



Analysis of Manual Tally Options for Shasta County

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All references contained in this guide are to the California Elections Code unless otherwise stated

Executive Summary

On January 24, 2023, the Shasta County Board of Supervisors voted to cancel the county's voting system lease agreement with Dominion Voting Systems. At the Board's next meeting, on February 28, 2023, the Shasta County Elections Department presented an agenda item to recommend the Board select a certified voting system or vote to rescind the cancellation of the Dominion lease agreement. Instead, the Board voted to explore hand counting (a "manual tally") of paper ballots. That item moved forward; the Board took no action to secure a certified system. The Board indicated it would take up these items again at its March 28, 2023 meeting.

In response, and in the limited time available, the Elections Department has undertaken the most thorough study and analysis of the feasibility and legality of different methods of manual tally possible under the circumstances. This document attempts to address the many complexities of a full manual tally in the context of elections in Shasta County. It also addresses the Election Department's plan for implementing any manual tally given these complexities. Due to the quick turnaround between the request for more information about hand counting (February 28, 2023) and the date on which the Board will take up this subject again (March 28, 2023) we acknowledge that there is room for deeper analysis and development of process and procedures. However, because these items must be settled immediately to minimize the risk of voter disenfranchisement, we provide this report to guide the discussion.

The cost and time required for any manual tally process depends on the complexity and size of the ballot. The jurisdictions we are aware of that perform a full manual tally without the use of a voting system are much smaller, operate under materially different legal constraints, and do not vote a complex ballot like the ones utilized by California voters.¹ According to the MIT Election Data & Science Lab, "[o]nly a handful of very small counties continue to use hand-counted paper ballots."² By comparison, Shasta has 111,503 voters; typical turnout ranges from 50,000 votes in a primary to a high of 94,084 votes in the November 2020 Presidential General Election. In the November 2022 General Election, which saw 61.8% turnout, there were 47 ballot types, 42 contests, and 114 candidates. There were over 2.8 million ovals counted across the ballots.

Whether and how a manual tally can be completed also depends on the legal timelines for ballot processing, tally, and audit. California law requires certification of most elections within 30 days.³ In a presidential election or presidential primary, counties must send the Statement of Results to the Secretary of State no later than 28 days after the election.⁴ But elections officials

¹ In addition, California and federal law require the county to adopt some form of voting system. A voting system is also necessary for processes including ballot creation and audit of any hand count. Failure to adopt a voting system would illegally disenfranchise disabled voters and threaten the election and its results for all voters. As a result, this document assumes that the Board will adopt such a system.

² *Voting Technology*, MIT Election Data + Science Lab, <https://electionlab.mit.edu/research/voting-technology>.

³ [Cal. Elec. Code §§ 15372, 15375](#).

⁴ [Cal. Elec. Code § 15375](#).

cannot begin counting votes until the close of the polls.⁵ To conduct an undertaking as complex as a full manual tally of a Shasta County election in this timeframe, an enormous number of additional staff are necessary. The California Elections Code mandates that these individuals cannot be volunteers but must be paid county staff.⁶

Compounding this issue, the choice to hand count ballots reduces the Elections Department's ability to process ballots before beginning the count. The vast majority of Shasta County voters have chosen to vote from home in every election since 2005. California Elections Code section 15101 prohibits an election official from processing vote by mail ballots any earlier than 5 PM the day prior to election day.⁷ By contrast, a jurisdiction using a voting system can begin processing vote by mail ballots 29 days before the election.⁸ As a result, the choice to perform a full manual tally dramatically shortens the legally permissible time for processing vote by mail ballots. When counting by hand prior to election day, many people will know pieces and parts of election results. In order to keep election results confidential while voters are still voting, when hand tallying, the process cannot begin until the polls close.⁹ This shortened time is particularly challenging in the context of a full manual tally, which would require even more staff and resources on and after election day.

In addition, a manual tally at the scale contemplated by the Board is exceptionally complex and error prone. Several studies indicate that manual tally is far less reliable than tabulation by optical scan, the technology used by California's certified voting systems. As a result, several levels of checks must be built into the process to ensure errors are identified. When errors in the manual tally are found, recount and reconciliation must be performed. These processes are also extremely time-consuming.

The Shasta County Elections Department lacks the resources and staff that would be required for a successful, legally compliant full manual tally in a Presidential primary or Presidential election.¹⁰ Needed resources to securely and efficiently perform such a project include: increased physical space in an alternate facility, temporary staff numbering in the hundreds, and resources to produce additional process and procedure documents and security plans for all of the activities mentioned here. Other needed resources include a continuity of operations plan and an expanded observer plan, to ensure that observers can meaningfully participate, and that the process can continue in the event of any emergency.

If a full manual tally is pursued, these factors make it extremely difficult to produce results in a timely way and introduce very serious risk that Shasta County will miss statutory deadlines for

⁵ [Cal. Elec. Code § 15152.](#)

⁶ [Cal. Elec. Code §§ 12310, 15103.](#)

⁷ [Cal. Elec. Code § 15101.](#)

⁸ *Id.*

⁹ [Cal. Elec. Code § 15152.](#)

¹⁰ Given the upcoming Presidential primary and election, our analysis focuses on the resources necessary to perform a full manual tally in these elections. However, many of the same resources, on a smaller scale, would be necessary in a smaller or special election, as well. And in any case, the Elections Department will require time to develop and implement appropriate processes and procedures.

certification to the Secretary of State. We conclude, based on our study, that adding the necessary resources would cost at least \$1,651,209.68 for tally staff and require the addition of more than 1,200 staff members. This study does not include the cost to provide for and prepare a facility (rental or purchase) that is large enough to complete the manual tally process in a secure and transparent manner. Without these resources (including a facility), a full manual tally cannot occur within the legally mandated timeline for certification of election results. Even with these resources, because of the complexity and difficulties of a full manual tally, we cannot be certain of success. As a result, the Elections Department strongly advises against the Board pursuing a full manual tally. That path puts each future election at risk of failure, inviting litigation, threatening election results, and undermining confidence in the county's elections.

Instead, we recommend that the Board either take no action on this item or adopt the [policy set out in the Staff Report](#) for Item R7 on its March 28, 2023 agenda. That policy proposes appointment of an Election Manual Tally Selection Commission and establishes a process for manual tally of all ballots in certain contests. This path accomplishes the Board majority's goals without sacrificing millions of dollars and legal compliance. While the Secretary of State's existing certification process ensures that certified voting systems are safe and secure, this option ensures additional quality control. Its streamlined and manageable process also makes it less prone to failure and inaccuracy than a full manual tally. And it could be achieved within legally mandated timelines and at minimal cost to taxpayers.

Considerations for Implementing a Manual Tally of Ballots

A selective manual tally—that is, hand counting some ballots to prove that machine counts are precise, accurate, and indicate the correct winner—is generally recognized as a best practice. Indeed, such a manual tally of some, randomly selected ballots is already part of the comprehensive audits required by California law.¹¹ However, in a county the size and complexity of Shasta, hand counting every ballot—particularly without verification by another method, normally a machine count—is not a best practice. Full manual tallies are expensive, complex, and prone to significant errors.

While Shasta County reviews the possibilities of completing a manual tally, it is vital to be aware of the following information.

Full manual tallies are less reliable than tabulation by optical scanning technology.

Hand counting ballots has been found to be significantly less reliable and accurate than using optical scanning tabulation equipment. Computers excel at tedious repetitive tasks in a way that humans do not.¹² In the 2018 study [Learning From Recounts](#)¹³ researchers found that ballot scanners were more accurate than hand counts.

It is important to note that in this study and others,¹⁴ recounts with a single contested contest are often the data source used to draw conclusions about the accuracy of hand counting. Given that a complete ballot hand count could have an average of 45 contests on each ballot, for a complete manual tally workers would need to perform 45 individual and separate counts, making the problem of lower accuracy for hand counts worse.

¹¹ [Cal. Elec. Code §§ 15360](#) et seq.

¹² See, e.g., Amber Phillips, *Why Hand-Counting Ballots is Such a Bad Idea*, Wash. Post (Apr. 8, 2022), <https://www.washingtonpost.com/politics/2022/04/08/hand-count-election-explained/>.

¹³ Stephen Ansolabehere, Barry C. Burden, Kenneth R. Mayer, and Charles Stewart III. *Learning from Recounts*. Election Law Journal: Rules, Politics, and Policy. Jun 2018.100-116. <http://doi.org/10.1089/elj.2017.0440>

¹⁴ See, e.g., *Hand counts of votes may cause errors*, ScienceDaily (Feb. 2, 2012), www.sciencedaily.com/releases/2012/02/120202151713.htm (summarizing a Rice University study that found that hand counting was found to have an error rate between 0.5% and 2%);. See also, Joel Shurkin, *Even Careful Hand Counts Can Produce Election Errors*, Inside Science (Mar. 2, 2012), <https://www.insidescience.org/news/even-careful-hand-counts-can-produce-election-errors> (summarizing a study completed by Clemon University and Rice University that test e “read and mark” method described above, and found an error rate of 0.5 to 1 percent).

Most recently, Nye County, Nevada, a jurisdiction with approximately 33,000 registered voters, attempted to conduct a hand count for the 2022 General Election. The [Associated Press](#)¹⁵ observed two groups that spent approximately three hours to each count 50 ballots, and reported volunteers noting ““how arduous the process was, with one volunteer lamenting: ‘I can’t believe it’s two hours to get through 25’ ballots.” After observing an estimated 25% error rate in the first day of counting, the clerk overseeing the hand count stepped back from claims that the hand count results would be the official results, and characterized the hand count as a “test.”¹⁶

Hand counting is a very tedious and detail-oriented process. As workers become fatigued, more mistakes will be made, so it is important to limit the time a manual tally team works and require breaks.

Countries that hand count ballots have simpler ballots than California’s.

Hand counting is viable in nations like France because their ballots are less complex than American ballots. For example, the French have one contest per presidential ballot.¹⁷ This ballot system reduces confusion and speeds up counting, allowing accurate and timely human tabulation.

This is quite different from ballots in the United States. According to the MIT Election Data & Science Lab: “The U.S. has the longest ballots in the democratic world. . . Without automation, it would take weeks if not months to count ballots in many places, with a significant chance of human error.”¹⁸ California ballots are particularly complex and therefore not well-suited to hand counting. Typically, ballots in California are multi-contest, usually including at least 20 in the collection of federal, state and local contests, and sometimes including more than 32 contests in some precincts. Additionally, contests often have multi-member districts adding additional complexity. This means that a hand count of a single ballot takes multiple rounds of sorting and counting to record a voter’s choice for each contest on the ballot. This dramatically increases both the time it takes to count a ballot as well as the likelihood that a hand count will be inaccurate. And, of course, this logistical problem is compounded by the ability to recruit, train, and pay individuals to manually tally ballots. On the other hand, optical scan tabulators can count voters’ choices accurately and efficiently; in California, those counts are then audited by selective manual tally.

¹⁵ Gabe Stern, *Nevada official begin unprecedented hand count of ballots*, AP (Oct. 28, 2022), <https://apnews.com/article/2022-midterm-elections-nevada-voting-las-vegas-617fc7a37e9cd8d1a512e4fb7be77574>.

¹⁶ B. Forrest, *Nye County Clerk Tempers Hand Count Expectations, Calls it a “Test,”* 3News Las Vegas (Nov. 12, 2022), <https://news3lv.com/news/local/nye-county-clerk-tempers-hand-count-expectations-calls-it-a-test>.

¹⁷ Amy Sherman, *Why France reports election results faster than the US*, Politifact (Apr. 13, 2022), <https://www.politifact.com/article/2022/apr/13/why-france-reports-election-results-faster-us/>

¹⁸ *Voting Technology*, MIT Election Data + Science Lab, <https://electionlab.mit.edu/research/voting-technology>.

Jurisdictions in the US have been using tabulation technologies for many years.

Lever machines were first used in the United States in 1892. By the 1930s, almost all major cities voted by lever machines. They were accepted as a way to combat election fraud, make voting more efficient, and reduce the need for interpreting voter intent.¹⁹

In the 1960s, punch card and optical scan technologies were deployed in U.S. elections.²⁰ Both technologies involved voters marking a paper ballot that was read and tabulated by a machine. In the 1990s, direct-recording electronic (DRE) machines were deployed. On a DRE, voters cast their ballot directly onto a computer.²¹

Timeline of voting systems in Shasta County

In Shasta County, we started using the punch card system in the early 1970's (see Figure 1).

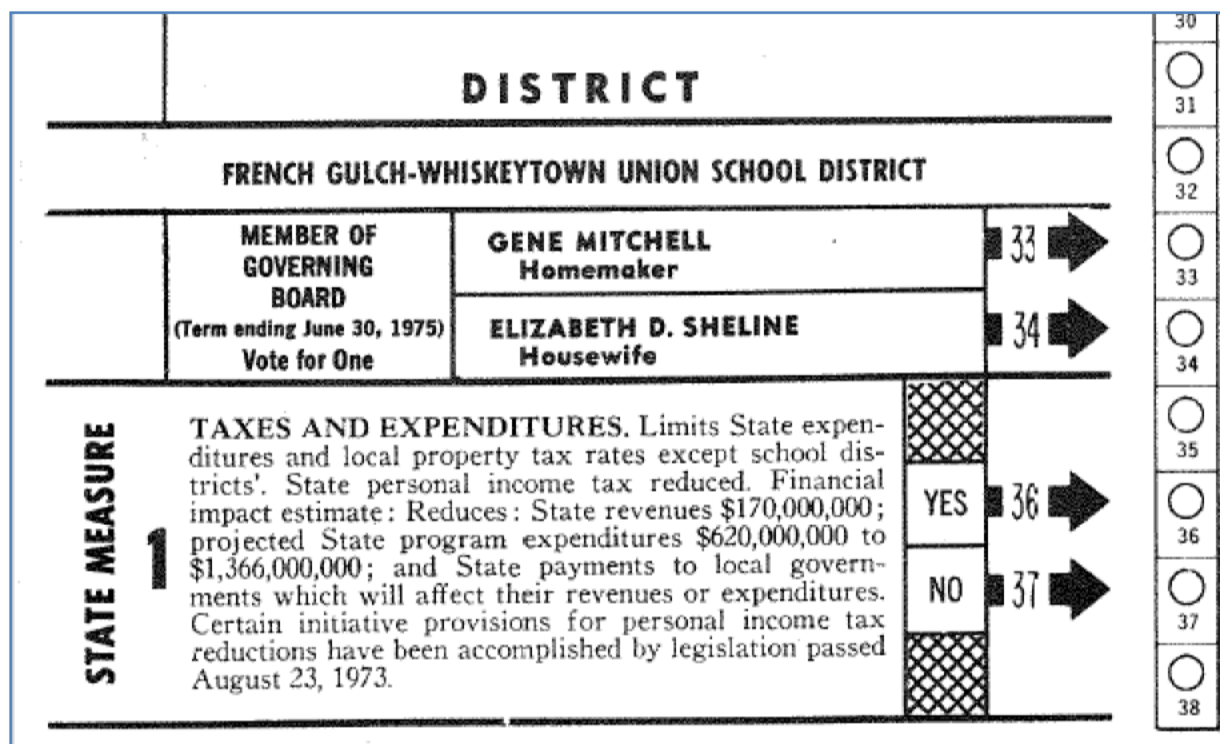


Figure 1 November 6, 1973 Votomatic Punch Card ballot from Shasta County, CA

In 2003, Shasta County started using DRE's from Sequoia Voting Systems.

¹⁹ See generally Douglas W. Jones, *A Brief Illustrated History of Voting*, University of Iowa Department of Computer Science (2003), <http://homepage.cs.uiowa.edu/~jones/voting/pictures/#lever>.

²⁰ *Id.*

²¹ The Direct Recording Electronic Voting Machine (DRE) Controversy: FAQs and Misperceptions, Congressional Research Service 4 (Mar. 7, 2007), <https://crsreports.congress.gov/product/pdf/RL/RL33190/6>.

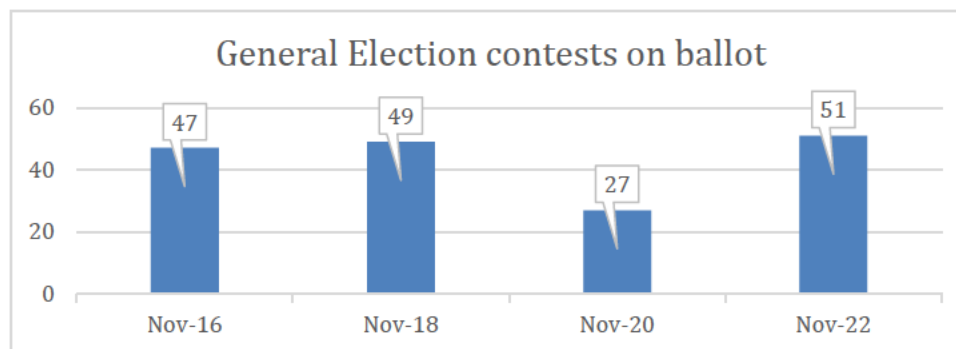
At the conclusion of the Secretary of State's 2007 [Top to Bottom Review](#)²², all DRE's in California were relegated to use on a request basis only, and all other voters voted on hand marked paper ballots that were centrally scanned on optical scanners beginning with the 2008 Presidential Primary Election.

In 2018, Shasta updated its voting system and added optical scanners in polling places; all voters, including those using assistive technologies, continue to vote on paper when marking a ballot at home, in the Elections Office for early voting, or voting in person on election day at a precinct.

The Help America Vote Act of 2002²³ established accessibility requirements for voting machines that effectively eliminated the use of lever and punch card technologies. Additionally, these accessibility requirements have been adopted in California law.²⁴ Currently, California utilizes systems that have paper ballots and are tallied by optical scanners. Manual tally is utilized only for auditing purposes.

Nationwide, few state/county election officials working today have conducted an entirely paper-based, hand-counted election. A complete manual tally, as the primary or exclusive method for tallied election results must be implemented with proper controls to assure some level of accuracy and precision. However, a manual tally using appropriate controls requires both significant financial investments and significant time to complete. It may be incompatible with current levels of infrastructure, certification deadlines, and the public's impatience for results.

Consolidation of local elections with the general election has significantly increased the complexities of Shasta County's ballot. In the November 2022 General Election, which saw 61.8% turnout, there were 47 ballot types, 42 contests, and 114 candidates. There were over 2.8 million ovals counted across the ballots. The complexities and large size of the ballot directly impacts the cost and length of time required for a potential manual tally process.



²² Secretary of State Debra Bowen Moves to Strengthen Voter Confidence in Election Security Following Top-to-Bottom Review of Voting Systems, CA Secretary of State (Aug. 3, 2007), <https://votingsystems.cdn.sos.ca.gov/oversight/ttbr/db07-042-ttbr-system-decisions-release.pdf>; see also Top-to-Bottom Review, CA Secretary of State, <https://www.sos.ca.gov/elections/ovsta/frequently-requested-information/top-bottom-review>.

²³ [52 U.S.C. § 21081\(a\)\(3\)\(A\)](#); [52 U.S.C. § 21081\(a\)\(3\)\(B\)](#).

²⁴ [Cal. Elec. Code § 19240](#); [Cal. Elec. Code § 19242](#).

Current Manual Tally Audits and Results

To calculate the time and resources required for completion of a full manual tally, the Elections Department gathered data on historical hand counts from both its own operations²⁵ and other counts in California. This sampling was required because Shasta has never conducted a hand count at the scale currently proposed, and the complexity, resources, and time required for a manual tally increase as the number of contests and ballots subjected to manual tally increase.

We incorporated the following data points to complete our initial analysis: the time to tally per contest and per ballot are based on an average of actual time from the Shasta County November 2020 1% manual hand tally, the Shasta County November 2022 1% manual hand tally, the Orange County November 2022 1% manual hand tally, and a time trial the Elections Department conducted last week (March, 2023). Just as in real estate valuation, while there is no identical property from which to draw data but valuation can be determined from the average of comparable properties, in this context, averaging multiple comparable datapoints gives a realistic sense of what to expect from a manual tally in Shasta.

Following the November 2022 election, staff re-counted 5,535 ballot cards from randomly selected precincts by hand, then compared the hand-counted vote totals to the software-counted totals. These hand-counted ballots came from 13 precincts, with no more than five of the contests on the ballot re-counted in 11 of the precincts. It took two teams of four people 8 days to hand-count this small sampling of ballots, which comprised just 8 percent of the nearly 69,000 ballots cast by Shasta voters in that election. It is also notable that the only variances discovered in the process were both caused by human error.²⁶

²⁵ Currently, the Election Department conducts post-election audits as required by state law, including a selective manual tally. [Cal. Elec. Code § 15360](#).

²⁶ In one case the hand-counter missed a voter's choice in a "vote for two" contest, and in the second instance, a voter marked a write-in space, then listed a qualified candidate, and voted for the candidate. These marks caused the software to identify the ballot as requiring adjudication and it was not adjudicated correctly. Shasta County 2022 General Election Statement of Vote at 8, <https://assets01.aws.connect.clarityelections.com/Assets/Connect/RootPublish/shasta-ca.connect.clarityelections.com/Election%20Results%202000-Present/2022/1108/Statement%20of%20Vote.pdf>

Requirements and Costs of a Reliable Manual Tally

To perform an accurate and secure manual tally at a larger scale than currently required by California law requires many resources and procedures. These either are not currently in place or are currently in place on a much smaller scale than would be required in a complete manual tally undertaking. The Department would need additional staff and space to enable the management of hand counting boards and expanded procedures to protect chain of custody of the ballots and tally sheets and ensure the security of the results. Required planning must also address physical logistics, including locating and engaging a large enough facility, as well as personnel logistics include hiring temporary staff, requiring advertising, recruiting, conducting background checks, completing payroll paperwork, assigning people to teams, and setting work schedules. The Department would further need to develop security logistics for ballot transportation to a large enough facility . Finally, personnel management, oversight and training for the various roles would be additional key logistics of this planning process. All of this planning will require additional staff time.

Staff requirements

To perform a full manual tally in a Presidential Election with 50 contests, the Elections Department would have to add at least 1,255 additional temporary staff members to perform a full manual tally, at a cost of \$1,651,209.68. This represents 86,696 total staff hours. This does not include auditing boards.

Ballot Tallying Time and Staffing Estimates

The time and personnel estimates listed above includes the time needed to check a ballot container out and check the counted container back in. It allows for the need to pause for adjudication of a ballot for voter intent which will increase the time to process each batch, but this only an estimate. It does not take into account the extra time that will be needed to perform the post-election audit or duplicating ballots. All time related studies were done under optimal conditions.

As discussed above, Shasta County Elections used a combination of time data to estimate the time it takes to count one contest and one ballot. As stated above, the estimates below are based on this testing and several other manual tally processes.

The working parameters are as follows:

- There are 94,084 ballots to process.

- The semi-official canvass period is 36 hours, from 8pm election night to 8am Thursday morning, when the official canvass must begin.²⁷
 - Operations of the semi-official canvass must operate continuously until all Election Day cast ballots are counted.
- The hand tally teams will work 8-hour days.
- The county used 18 days as the target completion time to determine how many workers would be needed, and to allow set up and auditing time within the canvass period.

To complete a hand count of 94,084 ballots over a twenty-one-day period, the county would need to employ 512 workers capable of working eight hours each day for the twenty one days. In addition, the county would need to hire an additional 758 workers to account for the 24-hour coverage needed for the semi-official canvass of precinct votes cast on election day.

Facility and space requirements

Facility preparation is a critical component of security and continuity of operations planning. Preparation will help establish order, and it will reinforce the impression that the operation is under control, which itself will deter unruliness.

The performance of a full manual tally of ballots would require a facility large enough to accommodate enough manual tally teams along with proper work and secure storage space. At a minimum, the following factors must be considered in choosing an appropriate location to conduct a manual tally.

- Timing: a facility that is available during the handling period prior to Election Day through the certification date.
 - The facility must be available seven days before the election until forty days after it
 - For the 2024 primary, that is February 27, 2024, through April 22, 2024
- Size requirements: a facility that can house at minimum the following (1,300 people)
 - County staff
 - 144 exam and manual tally Boards, including supervisors, for semi-official canvass
 - Chain of Custody Boards
 - Exam and Duplication Boards
 - Chain of Custody Boards
 - Manual Tally Boards
 - Election Results Reporting Boards
 - Audit Boards
 - Security personnel
 - Designated space for watchers/observers

²⁷ _ Cal. Elec. Code §§ 15152 (setting the start time of the semi-official canvas); 15301 (setting the start time of the official canvas).

- Designated space for the media
- Ballot Storage is a crucial security concern. Ballot storage containers will need to be stored prior to being counted, after being counted, and during the tally process; they will need to include a separate area for partially counted containers or containers with issues to resolve.
- Power and internet/networking requirements.
- Physical and cyber security of the facility and network.

Security and Contingency Planning

Preparing a Security and Contingency Plan (also known as a Continuity of Operations Plan (COOP)²⁸ will allow for security and will establish in advance the decision making policy and parameters that will be utilized during the process. This will include mitigations that may be necessary under worst-case scenarios. A successful security and contingency plan will include the following considerations:

Spatial organization

- Creating orderly, separated workspaces with fencing, rope, stanchions and signage so that each board can focus on their batch tally and not disturb or be distracted by other boards.
- Creating internal control points around ballot storage areas to ensure confidentiality of ballots.²⁹
- Setting of capacity limits that allow real observation.
- Minimizing distractions for workers.
- Providing for video feeds to duplicate sightlines, if possible.

Staff and worker safety

- Develop a plan for staff safety, including:
 - Presence of security personnel.
 - Alternate entry/exit plan, designated staff parking area, parking escorts or buddy system.
 - Additional support available for those directly threatened (liaison to law enforcement, provision of temporary housing, etc.).

Staff and worker efficiency

- Develop a plan for staff efficiency:
 - Understanding the abilities of a human to focus on tedious tasks for many hours.
 - Allowing for breaks to increase concentration.
 - Establishing maximum hours allowed on the task of hand counting.
 - Establishing decision making procedures.

²⁸ Governor's Office of Emergency Services, *Continuity Planning* (<https://www.caloes.ca.gov/office-of-the-director/operations/planning-preparedness-prevention/planning-preparedness/continuity-planning/>)

²⁹ Confidentiality protections are required by [Cal. Elec. Code § 3017\(b\)](#), alongside the guarantee of a secret ballot, Cal. Elec. Code § 2300(4).

- Providing for additional support for full time staff while training temporary staff.
- Providing for 24 hour supervision coverage of temporary staff working during the 36 hours after the polls close.

Observer spatial planning

- Ensuring sufficient proximity while separating from workspace to allow real observation of the task at hand.
- Creating a check-in desk or counter to control facility access.
- Establishing a neutral space outside the check-in desk to allow for an organized flow of observers.
- Designating a room to meet with observers or group leaders to change the setting away from operations, or from unruly crowds.

Security staffing – law enforcement or private security

- Creating an interagency team including city/county administration and sheriff/police.
- Establishing security staff for the facility check-in desk to control access.
- Assigning security personnel to monitor all critical workspaces.
- Identifying reserve security personnel/law enforcement to deploy if tensions rise.

Preparing a security camera system

- Coverage of the facilities entrances & exits, internal secure storage, and all key workspaces.
- Avoiding views that could violate voter privacy.
- Testing camera operation, video retrieval, and file storage.

Personnel and Management Logistics

Establishing policies, processes, recruiting and training hundreds of workers takes time and resources. The California Elections Code requires that counting boards be compensated for the work performed.³⁰ All county staff members, even temporary workers, are required to complete a background check³¹ and will also need to be trained according to county policy (physical safety, cyber security, etc.). Ideally, this process is completed months before an election. If it is not, it may interfere with the team’s focus on the tasks at hand and competing deadlines of an election cycle. In addition, the hiring process is enormously expensive.

When considering the option to manually tally votes, all of the following personnel considerations should be taken into account:

Onboarding requirements

- Ability for the human resources department to manage the onboarding of 1,255 new county employees for each election.

³⁰ Cal. Elec. Code [§§ 12310](#), 15103.

³¹ Shasta County Personnel Rules §§ 6.8, 19.2.G,

https://www.shastacounty.gov/sites/default/files/fileattachments/personnel/page/2466/personnel_rules_02232023_.pdf

- Establishing a training program to ensure all staff complete required trainings pursuant to County Policy and State and Federal Laws.
- Ensuring the ratio of line staff to supervisors is efficient and allows for successful communication.
- Understanding and preparing for drop off rates and planning for no shows or illness.

Staffing logistics and preparations

- Establishing processes and procedures to allow for effective workflows while also ensuring the highest level of security.
- Completing time studies to analyze actual staff needed under various circumstances.
- Establishing policies and procedures for each common and/or unexpected scenario.
- Creating a chain of command and communication plan.
- Understanding the amount of time necessary to check in and identify staff at each shift change.

Services and supplies

- Determining the need to purchase or rent the supplies needed for each staff member to conduct their assigned task.
- Understanding the time and resources required to create, enable, and then disable technology accounts for temporary staff.
- Determining the licensing costs of software and potential hardware needed to complete timecards and other required tasks.

Process for Manual Tally

Pre-counting Preparation and Testing

Ballot preparation and disability accommodation.

To assist with the complexities of the many ballot styles and to provide all voters with the opportunity to vote independently and privately, Shasta County must use a certified voting system to create paper ballots and an accessible voting tool. The paper ballots will need to be prepared, designed, and printed so that they can be read by the voting units required by HAVA and CA law.³² Under HAVA, voting systems must be “be accessible for individuals with disabilities, including nonvisual accessibility for the blind and visually impaired, in a manner that provides the same opportunity for access and participation (including privacy and independence) as for other voters.”³³

The preparation of the voting system to create ballots will also provide a contingency option in the case of failure or the inability to meet statutory deadlines during the manual tally.

Manual tally system testing

Before each election, the Election Department will need a proof of concept to establish that their process will produce accurate results. Similar to the way pre-election logic and accuracy testing is performed on voting equipment to ensure it is producing accurate results, some method of testing the procedures for the manual tally will be conducted.³⁴ This will include testing the quality control checks done throughout the counting process and aggregating of tally sheets. This testing process and procedure will need to be created and implemented and will aid in the training of election workers.

Ballot sorting

California law requires election results to be reported at the precinct level and a statement of results showing the number of votes cast in each city, assembly district, congressional district, senatorial district, State Board of Equalization district, and supervisorial district located in whole or in part in the county.³⁵ To ensure accuracy of the count for these districts, precincts are established and do not cross major jurisdictional boundary lines. Prior to manual tally, all ballots must be sorted by precinct in order to provide precinct level results.

In Shasta County, the majority³⁶ of voters chose to vote by mail each election. Mail ballots are sorted to the precinct level using the Agilis mail sorter. Once the ballots in their return envelopes

³² See [Cal. Elec. Code §§ 19240, 19242\(b\)](#) and [52 U.S.C.A. § 21081](#).

³³ [52 U.S.C.A. § 21081\(a\)\(3\)\(A\)](#).

³⁴ Most modern ballots are designed to be easily understood by the voter and read by an optical scanner, not counted by hand. If hand-counting becomes the new norm, a new ballot layout design might be adopted. Additional testing, along with voter education and outreach, would be required.

³⁵ California Elections Code §§ [15373](#), [15374](#)

³⁶ Currently 80.65% of voters in Shasta County have requested to receive a ballot in the mail for each election.

are sorted down to the precinct level, signatures are checked. Once signatures are verified, staff will extract ballots from the envelopes and visually examine each ballot to determine the need for adjudication or duplication. Ballots are currently sorted into batches of 100 for electronic tabulation. For a manual tally process, in order to increase accuracy and the opportunity for a more effective process, the batch size will be reduced to 25. This will effectively increase the number of chain of custody forms, processes and time to complete the signature verification process.

While the process of sorting ballots to the precinct level is already established in Shasta County, procedures will need to be updated to ensure new chain of custody requirements are established and met. The minimum supplies and forms for this process will require:

- Large secure room or area in the central count location
- Sorting containers and trays
- Seals and locks
- Batch tracking forms
- Ballot storage containers with appropriate labeling.

Ballots that are damaged in a way that would make it difficult to count (cut in half) or marked with identifying marks³⁷ will need to be logged and set aside for additional review and tracking. Identifying marks could include the voter's signature, food or liquid stains, or other marks made by the voter. Including this process at the beginning of the tally process will allow the tally teams to move successfully through each batch. This will increase speed during the tally process and help enable the other boards to effectively manage their workload.

Conducting the Full Manual Tally

Due to Shasta County's size and the number of contests on a typical Shasta County ballot, converting to a manual count process for all of tabulation will require an enormous number of people, take a vast amount of time, and cost a substantial amount of money. This section outlines some of the steps necessary for the manual tally. While we provide some level of detail in the attached document, given the short timeframe for development of these procedures, some procedures will need to be refined. Additionally, some procedures are sensitive from a security standpoint and are intentionally not detailed.

Important Statutory Processing and Reporting Timelines

Vote by mail ballot processing timelines

The California Elections Code is specific about when the election official may begin processing vote by mail ballots.³⁸ When using a voting system, election officials may start processing and tallying ballots beginning 29 days before the election. When completing a manual tally, the processing timeline starts at 5:00pm on the day before the election. Processing, in the law,

³⁷ [Cal Elec. Code 15302\(g\)](#).

³⁸ [California Elections Code § 15101](#)

“includes opening vote by mail ballot return envelopes, removing ballots, duplicating any damaged ballots, and preparing the ballots to be machine read, or machine reading them, including processing write-in votes so that they can be tallied by the machine.”³⁹

The result is that in a hand count scenario, ballots will have to be removed from their envelopes, flattened and prepped for counting no earlier than 5pm the day before election day. Those processes will add to the length of time after election day for results to be final.

Precinct Ballot Processing Timeline

When completing a manual tally, no ballots, including those cast at the precinct on Election Day, can be tabulated until after the polls close at 8 pm. Before tabulation can begin, poll workers must verify the number of ballots in the ballot box compared to the number of signatures on the roster.⁴⁰ Then they may proceed to count at the polling place or return the ballots to the central count location for tabulation (as directed by the county elections official). To ensure the manual tally complies with the county-established chain of custody policy, the count will be conducted at the central count location. Under state law, the count must continue without adjournment until the results are declared.⁴¹ This means that the count of in person precinct votes must continue, in shifts, 24 hours a day until it is complete.

Semi-Official Results Reporting Timeline

The semifinal official canvass⁴² consists of tabulating vote by mail and precinct ballots and compiling the results. The semifinal official canvass must begin as soon as the polls close on election day. During the semiofficial canvass, law also requires the elections official to transmit results according to a schedule determined by the SOS, and at intervals no greater than two hours and until all ballots cast at each precinct on election day are tabulated.⁴³

Performing a full manual tally during this time involves both the significant additional time of the tally itself and substantial additional time required to accomplish the additional chain of custody documentation described below, which causes a significant additional time burden apart from the enormous time needed to conduct the manual tally. For example, a reliable hand count as described herein requires batching of ballots. Batches of 25 ballots based on the November 2020 turnout of 94,804 gives us 3,763 batches. Each batch will need to have a band and label, a check in and check out form, seal records from the envelope used to store after batch creation and after tally; this is a total of 22,578 chain of custody documentation (pieces of paper) that will need to be created, completed, audited and stored.

Official Canvass Deadlines

³⁹ [California Elections Code § 15101](#)

⁴⁰ [Cal. Elec. Code § 15271.](#)

⁴¹ [Cal. Elec. Code § 15272.](#)

⁴² [Cal. Elec. Code § 15150.](#)

⁴³ [Cal. Elec. Code § 15151.](#)

The official canvass⁴⁴ must begin no later than the Thursday following the election (two days after the election).⁴⁵ All ballots cast in person on election day must first be tabulated in order to begin this process.

Certified Statement of Election Results Deadlines

For most contests, the election official must prepare a certified statement of the election results within 30 days after the election and submit a certified statement of the results of the election to the Secretary of State within 31 days after the election.⁴⁶

In a presidential election or presidential primary, counties must send the Statement of Results to the Secretary of State no later than 28 days after the election.⁴⁷

For the 2024 presidential election, the Governor must issue a certificate of ascertainment by December 11, 2024 (6 days before the meeting of the Electoral College, which occurs on December 17, 2024).⁴⁸

The statement of vote document produced by the current voting system is approximately 200 pages for each statewide election. Producing the equivalent statement without a voting system will become a tedious handwritten process.

Current Practice

Shasta County currently completes the tabulation of votes within 28 days after an election. Using voting system optical scanners, the county has historically tabulated the bulk of ballots cast within 10 days of Election Day. Because the vast majority of county voters vote by mail, our department starts processing the vote by mail ballots, which includes ballot scanning, in the weeks before Election Day.

Chain of Custody and Separation of Duties

Best practices for the tabulation of ballots include strict chain of custody processes to protect the confidentiality of voters' ballots.⁴⁹ In addition to established chain of custody protocols, temporary staff will provide additional layers of oversight and separation of duties. Those that tally the vote will not aggregate totals and those that are responsible for chain of custody will not tally the vote or aggregate totals. Similarly, those that adjudicate will not tally, etc. This

⁴⁴ [Cal. Elec. Code § 15301](#), *et seq.*⁴⁵ [Cal. Elec. Code § 15301](#).

⁴⁵ [Cal. Elec. Code § 15301](#).

⁴⁶ [Cal. Elec. Code §§ 15372, 15375](#)

⁴⁷ [Cal. Elec. Code § 15375](#).

⁴⁸ [Electoral](#) Count Reform Act § 104(a), H.R.2617-776 (available at https://campaignlegal.org/sites/default/files/2023-01/ECRA%20_0.pdf)

⁴⁹ [Cal. Elec. Code § 3017\(b\)](#)

separation of duties⁵⁰ is intended to minimize the occurrence of fraud or errors by ensuring each task is independently monitored and controlled with checks and balances.

To ensure proper separation of duties, the canvassing board staff will be assigned to one of the following teams:

- Exam and Duplication Board – responsibilities include extracting and examining ballots, placing ballots in batches, and duplicating ballots.
- Chain of Custody Board – scanning ballots, assigning batch numbers, maintaining custody of ballots prior to and after tabulations, and reviewing tabulated ballot to ensure images scanned prior to counting.
- Manual Tally Board – tallying ballots.
- Election Results Reporting Board – aggregating and maintaining tally sheets and statement of vote.
- Audit Board – tally team that audits the election results through electromechanical devices.

Rule of Two

Following the “Rule of Two” is an established practice that requires a minimum of two staff members to be present when working on tasks that pertain to the ballots, voting system, and chain of custody forms. This rule is established to help ensure full transparency and accuracy when tasks involve the ballots or voting system security. At least two staff members must be present for the tasks outlined in this document and more staff members may be required pursuant to procedures outlined in California Elections Code or Regulations.

Ballot review and recording of votes

Preparing Ballots for Tabulation

Both precinct ballots and vote by mail ballots will be kept in a secure “check-in/check-out” area managed by the chain of custody team. Staff will scan batches to create a record of the votes they contain prior to tally and after so that there is an additional record in the event of dispute or allegations as to the conduct of the hand count.

- Batches will be scanned and ballots imprinted prior to manual tally.
- Batches will be checked out by the chain of custody team.
- Teams of two will complete check-out logs by:

⁵⁰ Cal. State Admin. Manual § 7280, <https://www.dgs.ca.gov/Resources/SAM/TOC/7200/7280>. While the California Department of General Services’ State Administrative Manual does not mention the conduct of elections in this chapter, it is a common sense best practice. From the manual: “Well designed and implemented separation of duties reduces the risk of fraud and errors, and is essential for safeguarding state assets.”

- Signing the transfer log
- Verifying seals, ballot batch identification numbers, and ballot imprint numbers.
- Signing and delivering the ballots and tally sheets to the manual tally team table.

Ballot Exam and Duplication Board

The Exam and Duplication Board is responsible for extracting and examining ballots from the ballot envelope after signature verification is complete. During this process they will review the ballots to determine a need for duplication or manual adjudication for voter intent. They will then place ballots into batches of 25 retaining the sort by precinct. If any ballots need to be duplicated, they will segregate and log the ballots.

Manual Adjudication for Voter Intent

Adjudication as defined by the US Election Assistance Commission, “is the process of resolving cast ballots to reflect voter intent. Common reasons that ballots require adjudication include: write-in votes, overvotes, marginal machine-readable mark, having no contest selections marked on the entire ballot, or the ballot being unreadable by a scanner for voter intent. This process is currently accomplished by a team of two staff using electronic adjudication software.”⁵¹

The county will be required to develop processes for manual adjudication. This will have an unknown effect on the tally timeline.

Chain of Custody Board

Once ballots are received from the Exam and Duplication board, ballots will then be scanned through optical scanners that are available with a certified voting system. These scanners will imprint ballot ID numbers on each ballot and assign a batch ID number. The board will use those numbers to prepare batch tally sheets and prepare batch packets.

Manual Tally

Ballots will be manual tallied by a manual tally team composed of boards of four members and supervisors for the boards. Each board of four members will consist of two readers and two recorders. One supervisor is required for every 4 boards.

- No more than two members of the manual tally team should belong to the same political party.
- Manual tally teams will all need to be trained to perform adjudication for voter intent.
- Teams should be placed at least 10 feet apart in the counting facility so that overhearing the votes from one team does not confuse another.

The process for the manual tally teams is as follows:

⁵¹ U.S. Election Assistance Comm’n, Glossary of Terms, <https://www.eac.gov/glossary#:~:text=that%20required%20adjudication.-,Adjudication,being%20unreadable%20by%20a%20scanner.>

1. The tally board will confirm that the batch number identification compares on the paper band securing the ballots and the tally sheet.
2. Two members will break the seal on the batch band.
3. Confirm the sample ballot provided is the same precinct number and ballot type as on the batch band.
4. They will then count the ballots to confirm the total of ballots matches the total on the batch band.
 - a. Confirm each ballot is in the correct precinct and is the correct ballot type.
 - b. Examine the ballots to confirm there are no ballots that need to be adjudicated.
 - If there is an issue of voter intent, it must be resolved at that time in accordance with voter intent rules before the hand count can proceed.
5. After confirming the count, the board will set up the stacking boxes for the first contest on the ballot.
 - a. Each contest will have a label for the contest name, vote for X (the number of candidates voters were allowed to vote for), each candidate (including qualified write ins), overvote, and undervote.
 - b. Set the contest name and the "vote for X" in a manner that observers and supervisors may visually inspect.
 - c. Place all other names on the front of each stacking box in (the same order as the ballot) so both the observers and recorders can visually see the name of the candidate.
6. If it is a 'vote for 1' contest, sort the ballots according to the labels on the stacking box.
7. If it is a 'vote for 2' or more contest, you must count each individual candidate and then resort to count the next candidate.
 - a. Sort the ballots starting with the overvoted and blank ballots.
8. One member of the reading team audibly calls out the count while the other looks at the ballot and confirms the correct choice was read.
9. The recorders independently cross out the next number for each vote that a candidate receives.
10. After each candidate stack is completed, the recording team shall confirm they are each in agreement with the count and proceed.
 - a. If the two recorder members are not in agreement, the count will stop to determine the discrepancy.
 - b. If the discrepancy cannot be verified and corrected, the manual tally for that batch contest should start over.
11. Undervotes are tallied by counting the blank vote the number of times the votes could vote, for example, in a vote for two, if the contest is left entirely blank, the number of undervotes recorded is two. They are tallied based on the number of candidates a voter is eligible to vote for.
12. When each candidate count has been completed, board members will then move on to the next contest.
13. Tally sheets will be reviewed and signed by all members of the manual tally team after counting all the contests for each batch.

14. Tally sheets are placed in sealed envelopes, signed by all board members and returned with the batch to the chain of custody team.

Receiving the Ballots After Tally

Once the ballots are tallied, the ballots shall be returned to the “check-in/check-out” area managed by the chain of custody team.

- Batches will be checked in by the chain of custody team.
- Teams of two will complete check-in logs by:
 - Signing the transfer log
 - Verifying seals, ballot batch identification numbers, and ballot imprint numbers
 - Signing and delivering the ballots and tally sheets to the manual tally team table.
- The batches will be scanned into a mirrored election project; this will require two identical servers loaded with the same election project and results loaded onto both as they are produced, for backup and additional security.
- One Tally Sheet will be sealed with the ballot batch.
- One Tally Sheet will be delivered to the election results reporting board.

Aggregation of Results

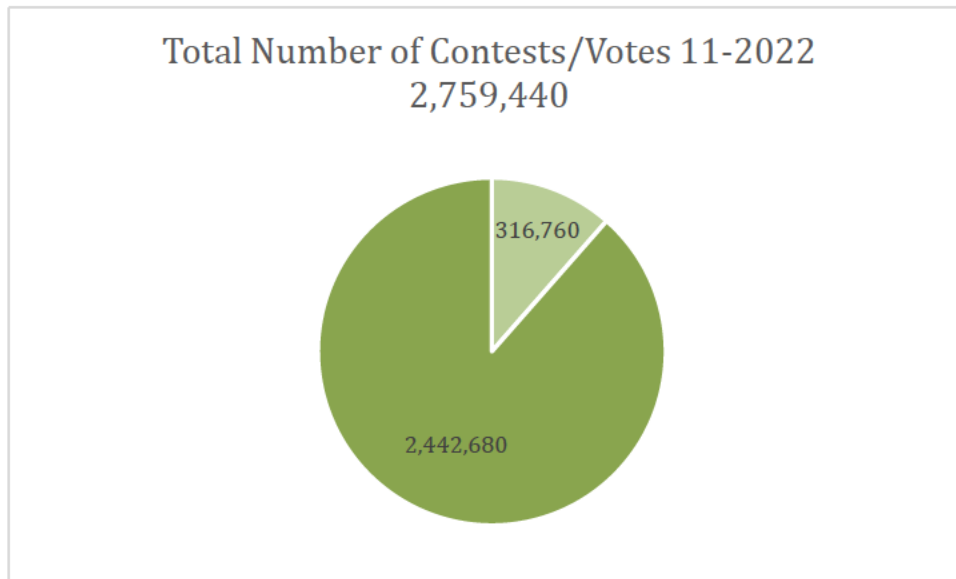
The California Secretary of State must approve voting systems, including the use of a computer program to add up votes before being used in an election in California.⁵² Certified voting systems are designed to aggregate and tally results while meeting the statutory requirements for the statement of vote. As discussed above, we assume that the Board will adopt a voting system, as it must in order to comply with state and federal law. However, without the use of a voting system in the tally, staff may be required to hand write and tabulate all results for the election. Completing a handwritten statement of vote and official results tally book will take an enormous amount of time, staff, multiple proofing processes, and patience. Patience on the part of candidates and the public, who will be waiting much longer than they are accustomed to for results, both unofficial summaries which you would typically see on election night, updates to vote totals, and final results, which will also take longer to publish.

The official results reporting board will consist of two or more members who will be recording tally sheets into one summary document and then manually adding up the results.

Each tally batch sheet will be placed in precinct order in the official results tally book. Then these batches will need to be aggregated into results by candidate within each contest, while maintaining precinct level results within each candidate/contest.

⁵² Cal. Elec. Code § 19202(d)

To give readers an idea of the scope of this project, for each election, we will examine the data from the November 2022 election. In November 2022 68,984 votes were cast. That would result in about 2,760 batches of 25 ballots each. The results reporting board would complete at least 85 pages of lists of batches, by handwriting them. Due to the complexities and length of the ballot, the summary reports for each precinct and batch may be more than one page, in some cases as many as ten pages long. **The manual tally teams would have tallied over 2.759 million completed ovals.** For the Presidential election in November 2020 this increases to 4.7 million.



Prior to certifying the election results all book pages, calculations, and final outcomes will be proofed multiple times and reviewed the by the Audit Board.

Auditing a Manual Tally - Method for Verifying the Accuracy of the Count

Currently, following the tabulation of the semi-official results (election night tally) and as determined by the Registrar of Voters, the 1% Manual Tally begins.⁵³ The Elections Code mandates “the public process of manually tallying votes in 1% of the precincts, selected at random by the elections officials, and in one precinct for each race not included in the randomly selected precincts.”⁵⁴ This process follows best practices to confirm the voting system worked as expected for each election. As a best practice and to confirm the accuracy of the count prior to certification, a manual tally should include processes that include a similar audit or procedure. These procedures will have to be developed.

⁵³ [Cal. Elec. Code § 15360\(d\)](#).

⁵⁴ [Cal. Elec. Code § 336.5\(a\)](#).

Conclusion

As the information above indicates, manual tallies at this scale are error prone, complex, and resource intensive. As a result, more hand counting is not always better. Instead, an approach that incorporates the benefits of optical scan technology and employs selective manual tally as a check is the wisest approach. While California law already incorporates manual tallies as a check on optical scan results, [Item R7 of the Board's March 28, 2023](#) agenda also accomplishes this aim, providing a process for performing additional selective manual tallies. The Elections Department therefore recommends that the Board either take no action in connection with this item or adopt the Staff Policy Proposal offered in connection with Item R7 of the Board's March 28, 2023 agenda.