the client test team and will cover all functionality of the solution.
3. **Process and System Training** – PCC's lead trainer, test team, and test lead collaborate to conduct training for the testers. The testing lead and the testing team are responsible for ensuring

that testers are familiar with testing processes and tools. The trainers will provide training of the knowledge and skills required to executed job tasks in the solution.

4. **Test Environment Setup** – PCC’s test team and the test lead coordinate set up of the test environment. This includes creating the environment, loading the data extract, creating a backup, configuring the environment, installing necessary tools or software, providing environment access, establishing the refresh schedule, querying data and/or setting up specific account conditions, and executing mock tests to verify environmental readiness.
5. **Execute Tests** – The test lead coordinates with the test team to execute the test cases and scripts. Results are captured, monitored, and reported; data is refreshed as scheduled; and defects are reported and managed. This effort also includes managing the environment, resources, reporting, and all other ongoing activities to support the testing effort.
6. **Code Fixes and Releases** – PCC developers are responsible for delivering code fixes based on defects identified and incorporating them into scheduled releases. This includes developing and testing the fix, scheduling the fix for a code release, updating the defect tracking tool, running regression testing, and migrating the code with the release.
7. **Retest** – Retests are performed by the test team; results are captured, monitored, and reported. The test lead coordinates any modifications to the original test plan (based on change control, data or resource availability, and/or other findings during testing).
8. **Review and Approval** – Daily reviews of testing are conducted once testing begins. This process includes review of system stability, code turnover, documented issues and defects, and review of overall progress and resources. Remaining work is prioritized and code fixes and retest are repeated until satisfactory results are achieved. This phase concludes with approval and sign off, where appropriate, of the testing phase.

## Testing Process

The testing effort is to test each aspect, from the units of code to the end-user or system interfaces, prior to moving the solution to production. The specific testing that will be conducted is detailed in the table below.

We conduct eight different tests:

- **Unit testing**, which is the developer test of code to ensure it meets design and behaves as expected focusing on individual modules and screens. This testing is completed prior to any other testing.
- **Integration testing**, which is conducted any time we interface with another solution. This testing is conducted after unit testing.
- **Functional**, which demonstrates each of the discrete functional capabilities of the system, mimics business scenarios with production-like simulated data, and checks particular features by comparing results against functional specifications.
- **Conversion**, which validates that the conversion process works and that legacy data is valid and stored/presented properly after it is converted to the new system, tests converted data to ensure accuracy, and validates the conversion process through test conversions.

- **Operational**, which demonstrates the full operability of all integrated components in an operational environment and to validate associated user and maintenance documentation; focuses on testing of the application using specific business scenarios that relate back to the requirements; and tests all functionality through use cases.
- **Regression testing** is performed on previously tested system functionally to ensure that changes or enhancements did not adversely affect unchanged functions and assesses whether new or modified code or infrastructure affects infrastructure or code already in place.
- **Final acceptance** demonstrates that system components are completely readied for production implementation and ensures that system accurately reflects specified usability and functionality requirements (and customer expectations) any identified workarounds do not adversely impact the business and unresolved errors will not prohibit users from performing primary and critical work functions.
- **Benchmark** demonstrates that the system meets or exceeds performance requirements, including throughput and response times.

PCC employs a use case methodology to perform the manual documentation and testing of application processing paths and requirements. This methodology drives the test cases and testing process to ensure completeness, organization, and quality during the testing effort.

Major functional areas of the application are broken down into use cases, which explain the various scenarios/high-level user interactions with the system and the goal or expected outcome. The construction of use cases is based on the core modules of our basic election solution, as well as those specific requirements outlined and specification documents that are defined for the implementation, such as FRD.

The use cases derived from the requirements specifications, as well as any other use cases documented in other specifications, are then broken down into multiple, specific test cases that clearly lay the path for proving the use case requirements have been met and the system functions in an acceptable manner as a whole. The test scripts are comprehensive to include input criteria, required response times where needed, business rules, and expected results and to enable the client users to perform the test with minimal assistance.

The most effective test cases are those that have been designed in collaboration with those persons responsible for actually using the system, so our team will work with the client SME and UAT teams to develop the scenarios, use cases, and tests for this effort.

Test cases are created with a distinct starting event (a trigger for the process) and an end result (outcome from the process). For each test case, acceptance criteria are defined, typically in the form of expected results. The tester is responsible for determining if the results occur as expected; if not, the specific test case fails. The high-level process follows these steps:

1. Designated resource designs and documents the test case(s) with input from client SME and UAT teams as appropriate, including expected results.
2. Testing lead assigns test cases to testers as needed.
3. Tester receives test case and reviews validity.

4. Tester (with the help of others as needed) prepares the test environment and identifies or creates the test data/conditions.
5. Tester executes the test case/script.
6. Tester records results in the test case database/log (including any evidence where required) and update the test case status.
  - a. If results are satisfactory (pass), tester moves to subsequent step.
  - b. If results are not as expected (fail), the tester logs a defect in TAS and assigns the initial estimated severity. The tester will immediately notify the testing lead of any defects in the Severity 1 level (severity levels are described later in this section).
7. At the end of day, the test team completes a review of newly submitted defects. The severity is evaluated and a priority is assigned to each defect. Testers, the testing lead, developers, and others participate in meetings as needed to clarify, analyze, prioritize, or resolve the defect.
8. Fixes are scheduled for releases and PCC performs regression testing.
9. Testers retest fixed defects or modifies test cases, as needed (and updates the defect log status as appropriate).
10. Designated representative (as defined in detailed test plan) provides sign-off when acceptance criteria is met.

Testers are responsible for thorough tracking and documentation. Tester documentation ensures that defects can be recreated and appropriately resolved. Testers are also responsible for identifying any test cases or conditions that may have been missed and bringing them to the attention of the testing lead.

The tester is also responsible for notifying the testing lead if any of the following entry criteria are not met when testing is scheduled to begin (or any other test case-specific entry criteria are not satisfied):

- All code of modules being tested have been unit and system tested.
- The Test Plan has been reviewed and approved.
- Testers have been given adequate training of the application and tools necessary to perform tests.
- Test environment has been configured and regression tested.
- Test data has been has been loaded into the test environment.

It is the responsibility of the testing lead to coordinate timely resolution of any issues raised by the testers and to escalate issues when necessary.

13. Please provide a recommendation for training. Elections Administrators and Staff around the state possess an intimate familiarity with their existing systems. We will require a training plan that enables county and state users to develop a high degree of comfort with the replacement system(s) in advance of go-live in order to support a seamless implementation for all Washington State elections stakeholders. Training to include internal users and administrators/IT support staff.

Our Training Plan provides a roadmap of the detailed schedule, objectives, and key deliverables associated with training on the new solution. The plan addresses the training activities to optimize the performance of stakeholders, such as the end users and the trainers, as well as the administrators and IT staff. We provide our strategies to evaluate the training throughout the training process, as well as post-training evaluations to ensure that the users are performing at the expected levels.

With any new system, gaps in knowledge are inherent. We use training to close those gaps in knowledge and skills and strategically align training activities with the various development, testing, and implementation activities. We base the Training Plan on our understanding of the current- and future-state environments, as well as on our Systematic Approach to Training (SAT); we have successfully employed this plan in several other large-scale implementations. We customize our training programs and modules to meet the needs of individual users groups as determined through stakeholder and user needs assessments and work closely with the stakeholder groups to review the approach in order to complete the activities outlined. The Training Plan is finalized during Phase 2 of our Implementation Plan, and the client reviews it, provides feedback, and then approves it.

We use SAT to deliver high-quality training programs that drive overall project success. Our team, which is certified in Instructional Design and Delivery, understands how training, communication, change management, organizational design, and process design fit together to ensure initiative success.

PCC offers several training packages with our solution implementations:

- Train-the-Trainer—the client delegates “super users” to learn the system who will train everyone else.
- End users—the client has all end users trained by PCC.
- System administrators—PCC trains the system administrators who will maintain the solution.
- Web-based training— this training consists of online help guides, video, computer-based training, and various other methods.

While these are common methods available for any system implementation, PCC knows from experience that Train-the-trainer types of approaches are not typically effective in a State-wide VR solution release. We will recommend the full classroom-based training curriculum for all key users at each of the Counties, immediately prior to the rollout of each county. Regional-based training centers can be utilized to maximize participation and limit costs, but PCC believes each user should receive hands-on training. If multiple Go-live rollouts are scheduled, users will be trained in a session closest to their county’s proposed roll-out date to ensure knowledge retention.

Commonly in our state-wide implementations, PCC will work with the State to schedule and plan for preliminary opportunities to educate the user base and provide upfront exposure to the system prior to the actual formal training sessions. These are often referred to as “traveling road shows” and entail a structured or simple meet-and-greet format where PCC and the State will jointly visit regional locations to provide personal communications and preparatory advice for interested stakeholders. In Georgia, PCC set up rooms at local election conferences where participants could stop by and get information as needed, or try out the new solution. These opportunities go a long way towards fostering trust and buy-in in States where multiple disparate County stakeholders need to feel heard.

Formal Training topics for election solution users could include:

Course	Description
Searching	During this course, users will learn how to run advanced searches, including wildcard searches.
Report generation	In this training, trainees will learn how to work with various canned reports, as well as how to generate and save their own ad-hoc reports.
Correspondence generation	The trainees will learn about the generation of correspondence, including letters, emails, and notices to the external users' dashboard.
Voting districts and precincts	Users will learn how to add and update the voting districts and precincts in the State.
Elections	In this discussion, users will learn how to add elections to the systems and then maintain them. This includes selecting the appropriate election category, names of the elections, and dates.
Candidate Management	Approving candidates through the process, generating necessary correspondence and processing payments are some key topics of discussion.

PCC also provides training for the users who will have the administrative privileges of the solution. Topics could include the following:

Course	Description
Database Backup	Data backup and recovery protects against accidental loss of data, corruption, and hardware failures. Training will cover the process to backup and restore the database for database administrators.
Application Backup	Application backup training will cover the process to backup and restore the application structure for system administrators (to prevent against failures, corruption, etc.).
Deploy patches to the servers	Training will demonstrate the process to deploy software patches to the server when updates are released to the client.
Application deployment	Administrators will learn the process to deploy the application to new users/desktops.
Manage user information	Maintenance of application users includes providing system access, modifying user roles, removing access, and other activities associated with ensuring the proper personnel has the appropriate system permissions to perform job functions.
Resolve Browser compatibility issues	Administrators will learn to check for browser compatibility and troubleshoot common browser compatibility issues.

Course	Description
Setup printers	This training covers the steps to set up printers and related settings for the system application or resolve issues with printing from the solution.
Configure and Monitor Batch Jobs	Trainees will learn the tools and processes to monitor the system's batch jobs and configure batch job settings.
Managing work queues	Trainees will learn how to change the work queues in order to route the work to other users.
Configure templates	The trainers will show trainees how to configure the templates that are used for sending correspondence to users.
Maintain business rules	Business rules are configured by the IT staff and are used to drive how the solution operates.
Configure correspondence and reminders	This training covers how notifications and reminders are sent to users.
Ad-hoc query tool maintenance	Trainees will learn how to create ad-hoc reports and maintain those reports for future use.
Report maintenance	This training will cover the various reports that users can run, as well as the features and benefits of the Ad-hoc Query capabilities.
Redistricting	This highly complex and potentially high-impact process is limited to restricted users and provided in a separate track.

Again, we feel it is important to note that the more the OSOS can detail the number of users, admins, IT staff and other training needs, as well as the number of locations or regions in which you would expect effective training to require, the more vendors will be able to contain costs in any upcoming RFP response.

14. Please provide a recommendation for documentation, including internal, external, and administrator.

PCC recommends that the SOS ask for training manuals in an electronic format so that the SOS can reproduce the manuals as often as necessary. We also recommend an online help guide that can assist online user.

15. Please provide a recommendation of voter outreach requirements for the Modernized Elections System.

PCC will provide any proprietary ideas for voter outreach in any upcoming RFP.

16. Please provide a timeline estimate for implementation of your envisioned solution in response to business requirements in Exhibit B and your responses to items 1 – 15 above.

PCC estimates that a project of this scope could be accomplished between 12 to 24 months.

17. Please provide a cost estimate for implementation of your envisioned solution in response to business requirements in Exhibit B and your responses to items 1 – 16 above.

We estimate that a project of this magnitude could cost the SOS between \$2M to \$4M for the implementation, depending on the scope, the number of requirements, and the level of customization and configuration of PCC's *ElectioNet* solution. Yearly maintenance and support and hosting would incur additional annual fees.

# SECTION 1