



MARICOPA COUNTY

Elections Department



TO: The Maricopa County Board of Supervisors and the Maricopa County Recorder
FROM: Elections Department Staff and Recorder's Information Technology Staff
SUBJECT: Technical Response to Chain of Custody and Ballot Organization (Item II) and Election Management System Databases (Item III)
DATE: May 17, 2021

The purpose of this memo is to document the analysis that the Elections Department and Recorder Office's Information Technology Teams performed in response Senate President Karen Fann's letter dated May 12, 2021 (Senate President Fann's Letter). The focus of the analysis was on Item II (Chain of Custody and Ballot Organization) and Item III (Election Management System Database).

The analysis found that Maricopa County did not spoil any evidence and the issues identified in Senate President Fann's Letter are either incorrect or that there is a reasonable and valid explanation that addresses the issue.

The analysis did not cover Item I (Legislative Subpoenas). The Maricopa County Chairman of the Board of Supervisors (Exhibit A-1) and the Maricopa County Sheriff (Exhibit A-2) have already provided public statements explaining the security concerns related to the County's routers.

As for the Dominion password and security token. The County is not in possession of the requested password and security token. In February, the County hired Election Assistance Commission (EAC) Certified Voting System Testing Laboratories to perform an independent audit of the tabulation equipment. These EAC certified firms made the necessary arrangements with Dominion to obtain the necessary security protocols to perform their audits. The County notified Ken Bennet, the Senate's Liaison on 5/03/2021 that we were not in possession of the password and security token.

The results of the Elections Department and Recorder's IT team's analysis are detailed in the sections below and supported by information included in the attached exhibits (B - D).

Item II: Chain of Custody and Ballot Organization

The Elections Department teams reviewed the five areas of concern included in the Chain of Custody and Ballot Organization section of Senate President Fann's Letter.

1. *Chain-of-custody documentation for the ballots*

On April 29, 2021, a Chain of Custody Document with included signed manifests and delivery load information was delivered to the Senate Liaison, Mr. Ken Bennett. Each manifest and delivery load was signed by the Senate Liaison, Mr. Ken Bennett on the date that the documents, ballots, and equipment were accepted by the Senate. On April 30, 2021 Senate Liaison, Mr. Ken Bennett returned the signed copy of the chain of custody document (Exhibit B).



MARICOPA COUNTY

Elections Department



2. Boxes, Bags, and Ballot Seals (Ballot Organization)

As demanded in item 15 of the Senate’s January 13, 2021 subpoena, Maricopa County delivered the original November 2020 General Election early ballots, Election Day ballots, and provisional ballots on 4/22/2021.

15. Access to all original, paper ballots (including but not limited to early ballots, Election Day ballots, and provisional ballots).

Image 1: Item 15 included in the January 13, 2021 Subpoena

The ballots were delivered to the Senate in sealed boxes, not bags as stated by Senate President Fann’s letter. To comply with legal requirements (A.R.S 16-608 and Chapter 9 of Elections Procedures Manual¹) the Elections Department provides poll workers with black canvas bags (see Image 2 below) and tamper evident seals (see Image 3 below) to return Election Day ballots that were voted and tabulated onsite at a voting location. The poll workers, in bi-partisan teams of two or more, delivered the ballots to the Election Department in the bags affixed with a tamper evident seal on election night.



Image 2: Black canvas bag used to transport and temporarily store Election Day ballots.

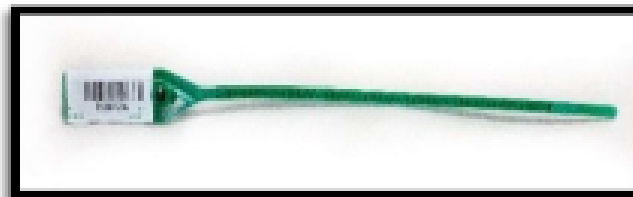


Image 3: Example of temper evident security seal.

In December, after the Statewide Canvass and the subsequent 5-day contest period was concluded, the Elections Department established a team of bi-partisan employees to transfer the contents of the black canvas bags, along with the tamper evident seals that were affixed on the bag to the long-term ballot storage boxes. Multiple voting locations may be included in one long-term storage box. Each location is separated by a piece of hard stock paper.

¹ Elections Procedures Manual Chapter 9 – VIII.B. Closing the Voting Location/Election Board Close-Out Duties: 8b – Voted ballots ...sealed in a container with a numbered seal.



MARICOPA COUNTY

Elections Department



3. Ballot Batch Dividers (Ballot organization)

At the central count tabulation center, the Election Department tabulates early ballots and provisional ballots in batches of approximately 200 ballots. After these batches are tabulated, they are immediately placed in a long-term storage box with an Early Voting Report Transmittal form (see Image 4 below) and then sealed. These forms include the transmittal batch number assigned by the early ballot processing board. For ballots tabulated at the central count tabulation center, these forms are placed in-between each batch within the box and serve as an indicator to separate the batches. If Arizona Senate auditors are careful when moving the boxes, these forms will still be located in-between batches and can be used as an aid to identify where each batch ends and the next batch begins.

The form is titled "EARLY VOTING REPORT" and contains the following sections:

- Header:** Board #, Today's Date, Boardworker #1, Boardworker #2, # INB.
- Election Type:** PRIMARY, GENERAL, SPECIAL, JURISDICTION. Includes fields for Election Date, Election #, and Tray #.
- Table 1:** Summary table with columns A, B, C, D, and Combined Totals (A-D). Row 1: Total # of AFFIDAVITS. Row 2: Total REJECTED. Row 3: Total to DUPLICATION. Row 4: Total to TABULATION.
- Table 2: DUPLICATION** (Enter Total # of ballots to be DUPLICATED on line 3 above)

Column	PER AFFIDAVIT ENVELOPE			Reason Below
	PRECINCT/DIST	COLOR	PARTY	
- Table 3: REJECTED** (Enter Total # of ballots from "R" to be REJECTED on line 3 above)

Column	ID NUMBER	Reason Below	
		G	H
- Textual Instructions:**
 - E. Damaged Ballot:** Torn or cut, sticky, timing marks not visible, spill that results in a stain overlapping timing marks, tape, etc.
 - F. Erroneous Ballot:** Alternate Format (e.g., Braille, lg. Print), Precinct and/or Ballot Color DOES NOT match affidavit information; if party on affidavit does not match party on ballot, ask for assistant.
 - G. Multiple Ballots:** Ask for assistance if affidavit contains multiple ballots.
 - H. Insufficient:** Affidavit contained no ballot or ballot is not from current election.
- Legend:** White - Place on Ballots in Tray; Yellow - Apperlip to Tray Report; Pink - Rubber band with Affidavits.

Image 3: Example of Early Voting Transmittal Slips

4. Storage of Ballots (Ballot Organization)

As required by statute, the Elections Department seals each box of ballots for long-term storage. The County takes great care to ensure ballots are stored and transported securely. When ballots are transported, even short distances, tamper evident tape or tamper evident seals are added as a security precaution. Due to the security protocols (e.g., highly restricted badge access and 24-hour camera surveillance) at the central count tabulation center and vault, sturdy clear packaging tape is used. Tamper evident tape is unnecessary because the early ballots never leave the vault until after the statewide canvass and the 5-day contest period has concluded.



MARICOPA COUNTY

Elections Department



Because Election Day ballots are cast in voting locations and transported to the Elections Department, we use tamper evident seals and tape. As described in Item II.2 above, Election Day ballots are temporarily stored in sealed black canvas bags. Transferring the ballots from the canvas bag to a long-term storage box requires transport from a secure storage cage to the central count tabulation center and vault. Even though the ballot storage cage and vault are only a short distance of less than 100 feet, we add this security precaution to ensure that the boxes are not tampered with during transport.

The ballots tabulated at the central count tabulation center are immediately placed in long-term ballot storage boxes and stored in the secure ballot vault. The vault is one of the most secure areas within the Elections Department and has highly restricted access and numerous overhead security cameras. The boxes are sealed with standard clear sturdy packing tape. While in the custody of the Elections Department and with the exception of the batches of ballots used for the Hand Count, these ballots never leave the custody of the central count tabulation center.

The long-term storage boxes that include batches of early ballots selected by the political parties to be included in the hand count are affixed with tamper evident tape. This extra security measure is provided because these batches of ballots are removed from the vault during the hand counted performed by the political parties. The Election Day ballots are transferred to the bi-partisan hand count boards in the sealed black canvass bags described in section II.2 above. The hand count boards confirm the tamper evident tape and seals have not been modified prior to beginning the hand count procedures.

To maintain the integrity of the ballots during transport to the Senate, the Elections Department ensured: (1) each vehicle was driven by two team members of different political parties, (2) the storage containers were locked, (3) the storage container and locks had a tamper evident seals affixed, and (4) the delivery trucks were escorted by the Sheriff's Office. Confirmation that the tamper evident seals were intact and unmodified was confirmed by Senate staff prior to accepting custody of the ballots.

5. *Duplicated Ballots and Early Voting Transmittal Slips (Ballot Organization)*

There are two places where duplicate ballots are recorded. Early Voting Transmittal Slips are used by bi-partisan early processing boards for ballots that are obviously damaged. Hand-written tabulator logs are used during the tabulation process when a ballot won't run through the central count tabulator. To have an accurate count of ballots processed and ballots pulled for duplication, BOTH the slips and the logs must be reviewed.

To ensure an accurate and thorough accounting of ballots as they are transferred from early processing board to the central count tabulation center, the Elections Department uses Early Voting Transmittal Slips. These slips originate as part of a three-part carbon copy form. The remaining slip copies of the form are used for other tracking purposes. The Early Voting Transmittal Slips are completed by bi-partisan early ballot processing boards and accompany early ballots batches sent to the central count tabulation center.

The central count tabulation team use the transmittal slips to verify the amount of ballots sent from the early ballot processing boards reconciles with the total ballots received. The forms document several items including (1) the date the batch of ballots was processed by the early processing boards, (2) the



MARICOPA COUNTY

Elections Department



board workers that processed the ballots, (3) the batch number (tray number), and (4) the following ballot subtotals and totals.

- Total number of affidavits
- Total ballots rejected (e.g., ballot not from current election, multiple ballots in one affidavit)
- Total damaged ballots sent to duplication (e.g., torn ballot, coffee spill)
- Total ballots sent to tabulation

When processing early ballots, there are instances where the boards find voted ballots returned from the voter with obvious damage (e.g., coffee stains, tears, tape) or other obvious situations (e.g., red ink) that would prevent the ballot from being read by a tabulator. In these situations, the early ballot processing boards log the number of ballots for that specific batch on the line “Total to Duplication”. This results in a decrease in the total amount of ballots that are sent directly to tabulation.

However, there may be instances where an early ballot processing board does not identify a damaged ballot that needs to be duplicated. This could be for a variety of reasons (e.g., the early ballot was printed at early voting center slightly askew or printed off-center, a subtle mark made by the voter in a timing mark). In these instances, those damaged ballots are sent to be duplicated directly from the central count tabulation center. To maintain the integrity and consistency of the data on all three copies of the three-part Early Voting Transmittal Slip, the Elections Department uses a separate set of tabulator logs to track when a damaged ballot is sent to duplication from the central count tabulation center.

After a review of the Early Voting Transmittal Slip and our tabulator logs (Exhibit C), we have confirmed that the Senate’s variances for batches 2104, 9276, 9278, 6359 were the result of a damaged ballots being sent to be duplicated because they could not be read by the tabulator.

Maricopa County Elections Department Ballot Tracking Information			
Batch	Early Voting Transmittal Slip Total	Tabulator Log Total (Exhibit C)	Ballots Sent to Duplication from Central Count (Tabulator Log)
2104	200	200	2
9276	200	200	35
9278	200	200	13
1643	200	200	0
6359	197	197	10

However, our tabulator logs show that our central count tabulation center did not send any damaged ballots to duplication for batch 1643. The Early Voting Transmittal Slip and the tabulator logs both show that there



MARICOPA COUNTY

Elections Department



were 200 ballots included in the batch. This is also consistent with our practice of not creating early ballot batches of more than 200 ballots.

Note: For the November 2020 General Election, there were fewer than 18,000 damaged ballots (less than one percent of the total ballots. A court concluded (Ward V. Jackson, CV2020-015285) that Maricopa County’s duplication process was accurate and determined there was no misconduct, fraud, or no effect on the outcome of the election. The Arizona Supreme Court upheld this ruling.

Item 3: Election Management System Databases

Election Officials from the Elections Department, the Recorder’s Office IT Team along with assistance from subject matter experts from the Office of Enterprise Technology reviewed the screenshot provided in Senate President Fann’s letter and the incorrect assumption that the entirety of the database directory from the D: Drive and the main database for the election had been spoiled or deleted. The analysis below confirmed that the original database folder on the “EMSPPrimary” server was not deleted or otherwise tampered with during packaging and delivery to fulfill the Arizona Senate’s subpoena.

1. Significance of April 12, 2021 and D: Drive Directory Files

On April 12, 2021, the Recorder Office’s IT Team, shut down the server to be packed up and made ready for delivery to the Senate. At no point was any data deleted when shutting down the server and packing up the equipment. The screenshot shows the program used by the Senate was R-Studio Data Recovery Technician. It shows a modified date of 4/12/2021 (see Image 4 and Exhibit D) which corresponds to when the server was shut down. Microsoft SQL (MSSQL) Services will often change the “metadata” (additional data on files such as creation date, access date, modified date, owner, etc) on MSSQL database files based on MSSQL actions that are needed to run the databases. The modified dates on the files are identical for all files included in the screenshots (see Image 4) because that is when the MSSQL services were shut down, causing the server to update the metadata on all the files to the MSSQL services shutdown time.

Name	R	Size, Bytes	Created	Modified	Accessed
20200317 PPE-2019-12-18-12-08-39.ldf		8,388,608	3/25/2020 ...	4/12/2021 ...	3/25/2020 ...
20200317 PPE-2019-12-18-12-08-39.mdf		4,294,967,296	3/25/2020 ...	4/12/2021 ...	3/25/2020 ...
20200804PrimaryTemplate-2020-05-14-09-41-16.r		4,294,967,296	5/14/2020 ...	4/12/2021 ...	5/14/2020 ...
AdjudicableBallotStore_2018_Maricopa_General_2		8,388,608	2/3/2020 1...	4/12/2021 ...	2/3/2020 1...
AdjudicableBallotStore_2018_Maricopa_General_2		8,388,608	2/3/2020 1...	4/12/2021 ...	2/3/2020 1...
AdjudicableBallotStore_20191105_Madison_Electi		8,388,608	11/1/2019 ...	4/12/2021 ...	11/1/2019 ...
AdjudicableBallotStore_20191105_Madison_Electi		75,497,472	11/1/2019 ...	4/12/2021 ...	11/1/2019 ...
AdjudicableBallotStore_20191105_Madison_Electi		75,497,472	11/4/2019 ...	4/12/2021 ...	11/4/2019 ...
AdjudicableBallotStore_20191105_Madison_Electi		75,497,472	11/4/2019 ...	4/12/2021 ...	11/4/2019 ...
AdjudicableBallotStore_20200317_PPE_2020-03-1C		75,497,472	3/10/2020 ...	4/12/2021 ...	3/10/2020 ...
AdjudicableBallotStore_20200317_PPE_2020-03-1C		209,715,200	3/10/2020 ...	4/12/2021 ...	3/10/2020 ...
AdjudicableBallotStore_20201103_General_2020-1		0	10/20/2020...	4/12/2021 ...	10/20/2020...
AdjudicableBallotStore_20201103_General_2020-1		0	10/20/2020...	4/12/2021 ...	10/20/2020...
AdjudicableBallotStore_20201103_General_2021-0		8,388,608	2/3/2021 1...	4/12/2021 ...	2/3/2021 1...
AdjudicableBallotStore_20201103_General_2021-0		8,388,608	2/3/2021 1...	4/12/2021 ...	2/3/2021 1...
AdjudicableBallotStore_20201103_General_Post_L		8,388,608	11/17/2020...	4/12/2021 ...	11/17/2020...
AdjudicableBallotStore_20201103_General_Post_L		8,388,608	11/17/2020...	4/12/2021 ...	11/17/2020...
AdjudicableBallotStore_20201103_General_Post_L		8,388,608	12/10/2020...	4/12/2021 ...	12/10/2020...
MRC Template Bilingual-2019-12-09-14-57-12.ldf		1,073,741,824	12/9/2019 ...	4/12/2021 ...	12/9/2019 ...
MRC Template Bilingual-2019-12-09-14-57-12.mc		4,294,967,296	12/9/2019 ...	4/12/2021 ...	12/9/2019 ...
MRC Template Monolingual New-2020-06-12-14		1,073,741,824	6/12/2020 ...	4/12/2021 ...	6/12/2020 ...
MRC Template Monolingual New-2020-06-12-14		4,294,967,296	6/12/2020 ...	4/12/2021 ...	6/12/2020 ...
MRC Template Monolingual-2019-12-09-14-57-4		1,073,741,824	12/9/2019 ...	4/12/2021 ...	12/9/2019 ...
MRC Template Monolingual-2019-12-09-14-57-4		4,294,967,296	12/9/2019 ...	4/12/2021 ...	12/9/2019 ...
RepublicanGenericJan2020-2020-01-02-14-19-52.ldf		1,073,741,824	1/2/2020 2...	4/12/2021 ...	1/2/2020 2...
TabulationStore_2018_Maricopa_General_2020-02		8,388,608	2/3/2020 1...	4/12/2021 ...	2/3/2020 1...
TabulationStore_2018_Maricopa_General_2020-02		8,388,608	2/3/2020 1...	4/12/2021 ...	2/3/2020 1...

Image 4: Screenshot of R-Studio provided in Senate President Fann’s Letter



MARICOPA COUNTY

Elections Department



We tested the functionality of the R-Studio program by creating new databases on a test system. In every instance when the SQL services were started and shut down, the database file metadata was modified to that date and time of the system state change. This testing confirms the April 12, 2021 modification dates correspond to when the “EMSPPrimary” server was turned off and services halted.

2. Scan Configuration Files and Databases

It appears the Senate performed the R-Studio scan on the subpoena servers RAID storage array drive, referenced on the “EMSPPrimary” server as the D: Drive. RAID storage array configurations maintain data integrity in the event of a hard drive failure and are standard in most enterprise servers. Although the R-Studio Data program has many useful features, it is important for the auditors to configure the scans and parameters properly to create viable results. If scan parameters are misconfigured, file associations may not be followed and may be missed entirely. When creating “forensic clones” of RAID arrays, it is critical to understand the source servers parameters for the RAID array’s data to be successfully reproduced.

There are several indicators on the R-Studio screenshot that the auditors did not properly reconstruct the “EMSPPrimary” servers RAID array. This could result in the R-Studio Data Recovery Technician program not being able to accurately translate the parameters of server’s RAID array partition schema. This is evident in four different ways.

- A. First - The Dominion EMS application uses three different database files to function during an election period.
 - o ElectionStore
 - o TabulationStore_Electionname_Date
 - o AdjudicableBallotStore_Electionname_Date

If the entire D: Drive Database directory was deleted, as Senate President Fann’s letter stated, there would be additional deleted databases in the R-Studio list from the screenshot provided (see Image 4 above). The ElectionStore database is not present in the alphabetical ordered screenshot. The fact that the ElectionStore database is not included on the screenshot indicates the screenshot is not representing the complete partition schema within the D: Drive database folder on “EMSPPrimary”.

- B. Second - The R-Studio log section of the screenshot (see Image 5) shows signs of significant partition degradation based on improperly configured parameters in the (assumed) reconstruction of the RAID storage array.

Log				
Type	Date	Time	Text	
Partition	5/9/2021	11:37:28 AM	E:/AZAudit/Evidence Images/AZAud-E-089-3_EMS PRIMARY/AZAud-E-089-3_EMS.001: Partition at 2048 extends beyond disk bounds	
Partition	5/9/2021	11:38:07 AM	E:/AZAudit/Evidence Images/AZAud-E-450-1_EMS PRIMARY/AZAud-E-450-1_EMS.001: Partition at 2048 extends beyond disk bounds	
Partition	5/9/2021	11:38:22 AM	E:/AZAudit/Evidence Images/AZAud-E-450-1_EMS PRIMARY/AZAud-E-450-1_EMS.001: Partition at 2048 extends beyond disk bounds	

Image 5: Screenshot of R-Studio log section provided in Senate President Fann’s Letter



MARICOPA COUNTY

Elections Department



- C. Third -Additionally, there are two database files named “AdjudicableBallotStore_20201103_General_2020-1” showing 0 bytes in the R-Studio screenshot (see Image 4). This is an indication of a corrupted data retrieval process. Deleted Microsoft SQL database files would have a size associated with them even if the database’s contents were deleted. This corrupt file observation is also supported by the same R-Studio log section of Senate President Fann’s screenshot by showing the program’s inability to properly reconstruct the RAID storage array’s partition mapping and subsequent file associations (see image 6)

	File	5/10/2021	12:52:41 PM	[FileId: 131074] Closing attribute: parsed allocated size (33554432) differ from stored one (67108864)
	System	5/10/2021	12:53:24 PM	File enumeration was completed in 44 sec
	File	5/10/2021	12:53:30 PM	[FileId: 3542548495] Closing attribute: parsed allocated size (4194304) differ from stored one (8388608)
	File	5/10/2021	12:53:41 PM	[FileId: 3542548495] Closing attribute: parsed allocated size (4194304) differ from stored one (8388608)
	File	5/10/2021	12:53:41 PM	[FileId: 3542220824] Closing attribute: parsed allocated size (2147483648) differ from stored one (4294967296)

Image 6: Screenshot of R-Studio provided in Senate President Fann’s Letter

- D. Fourth - R-Studio also utilizes the red “X” icon descriptor to indicate three different file states. The red “X” indicates the presence of a deleted file, a corrupted file or a missing (unreachable) file. It is a mistake to assume the red “X” signifies the deletion of a file within a corrupted partition directory.

Additionally, the “EMS Primary” server was originally created on August 6, 2019. The Recorder’s IT staff confirmed that backups of the “EMS Primary” server that was delivered to the Senate still show this same creation date. This is evident that the original database folder on the “EMSPPrimary” server was not deleted or otherwise tampered with during packaging and delivery to fulfill the Arizona Senate subpoena.

3. Dominion EMS Application Archival Policy and Procedures

In the January 15, 2020 published version of the “Democracy Suite Use Procedures” guide, Dominion outlines the proper utilization of database archival processed to maintain the healthy operation of the Dominion EMS system. Section “12.6.3.3” outlines the archival and restoring process. The Elections Department and Recorder’s IT Teams performs actions that are in compliance with guidelines to create archival backups of the full Dominion EMS system databases that would support restoration. Section “12.7” provides guidance on the justifiable moving of election databases to backup storage devices upon setup of a new election. “The purpose of moving election databases and results from RTR [Results Tally & Reporting] is to clear results from a previous election before starting a new election.” It is a legitimate practice to move database files within the Dominion EMS application to backup storage devices prior to creating new election configurations to allow efficient operation during each election cycle.

In accordance with the standard database archival processes, the data files (MDF file type) were moved to a backup hard drive in February to ensure the server had sufficient space to perform the statutory mandated March Jurisdictional Election. When this occurred, the SQL Log Files (LDF file type) demanded by the Subpoena were retained on the primary server. These files were not removed and were stored on the server when it was provided to the Senate on 4/21/2021.