



“The first rule of any technology used in a business is that automation applied to an efficient operation will magnify efficiency. The second is that automation applied to an inefficient operation will magnify the inefficiency.”

Bill Gates. Jul 8, 2019

MARICOPA COUNTY ELECTION DAY PRINTER FAILURE INVESTIGATION REPORT

On November 8th, 2022, Maricopa County experienced a widespread failure as voters attempted to cast their ballots at Voting Centers across the county. Many polling locations witnessed a situation in which ballot scanners would not accept ballots, several of which occurred immediately upon opening of the polls. The failure was intermittent, inconsistent in location and severity; yet widespread.

Initially it was suspected that Image-Cast Precinct-2 (“ICP-2”) voting center tabulators were malfunctioning, but the problem was soon isolated to the county’s Ballot on Demand (“BOD”) printers. Printing problems were found to yield defective ballots which the ICP tabulators could not read (ballots rejected/returned to the voter).

This report will isolate and identify the problems, the scope of those problems, and determine the most likely causes. As the product of an investigation, this review is all encompassing and not limited to a technical review, but includes all relevant acts, law, manuals, rules, records, references, statements, testimony and events.

The Problems

Description:

Two (2) separate Election Day Ballot on Demand (“BOD”) printer failures have been identified:

1. Speckled pattern ballots
2. 20-inch ballot image resized to 19-inch printed on 20-inch paper (addressed by Clay Parikh’s Declaration and furthered in trial testimony)

Speckled-Pattern Ballots:

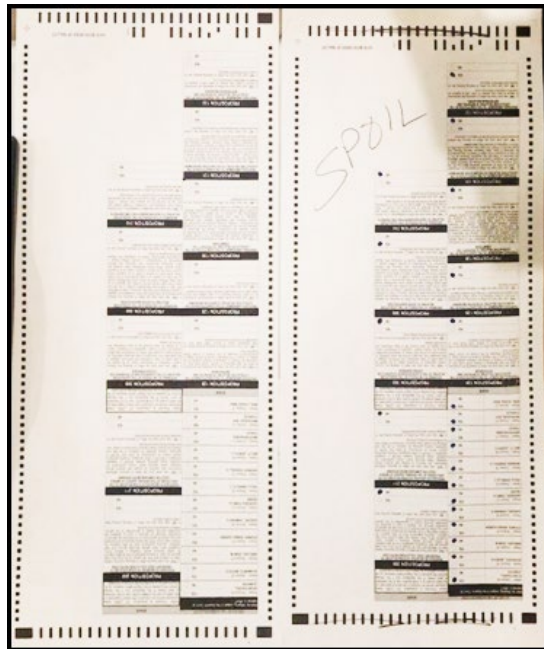
The predominant deficiency common to ballots being rejected by the tabulators was characterized by witnesses as the print appeared “faded” or “speckled”. More specifically, areas of the ballot which were supposed to be solid or uniform, were not. The defective ballots had areas interspersed with white “specks” making them appear faded.

According to witness interviews, poll worker reports/affidavits and images shared on social media, the deficiency appeared in a remarkably consistent pattern on the same area **of the reverse upper left corner of the ballot.** Example of an Election Day ballot with the Speckled pattern below:



Resized Ballot Images

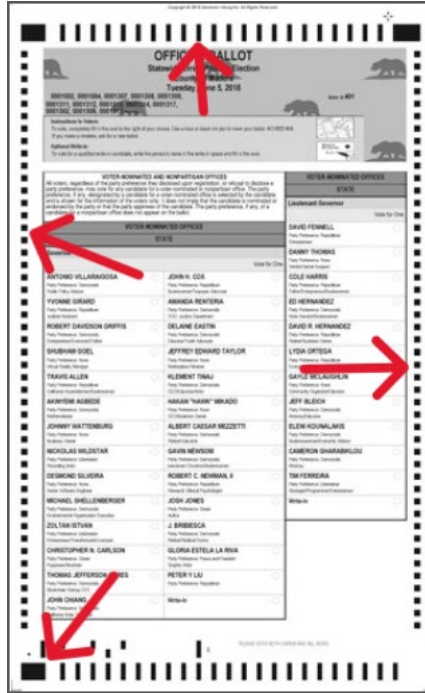
The second printing deficiency has been identified as a ballot image that has been resized or rescaled to a smaller image. An example of such an image is below as it appears alongside a ballot printed to proper size:



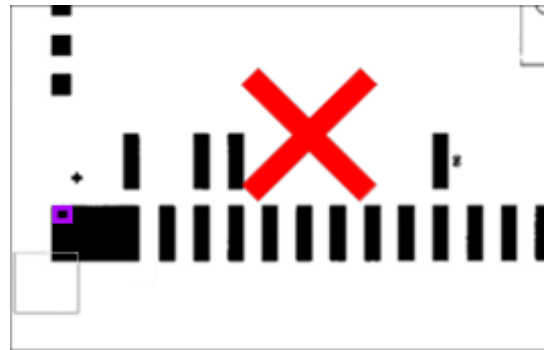
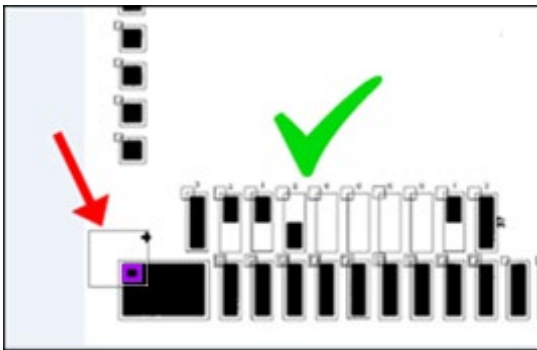
It is important to understand how the contest selections on a paper ballot are counted. Despite common misconceptions, tabulators do not count or “read” directly from the paper document, but an electronic image of the ballot. When a ballot is scanned it moves across the imaging device and is illuminated by different color-filters, and a separate image is produced for each filter. These images are then adjusted for the spectrum visible to the human eye (the scanner is essentially mimicking or fabricating the appearance of the document as it would appear under natural or white light conditions). Software overlays the separate color images to form one composite image.

Separate software removes stray markings, crops, and adjusts for any imperfections created by the inconsistent movement of the paper during the scanning process. Lastly, the image is resampled into either B&W or grayscale and a resolution of 150-200 dpi depending upon the jurisdiction’s preferences. Only after this process is the ballot image passed to the Dominion software to analyze, authenticate, and then count the contest selections.

First the software attempts to validate the black squares and rectangles, called timing marks, which surround the ballot as identified below:



This starts with one of the black rectangles in the corners- not by looking for the markers, rather the software looks at the position of where the corner marker should be in relation to the paper's edge. It then determines if the solid black corner marker is there or not. For example, the images below are produced by Dominion's troubleshooting tool which assists administrators in determining the potential cause for ballot rejections (color markings added).

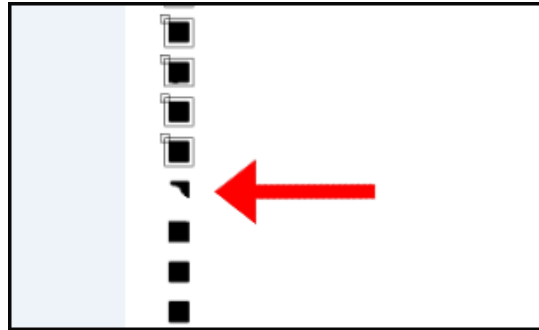
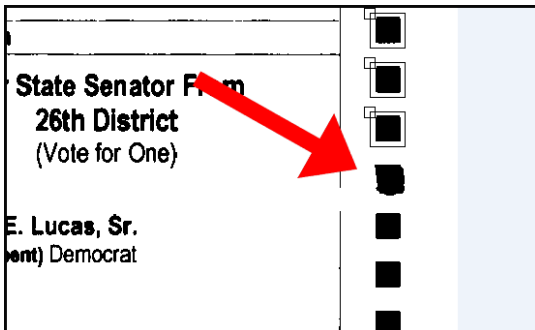


Representative of Maricopa County's resized ballot issue

In the image on the left, the red arrow is pointing to a square outline which delineates the defined area in which the software looks for the top left corner of the solid black corner marker. The top left corner is indicated by the

purple square. In this case the corner marker is where it is supposed to be as the purple square is within the tolerance square. The image on the right is a ballot that has been resized and the top left corner of the corner marker (purple square) is found outside of the tolerance square causing the ballot to be rejected. Note that the rejection is not caused because it couldn't find the corner marker, rather it did not find the corner marker in the position where it was supposed to be.

If the corner marker is in proper position, is the correct size, and is solid black, then the software proceeds to the next timing mark location and checks it in the same way. This process is repeated until all timing marks have been established around the entire perimeter of the ballot. If only one timing mark is out of place, is improper in size, or is not solid black, the ballot will be rejected. See the examples below:



Such strict tolerances are by design and act as an inherit security feature making it difficult to produce counterfeit ballots with the requisite precision. From Dominion's manual:¹

¹ The corresponding Dominion manual is available upon request.

The machine is designed so that no ballot is allowed to pass the scanning stage unless:

- The scanner verifies that it is a valid ballot
- The scanner reads all the fiducials around the ballot image.

If, for whatever reason, the machine is unsure about the image, it will notify the operator with an appropriate error message (such as “Ballot Misread,” “Please Insert Again,” “Invalid ballot for this polling location,” “DRO box not signed,” etc).

In total, there are approximately 340 image checks that are performed on each image. If any check fails, the machine will report the ballot as misread and automatically reverse it. The system has been designed to have an error rate of less than 1 in 10,000,000 markings. For more information please refer to 2.04.1 - *Democracy Suite[®] ImageCast[®] Precinct System Hardware Characteristics.*

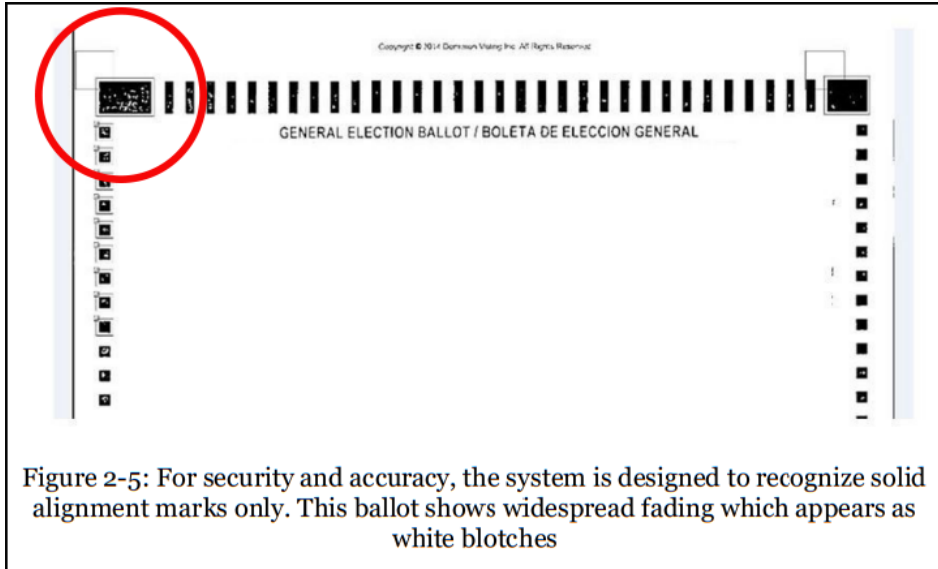
The ImageCast Precinct (Voting Center Tabulators) and the ImageCast Central (MCTEC or “Central Count” tabulators) authenticate and read a ballot in the exact same way. In fact, it is not the scanner that’s authenticating the ballot, but Dominion’s software. Both tabulators use the very same ballot definition file with the same requirements, ballot image resolution, specifications and tolerances.

Maricopa County’s Printing Problems & Dominion’s Tolerances

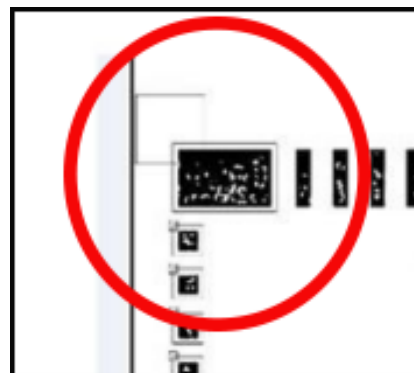
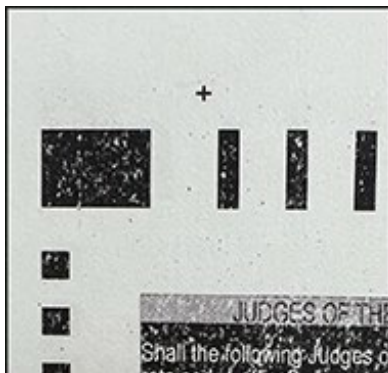
The speckled printed ballots witnessed in Maricopa County is specifically defined in Dominion’s *ImageCast Ballot Printing and Finishing Specifications* manual, Section 2.12 ***Examples of Problem Ballots.***²

The manual states in part, “...the system is designed to recognize **solid alignment marks only.** This ballot shows widespread fading which appears as white blotches” (emphasis added).

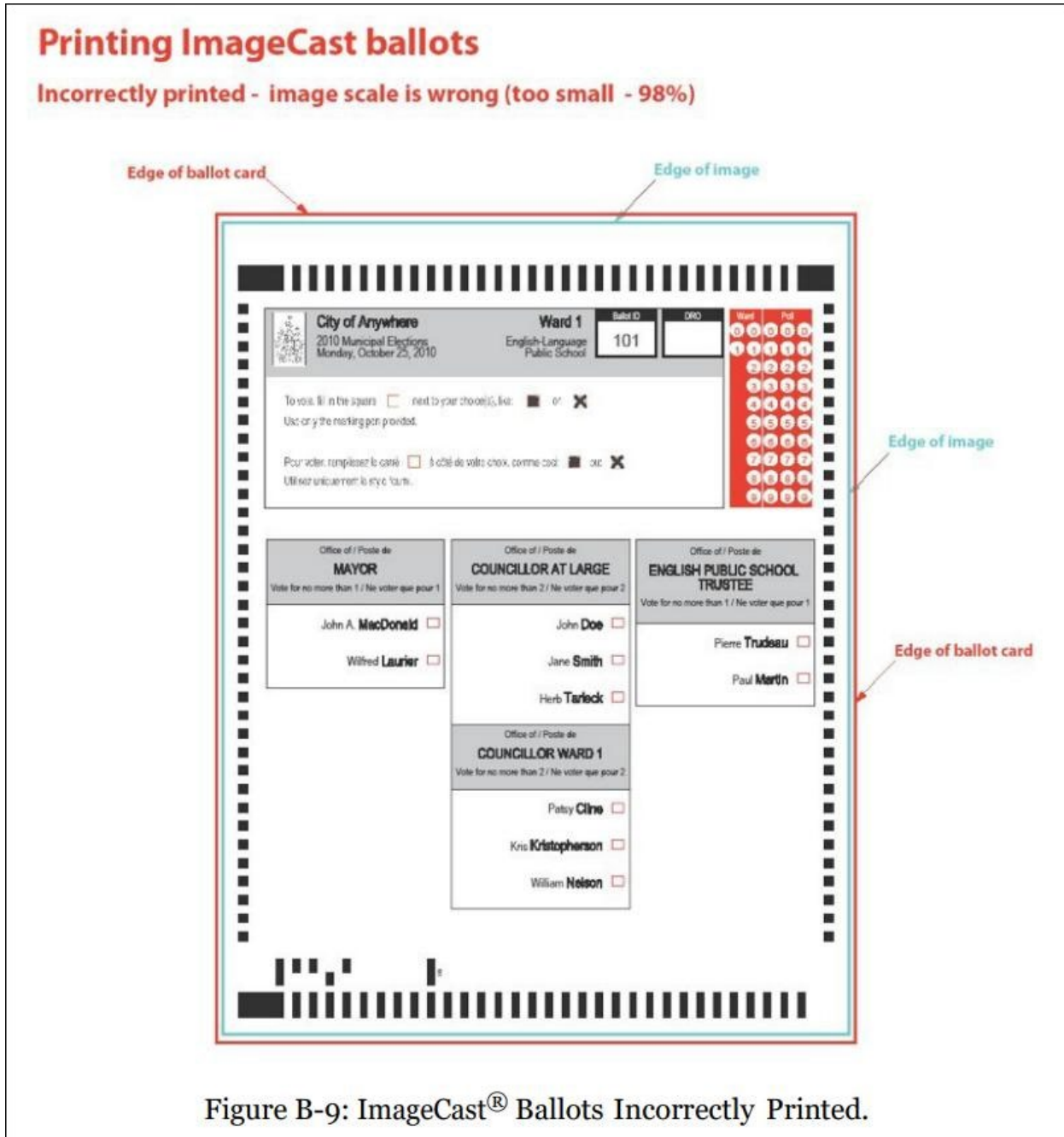
² The Dominion ImageCast Ballot Printing and Finishing Specifications manual is available upon request.



Maricopa County's defective Election Day speckle-printed ballots mirror the example Dominion provides in their manual as an issue **known to cause misreads**:



The resized ballot image defect is also specifically addressed by the same manual:



The manual describes a tolerance of only 2% size variation. Maricopa County's resized ballots were printed to approximately 95% of their original size, or a difference of 5%.

In summary of the two identified printing deficiencies, each fits squarely within Dominion’s corresponding definition of known problem conditions. As such, the fact that voting center tabulators rejected the defectively printed ballots is of no surprise; however, what is surprising is that two separate printing problems were both suddenly manifested on Election Day affecting hundreds of printers. The resized ballot failure was created across two separate hardware platforms.

The severity and scope of the ballot printing / tabulator rejection problem has been a matter of contention since Election Day. Almost immediately Maricopa County election officials began minimizing the printer failures as a mere inconvenience only affecting a small number of voting centers which was quickly resolved after changes in printer settings were implemented. The following is from Maricopa County’s November 27th response to the Arizona Attorney General’s office regarding the Election Day failures:

2022 General Election Day

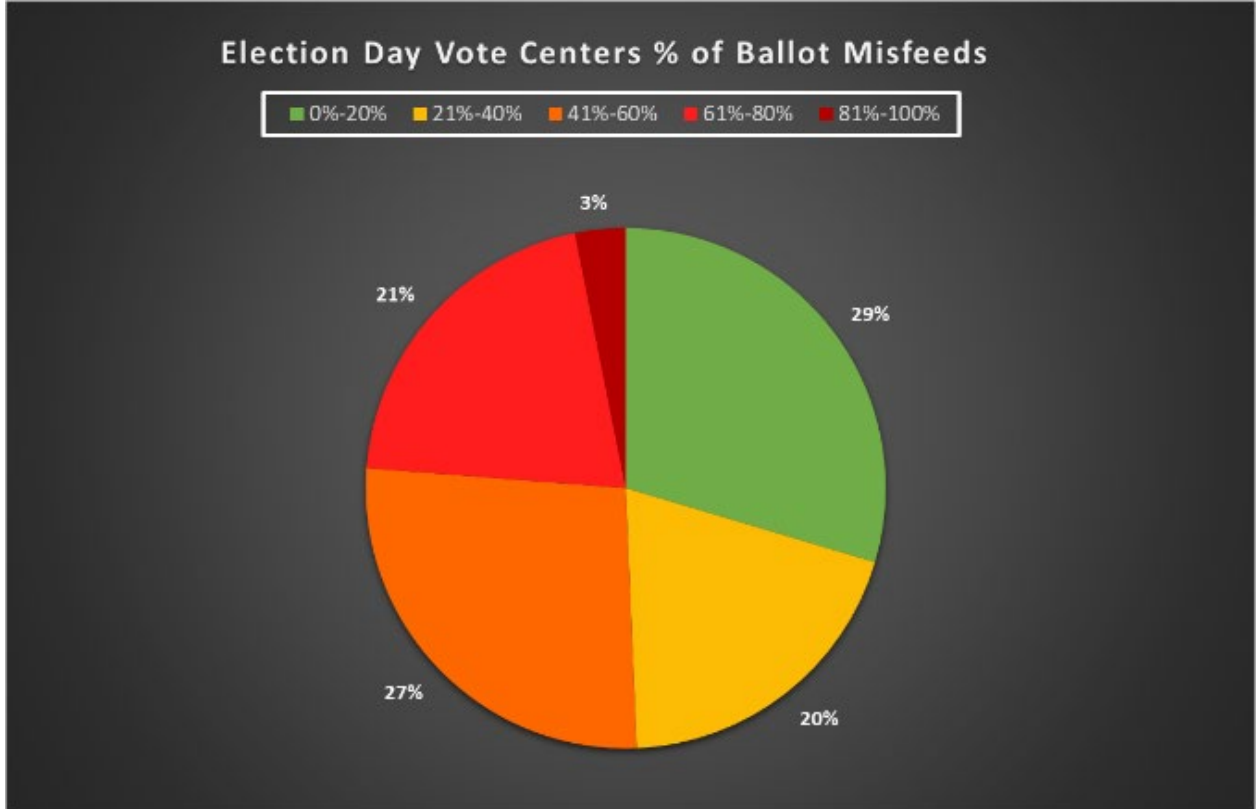
Despite stress testing the printers before Election Day, installing the latest firmware, using uniform printer settings, and using the same settings as programmed in prior elections, the Oki B432 printer experienced an issue affecting the ability of the on-site tabulators to accept the ballot. If an on-site tabulator could not read the ballot, the voter was instructed to deposit the ballot into a secure ballot box (“Door 3”) to be counted at Maricopa County’s central counting facility. These 16,724 Door 3 ballots represent 1% of the total ballots issued to voters during the 2022 General Election

Note that the description identifies only the Oki B432 BOD printer, and references pre-election “stress testing”, but for some reason doesn’t mention Logic & Accuracy testing.

Our preliminary root cause analysis shows the issue was not with the ink or toner, instead it was the fuser. The printers have three profiles, one for each item that we print for voters, the ballot, receipt, and envelope. The ballot “media weight” setting was set to heavy, as recommended, and the receipt and envelope were on a lighter setting, as recommended. These settings were exactly the same as in prior elections. The solution implemented on Election Day for the 2022 General Election was to set all three “media weight” settings to heavy.

Once identified, we began guiding poll workers to make this change over the phone and dispatching technicians to make changes at the sites with reported issues. The changes had to be completed onsite at the Vote Center and could not be made remotely. We also asked technicians to proactively make these changes at other sites that had not yet reported an issue. By mid-afternoon, most sites were no longer experiencing the printer issue. See the timeline on the next page.

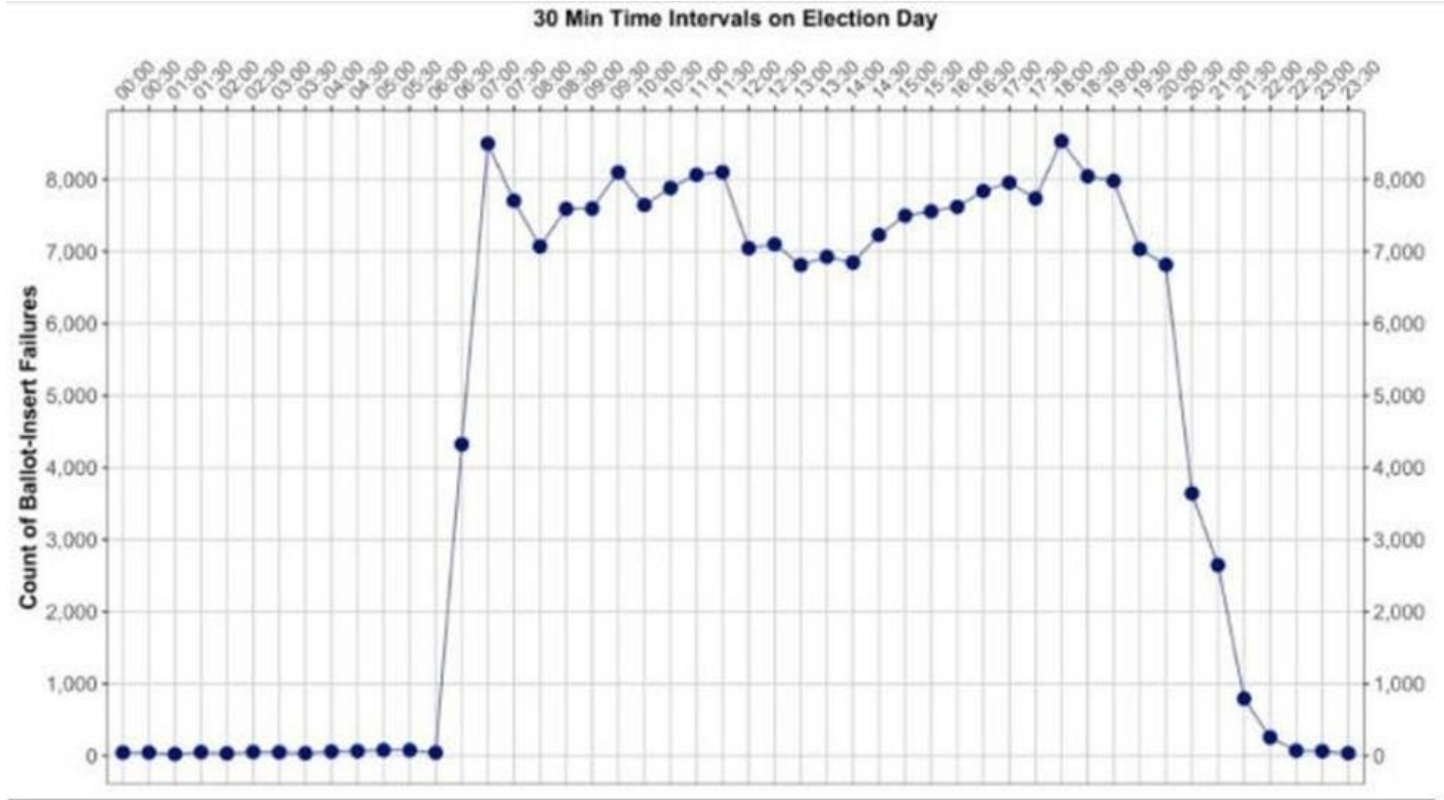
The characterization is materially false in both scope of voting centers affected and length of time.



The chart above represents the aggregated voting center tabulator system log data from 445 machines used to scan ballots on Election Day. Using a threshold of misfeeds of over twenty (20) percent³, nearly three fourths, or 68% of all ballots scanned on Election Day were involuntarily rejected.

Maricopa County claims to have found a “fix” for the speckled/faded print issue by changing the media weight settings for the envelopes and regular paper from normal to heavy. This nonsensical solution was supposedly implemented and “...by mid-afternoon, most sites were no longer experiencing the printer issue.”. This claim is incontrovertibly false as the printer failures raged until after the polls closed:

³ A 20% rate of rejection is in no way acceptable as the EAC guidelines limit the same to .2%, or .002. The extraordinary high value of 20% was chosen to leave no room for mistake, human error, or excuse.



Even though Maricopa County’s letter was nearly three (3) weeks after the election, there is no mention of the resized ballot issue. In fact, it wasn’t until later when Scott Jarrett was on the stand during the Lake v. Hobbs trial for the second day that Scott Jarrett finally acknowledged the second printer problem. Even then Mr. Jarrett concealed the fact that resized ballots were being produced by both Oki and Lexmark BOD printers⁴.

No matter Maricopa County’s misleading and false claims, the system logs from all 446 voting center tabulators have provided an inarguable fact-based record of every ballot inserted, whether it was accepted or rejected, and why.⁵ The following data was derived directly from those logs which were produced by the Dominion Election Day voting center tabulators and provided by Maricopa County in response to a Public Records Request.

A total of 461,826 ballots were inserted into the voting center tabulators on Election Day in Maricopa County. Out of those, a total of 229,781 ballots were successfully cast.⁶ To further understand the breadth of the Election Day failure, consider that the Election Assistance Commission’s threshold for ballot misreads is .002 or 1/500

⁴ Scott Jarrett testified that the resized ballot issue was discovered at three (3) voting centers. One of which was Gateway Fellowship Church (14864) that produced approximately 900 of the estimated 1300 resized ballots, and only used Lexmark BOD printers.

⁵ An electronic file containing a directory for each voting center and the corresponding tabulator system logs is provided separately.

⁶ It’s important to note that many of the same ballots were being fed multiple times as voters attempted to cast their ballots. Each additional attempt necessitated by the preceding failure.



ballots.⁷ On Election Day, Maricopa County's equipment averaged in excess of 2 in 5- or **two-hundred times the limit.**

Maricopa County's own tabulator records irrefutably establish that 151 (not 60) of the 223, or over 68% of Election Day voting centers experienced serious failure as ballots were rejected at a rate of 20% or higher.

The Response

Soon after the polls opened and the printer problems were realized, county officials and poll workers directed voters whose ballots were being rejected to deposit them into "Box 3" and they would be scanned on the county's central count tabulators, as acknowledged in Maricopa County's response above:

If an on-site tabulator could not read the ballot, the voter was instructed to deposit the ballot into a secure ballot box ("Door 3") to be counted at Maricopa County's central counting facility. These 16,724 Door 3 ballots represent 1% of the total ballots issued to voters during the 2022 General Election

The instruction seemed as though it was preconceived or choreographed- not just to deposit the problem ballots into door 3, but that they would be counted on the county's central count scanners. How could county officials have known that the defective ballots would magically scan without incident? There should have been no such expectation. In fact, any presumption should have been that the defective Box 3 ballots would have to be duplicated as prescribed by Arizona state statute:

Ariz. Rev. Stat. § 16-621: *If any ballot, including any ballot received from early voting, is damaged or defective so that it cannot properly be counted by the automatic tabulating equipment, a true duplicate copy shall be made of the damaged or defective ballot in the presence of witnesses and substituted for the damaged or defective ballot. All duplicate ballots created pursuant to this subsection shall be clearly labeled "duplicate" and shall bear a serial number that shall be recorded on the damaged or defective ballot.*

Central count scanners (ImageCast Central, or "ICC") use the very same ballot definition as those of the voting center tabulators, with the same tolerances and specifications. In other words, if the precinct tabulator at the voting center rejected the ballot, then the ICC tabulator should reliably also reject the ballot- and for the same reason. Any deviation between the two is in and of itself a failure as the same ballot should not yield two different results on two different tabulators.

⁷ The EAC Voluntary Voting System Guidelines can be found here: [Voluntary Voting System Guidelines | U.S. Election Assistance Commission \(eac.gov\)](https://www.eac.gov/voting-system-guidelines)

Maricopa County Officials later claimed that the same printer settings were used during the 2022 primary and previous elections. The following is from the November 28th MCBOS meeting:

And one of things we've been able to confirm through this analysis is every printer for every one of our Oki printers as well as our Lexmark had the exact same settings, uniform settings, and we were using the exact same settings that we had used in prior elections. Now, the only difference was we had a 20-inch ballot versus a 19-inch ballot. But before – as we were leading up to this election we stress tested that 20-inch ballot and we did not find any issues as we were leading into election day.

Similar claims were made by Maricopa County in response to a letter from the Arizona Attorney General's office:

Despite stress testing the printers before Election Day, installing the latest firmware, using uniform printer settings, and using the same settings as programmed in prior elections, the Oki B432 printer experienced an issue affecting the ability of the on-site tabulators to accept the ballot.

Strangely, no mention of Logic & Accuracy testing in either comparison- just stress testing. Throughout the course of this investigation, it has become evident that Mr. Jarrett has a propensity to make assertions which are at best, technically factual but "disingenuous" in context. This is a prime example as his repeated attempts to substitute or conflate stress testing with the statutorily required Logic & Accuracy testing.

Another example is his testimony during the MCBOS's November 28th meeting which he specifically claims that the printers "...had the exact same settings" as in previous elections. He tracks the same language in the response to the Arizona Attorney General's letter- "*uniform printer settings, and we were using the exact same settings that we had used in prior elections.*".

Maricopa County increased the ballot paper weight from the 80lb vote-secure paper used in previous elections, to 100lb vote-secure paper for the 2022 Primary and Mid-term election. Mr. Jarrett fails to mention the paper weight change in either forum. He even goes as far as to identify fuser heat settings which are directly correlated and affected by paperweight, but he never actually discloses the *change* in paperweight.

The fuser is essentially a heating element housed within a roller which heats the paper to a temperature that melts the toner and bonds it to the paper. The heavier the paper, the more heat that's required to melt the toner. When the heat is insufficient, the result is speckling.

Jarrett also fails to mention that the 2022 Primary Election ballots were nearly all one-sided- or said another way- the primary ballots fit all races on one page with only a few exceptions. This is important because any deficiency would have presented primarily on the reverse, or bottom -side of the ballot as witnessed on Election Day (further explained below).

Duplex printing (both sides) is more demanding and requires more heat than that of one-sided printing; which is why the specifications, paperweight capacities and fuser heat requirements are different for duplex printing.



Therefore, to use the “exact same settings” on Election Day as those used for the primary is effectively meaningless because the ballots, paper weight and printing demands were all materially different.

Moreover, the BOD uniform printer settings were not the same- nor were the circumstances. Following the August primary, Maricopa County specifically removed those uniform printer settings from all their Oki B432 printers and new firmware was installed. At the same time, new BIOS, printer, and postscript drivers were installed on the Runbeck Sentio laptops which control the printers. A similar conclusion was made in Justice McGregor’s report:

Changes Between Primary and General Elections

Maricopa County made several changes between the 2020 and 2022 elections and between the 2022 primary and general elections that could have affected the performance of the printers. We designed our tests to determine whether any of these variables, or a combination of them, caused the printer malfunction that occurred during the 2022 general election.

A statement more accurate than Mr. Jarrett’s assertion that “...we were using the exact same settings that we had used in prior elections” is that there was very little that had *not* changed between the August Primary and the November 8th General Election.

Causes of the Election Day Printing Failures

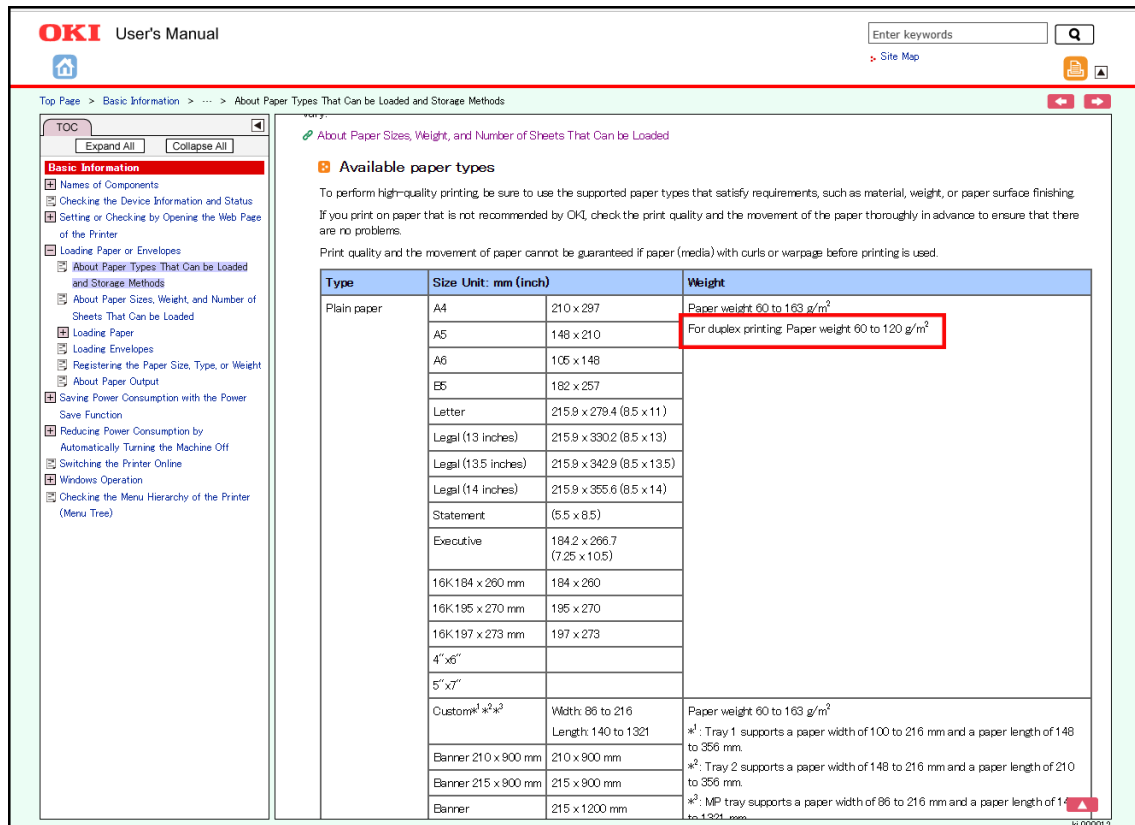
Speckled/Faded Printing

Based upon the totality of evidence reviewed to date, the 2022 General Election speckled/faded print problem was isolated to the Oki B432 BOD printers.⁸ Our findings as to the causes of the 2022 General Election speckled/faded printed ballots by the Oki BOD printers are as follows:

1. 100-pound ballot paper is beyond the capacity of the Oki B432 printer for duplex printing.

From the Oki B432 Operator’s Manual:

⁸ Our investigation included consultation with Oki-Data engineers, various subject-matter experts, poll workers, T-techs, and multiple Election Day voters. Additionally, review and reference of the corresponding product manuals, printer settings, checklists, reports, Troubleshooting/Election Dept. Hotline (STAR) call logs, Justice McGregor’s report, Dominion Voting Systems technical manuals and other associated documents which were provided by Maricopa County in response to Public Records Requests (“PRR”) and Arizona State Senate subpoena. Also included in our investigation was the bench testing of the same Oki printer model B432dn as that used by Maricopa County, with the same Roland Vote-Secure paper of the same 100-pound weight as that used on Election Day.



The screenshot shows the 'Available paper types' section of the OKI User's Manual. A table lists various paper types with their dimensions and weights. A red box highlights the weight specification for duplex printing: 'For duplex printing, Paper weight 60 to 120 g/m²'.

Type	Size Unit: mm (inch)	Weight
Plain paper	A4	210 x 297
	A5	148 x 210
	A6	105 x 148
	E6	182 x 257
	Letter	215.9 x 279.4 (8.5 x 11)
	Legal (13 inches)	215.9 x 330.2 (8.5 x 13)
	Legal (13.5 inches)	215.9 x 342.9 (8.5 x 13.5)
	Legal (14 inches)	215.9 x 355.6 (8.5 x 14)
	Statement	(5.5 x 8.5)
	Executive	184.2 x 266.7 (7.25 x 10.5)
	16K 184 x 260 mm	184 x 260
	16K 195 x 270 mm	195 x 270
	16K 197 x 273 mm	197 x 273
	4" x 6"	
5" x 7"		
Custom ¹ x ² x ³	Width: 86 to 216 Length: 140 to 1321	Paper weight 60 to 163 g/m ²
Banner 210 x 900 mm	210 x 900 mm	¹ : Tray 1 supports a paper width of 100 to 216 mm and a paper length of 148 to 356 mm.
Banner 215 x 900 mm	215 x 900 mm	² : Tray 2 supports a paper width of 148 to 216 mm and a paper length of 210 to 356 mm.
Banner	215 x 1200 mm	³ : MP tray supports a paper width of 86 to 216 mm and a paper length of 148 to 1321 mm.

"The paper weight capable of duplex printing is 60 to 120 g/m²."

120 g/m² converts to a duplex printing capacity limit of 80-pound paper. Maricopa County's use of 100-pound paper exceeded the manufacturer's specifications by twenty pounds or twenty percent (20%).

A recent report on the printer issues by former Arizona Supreme Court justice McGregor made the following erroneous assertion:

Maricopa County's experience during the primary election amply demonstrated that printing ballots on 100-pound paper does not exceed the capacity of the Oki B432 printer.

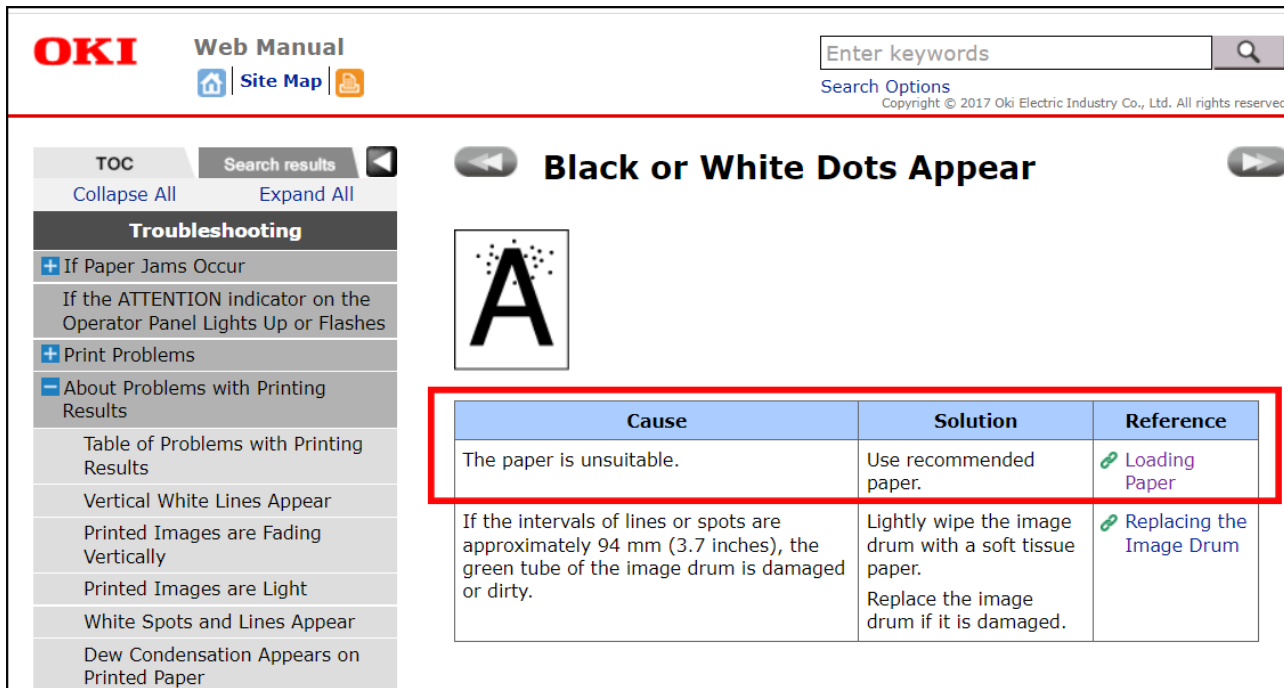
Again, another comparison- and conclusion based on something other than the most obvious, standardized, and closely matching metric- Logic & Accuracy testing. Justice McGregor's assertion that 100-pound paper does not exceed the capacity of the Oki B432 printer is at odds with a footnote on page 7 of the same report:

A suggestion of a problem did occur during early voting in the primary. Ballots from early voting are returned to the MCTEC in envelopes, removed by bi-partisan teams of workers, and tabulated on central equipment. Some of the workers noted flaking or speckling on some ballots and brought it to the attention of supervisors.

The fact that the same speckled printing problem was documented by workers who noticed “...flaking or speckling on some ballots...” **during the primary**, is a strong suggestion that 100-pound paper is beyond the capacity of the Oki B432 printer. Despite Justice McGregor’s conclusion, the performance of the Oki printers during the 2022 primary election is not a reliable benchmark. As stated earlier in this report, the ballots for the primary were nearly all one-sided and did not endure the same stresses of the duplex printing process.

Maricopa County’s Election Day experience irrefutably demonstrated that 100-pound paper far exceeds the capacity of the Oki B432 printer, as well as the manufacturer’s specified threshold of 80-pound paper for duplex printing. In any case Justice McGregor’s conclusion that “...100-pound paper does not exceed the capacity of the Oki B432 printer” is false- both realized and specified.

The speckled-printing issue is squarely defined in the Oki printer manual:



The screenshot shows the Oki Web Manual interface. The title of the page is "Black or White Dots Appear". Below the title is an image of a letter 'A' with speckles. A table with a red border lists causes and solutions for this issue.

Cause	Solution	Reference
The paper is unsuitable.	Use recommended paper.	Loading Paper
If the intervals of lines or spots are approximately 94 mm (3.7 inches), the green tube of the image drum is damaged or dirty.	Lightly wipe the image drum with a soft tissue paper. Replace the image drum if it is damaged.	Replacing the Image Drum

The McGregor report continues:

The experience during the general election tells us that, when 100-pound paper was coupled with a lengthier, 20-inch ballot, the task being asked of the Oki B432 printer simply exceeded the capacity of many, although clearly not all or even most, of the printers.

The Oki printers at issue are all of the same model. To claim that the task at hand exceeded the capacity of “many, although clearly not all or even most..” is a distinction without a difference. The printers failed. Justice McGregor’s characterization as to the number of printers adversely affected is also in error. So much so that it’s a gross misrepresentation.⁹ As detailed previously in this report, the majority of Election Day printers failed on Election Day. The metric is the number of ballots successfully cast versus the number of ballots rejected by the voting center tabulators- as documented by the system logs and provided by Maricopa County. The ballot print defects are specifically identified for each rejected ballot. The errors are defined, the tabulator system logs are undeniable, and the math certain.

Our bench-testing has found that while the use of 100-pound cardstock for duplex printing on the Oki B432 is beyond the manufacturer’s specified capacity, the printer is robust. After printing in excess of 5,000 test prints (likely exceeding the lifetime use of Maricopa County’s BOD printers) the only way to reproduce the speckled printing was to force it by reducing the media weight settings to light. These settings were inconsistent with Maricopa County’s Election Day settings.

2. Closer inspection revealed that Maricopa County’s Oki BOD printer media type settings were not set to “CARDSTOCK”, but to “PLAIN”.

Below is a portion of the printer configuration print-out for one of the Oki printers used on Election Day:

```


MENUMS
TRAY CONFIG
MP TRAY CONFIG
PAPERSIZE : CUSTOM
X DIMENSION : 8.5 INCH
Y DIMENSION : 11.0 INCH
MEDIATYPE : PLAIN
MEDIaweIGHT : MEDIUM
TRAY USAGE : DO NOT USE
TRAY1 CONFIG
PAPERSIZE : LEGAL14
MEDIATYPE : PLAIN
MEDIaweIGHT : HEAVY
TRAY2 CONFIG
PAPERSIZE : LETTER
MEDIATYPE : PLAIN
MEDIaweIGHT : MEDIUM
PAPER FEED : TRAY1

ADMIN SETUP
NETWORK SETUP
TCP/IP : ENABLE
NETBIOS OVER TCP : ENABLE
IP ADDRESS SET : MANUAL
IPV4 ADDRESS : 192.168.10.250
SUBNET MASK : 255.255.255.0
GATEWAY ADDRESS : 192.168.10.1
WEB : ENABLE
TELNET : DISABLE
FTP : DISABLE
IPSEC : DISABLE
SNMP : ENABLE
NETWORK SCALE : NORMAL
GIGABIT NETWORK : DISABLE
HUB LINK SETTING : AUTO NEGOTIATE
FACTORY DEFAULTS
USB SETUP
    
```

There is a difference between a HEAVY weight setting for a PLAIN media type and a HEAVY weight setting for a CARDSTOCK media type. The weight (and heat) setting is relative to the type of media. More heat is required

⁹ McGregor’s report indicates that she relied upon interviews with Scott Jarrett, Maricopa County staff, or references produced by Maricopa County, but did not reference the tabulator system logs.

for heavy cardstock than that of plain paper and the fuser temperature is adjusted accordingly. The significance of the media type and corresponding weight settings is defined by the Oki troubleshooting matrix:

Toner Comes Off When Printed Paper is Rubbed		
		
Cause	Solution	Reference
The settings of the media type and weight are incorrect.	Press Δ or ∇ on the operator panel, select [MENUS] > [TRAY CONFIG] > select the paper tray you are using, and then set appropriate values to <u>[MEDIATYPE]</u> and <u>[MEDIaweIGHT]</u> . Alternatively, set a greater value to [MEDIaweIGHT].	Registering the Paper Size, Type, or Weight
Recycled paper is used.	Press Δ or ∇ on the operator panel, select [MENUS] > [TRAY CONFIG] > select the paper tray you are using, and then set a greater value to [MEDIaweIGHT].	Registering the Paper Size, Type, or Weight

The addressed condition is an insufficient bond between toner and the paper. The recommended solution is to ensure that the media type and media weight settings are appropriate.

Justice McGregor’s report briefly mentions the media type, and in doing so acknowledges that the printers were in-fact erroneously set to PLAIN:

After trying several approaches to resolve the issue, Maricopa County concluded that the most promising approach involved setting all media weight settings to “heavy,” theorizing that the fuser would then maintain a high temperature at all times and would properly fuse the toner to the paper, and instructed its t-techs to make that change when called to a vote center. In addition to that change, Runbeck personnel called to vote centers changed the media type, or paper, setting from plain to cardstock for ballots.

The significance of this important distinction in media weight setting was not described in Justice McGregor’s report, nor was any acknowledgment made that the printer media weight settings had been set incorrectly

(prior to early voting began). No testing was undertaken to repeat the same conditions and observe the differences in printing that each setting would yield.

Similarly, Scott Jarrett and county election officials failed to disclose the same to the Arizona Attorney General’s Office in their November 27th letter, nor to the Maricopa County Board of Supervisors on November 28th, and not even to the court during the Lake v. Hobbs trial. Instead, Mr. Jarrett described a change to the envelope and paper tray settings that would have resulted in no effect on the printing of the ballot cardstock tray (we tested), while concealing the media type settings change from PLAIN to CARDSTOCK.

The following facts remove any possibility that the proper settings for the use of 100-pound paper were ever incorporated.

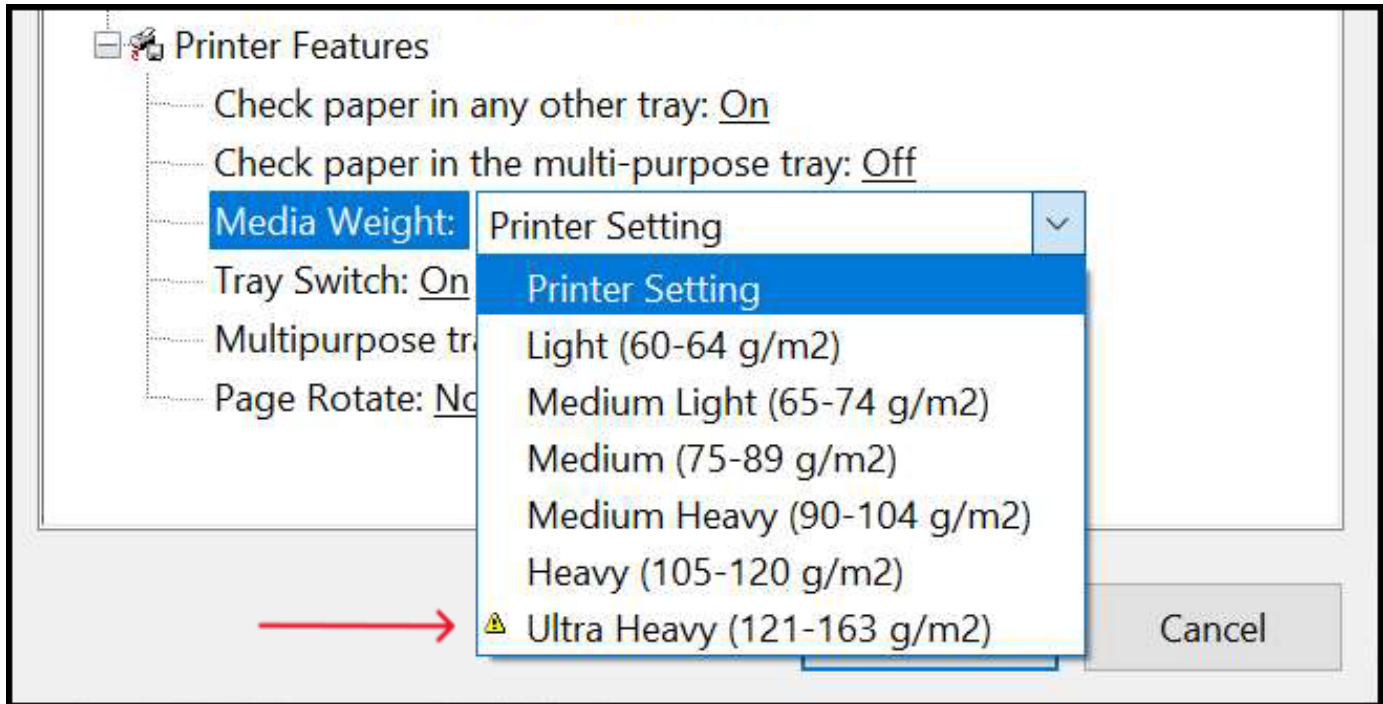
The Oki Print Media and Paper Weight conversion chart shows the proper setting for the 100-pound cardstock as “Ultra Heavy 1”:

Print Media Paper Weight (cont.)	
Index	
Setting	Index (metric)
Auto (default)	35 to 118.6-lb. (64 to 216 g/m)
Light	35-lb. (64 g/m)
Medium Light	37 to 40-lb. (68 to 71 g/m)
Medium	42 to 50-lb. (75 to 90 g/m)
Medium Heavy	52 to 56-lb. (94 to 105 g/m)
Heavy	60 to 71-lb. (109 to 128 g/m)
Ultra heavy 1	73 to 104-lb. (132 to 188 g/m)

```

MENUS
TRAY CONFIG
→ MP TRAY CONFIG
  PAPERSIZE : CUSTOM
  X DIMENSION : 8.5 INCH
  Y DIMENSION : 11.0 INCH
  MEDIATYPE : PLAIN
  MEDIAWEIGHT : MEDIUM
  TRAY USAGE : DO NOT USE
→ TRAY1 CONFIG
  PAPERSIZE : LEGAL14
  MEDIATYPE : PLAIN
  MEDIAWEIGHT : HEAVY
TRAY2 CONFIG
  PAPERSIZE : LETTER
  MEDIATYPE : PLAIN
  MEDIAWEIGHT : MEDIUM
  PAPER FEED : TRAY1
  
```

The Oki printer has 3 separate paper trays, and the actual settings used for the election are shown above on right. First is the multi-Purpose tray, (underlined in blue) is marked “DO NOT USE”. The tray delineated in red is Tray 1 which was the ballot tray used for ballot stock, and the Media Type is set to PLAIN.



The proper setting for the 100-pound paper is Ultra Heavy, but the caution symbol is to inform the user that the setting is not available, except for the Multipurpose tray. If the proper Ultra Heavy setting is selected, the application will automatically change the corresponding tray to the Multipurpose tray. In short, the proper setting cannot be selected for the tray used by Maricopa County. What’s more, the Ultra Heavy setting is not available for Duplex printing. Even though the paper weight exceeded the manufacturer’s specifications, there is no way with which to print 100-pound paper with the maximum heat settings using the tray that Maricopa County utilized- Tray one.

This is a very important data point as it confirms that the incorrect media weight settings remained unchanged from the pre-early-voting dates shown in the printer set-up reports until Election Day. The same BOD printers that failed on Election Day were used to print the ballots for in-person early voting. This means that the media weight settings were incorrect the entire time, and unsurprisingly the same failures were documented. The following is from the Declaration¹⁰ of an observer at the Maricopa County Tabulations and Elections Center (“MCTEC”) who witnessed the following on November 2nd between 8 a.m. and 1 p.m.:

8. On November 2, I was observing a table with two workers who were reviewing ballots to ensure they were able to be scanned by the tabulator. I noticed a growing pile of ballots that the workers had set aside as damaged and would be duplicated before tabulation. One of the workers called over a

¹⁰ The Declaration of Janet Patrick is available upon request.

manager of the ballot processing department, Melissa, who I understand is a Maricopa County employee. Melissa then called me over to the table so I could hear what was being discussed.

9. The worker explained to Melissa that the ballots he set aside had faded timing marks. Melissa then retrieved a manager from the elections department (who I also understand is a Maricopa County employee) to show that manager the faded timing marks. The elections department manager agreed that these ballots with the faded timing marks could not be processed by the tabulators. That manager said that she would notify the site from which these ballots came to service its printer.

The pertinent portion of the Declaration corroborates two important points:¹¹

1. The speckled-print issue was present during the in-person early voting period and did adversely affect the ballots in a manner consistent with those defective ballots printed on Election Day.
2. The manager of the elections department confirmed what has been previously asserted with very high confidence in this report - that the speckled/faded ballots could not have been read by the central count tabulators, just as they weren't read by the voting center tabulators.

Testing was conducted mirroring Maricopa County's plain media-type settings, and although print was speckled, the result was not representative of the serious failure produced on Election Day.

It was brought to our attention that the printer has a setting called "ECO Mode" which causes the Oki B432 to start printing **before** the fuser has reached target temperature. From the Oki B432 manual:

ECO Mode*1	ON	<p>If [ON] is set: Printing starts even before the temperature of the fuser reaches the prescribed degrees, if the job is small.</p> <p>If [OFF] is set: Printing starts after the temperature of the fuser reaches the prescribed degrees.</p>
------------	----	---

3. A review of Maricopa County's printer settings for the November 2022 General Election has revealed that ECO Mode was in-fact enabled on all of the Oki B432 printer configuration records provided by Maricopa County.

¹¹ During the course of our investigation, we interviewed Ms. Patrick and another individual who witnessed the same occurrence. We were also able to acquire surveillance video which corroborated the incident. This information is available upon request.



The following is the pertinent portion of the printer configuration from one of the Ballot on Demand printers used for Election Day:

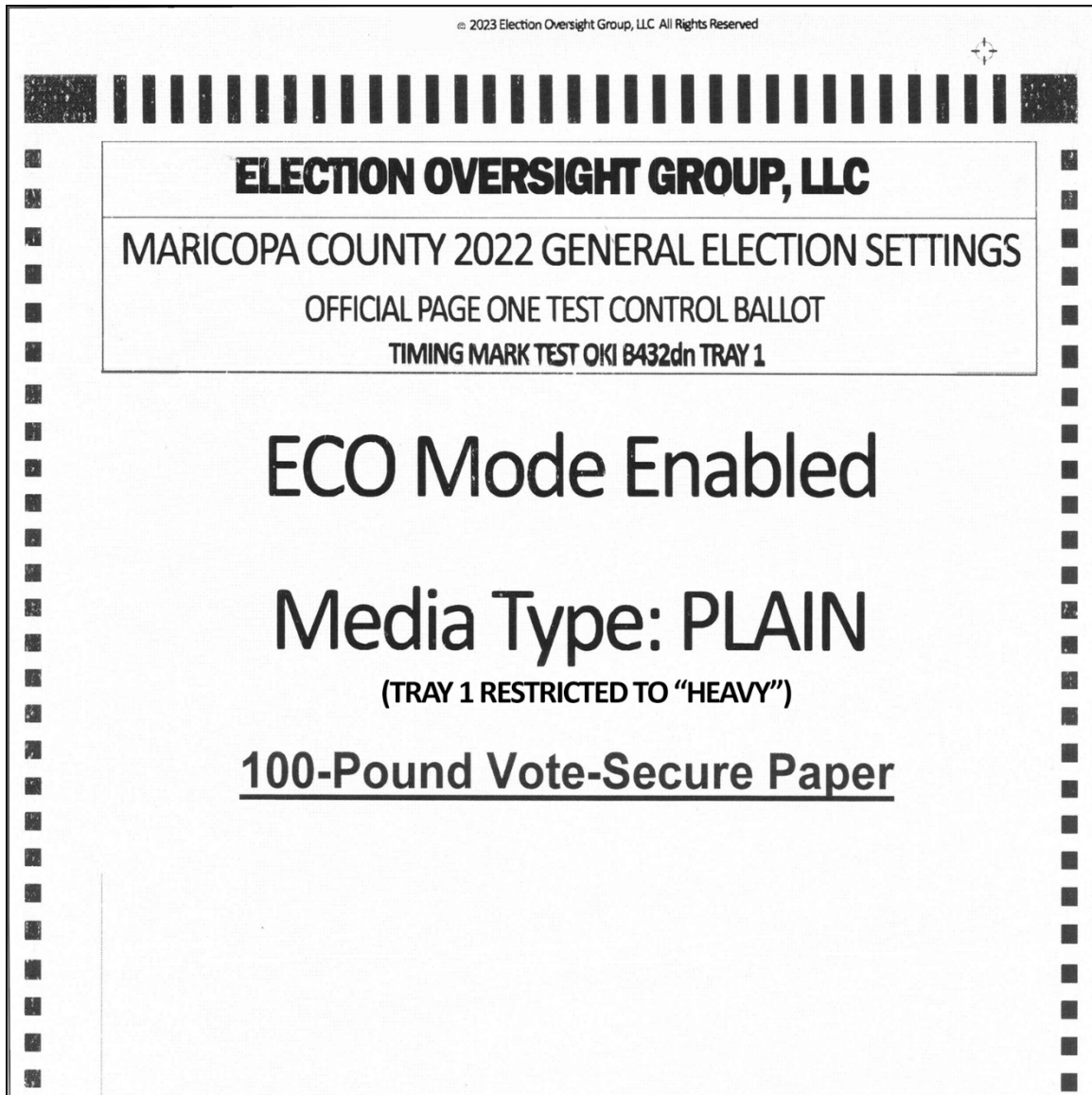
CONFIGURATION TRAY COUNT MP TRAY : 271 TRAY1 : 239 TRAY2 : 278 SUPPLIES LIFE TONER (12.0K) : REMAINING 70 % DRUM : REMAINING 94 % NETWORK IPV4 ADDRESS : 192.168.10.250 SUBNET MASK : 255.255.255.0 GATEWAY ADDRESS : 192.168.10.1 MAC ADDRESS : 00:25:36:81:7D:87 NETWORK VERSION : 00.55	SYSTEM ADJUST POW SAVE TIME : 60 MIN SLEEP TIME : 60 MIN AUTO PW OFF TIME : 12 HOURS ECO MODE : ON CLRABLE WARNING : ONLINE AUTO CONTINUE : OFF MANUAL TIMEOUT : 60 SEC TIMEOUT INJOB : 40 SEC TIMEOUT LOCAL : 40 SEC TIMEOUT NET : 90 SEC LOW TONER : CONTINUE JAM RECOVERY : ON ERROR REPORT : OFF
--	--

Justice McGregor’s report states the following as it pertains to the operation of the fuser and printing:

When the printer is powered on, the fuser is energized and heats until it reaches the set temperature of approximately 190 degrees. The paper with a latent image then passes between the upper and lower rollers. The heat and pressure from the upper and lower rollers heat and press the latent toner into the paper fiber, and fusing is complete. If the fuser does not maintain an appropriate heat, the toner will not properly adhere to the paper, causing flaking and speckling.

Her Honor provides an accurate description of the process, sequence of events and operation of the printer- as it would operate with standard settings. ECO Mode allows printing to begin before the fuser reaches the set temperature, and because the “...fuser does not maintain an appropriate heat, the toner will not properly adhere to the paper, causing flaking and speckling.”. Unfortunately, with the instant circumstances ECO Mode creates the very conditions and resulting failure that she describes- flaking and speckling.

Testing 100-pound cardstock with ECO Mode set to “ON” in conjunction with the media weight set to PLAIN has reliably reproduced the speckled printing failure consistent with that experienced on Election Day:



The same is reliably repeated with a minimum time interval of approximately fifty (50) seconds between printing ballots.

The cause for the Election Day speckling primarily on the reverse side of the ballot is due to the reverse side being printed first. The top left quadrant is where printing starts, and the fuser is the coldest. With ECO mode enabled- the temperature is insufficient to properly bond the toner to the paper.

After the reverse side of the ballot is printed, the printer ejects the paper then pulls it back into the machine, at which point the printer must turn (flip) the paper over to print the front side. This process entails routing the ballot over a series of rollers at very tight angles which exposes the freshly printed side to friction and “rubs” off the loosely bonded print.

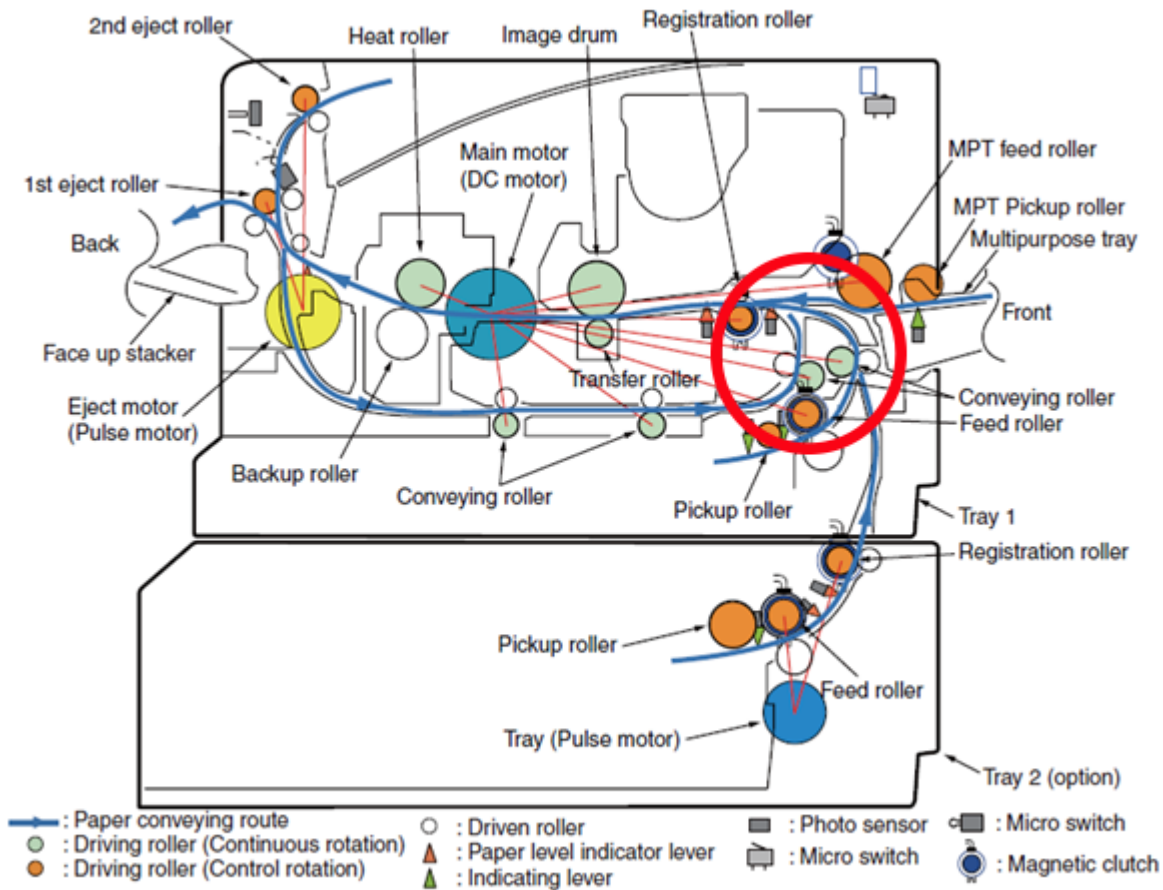


Figure 3-2

The front side is printed following this process and then the ballot is ejected from the printer. The front is not subjected to the same stresses and friction as the reverse, hence the speckled printing predominantly appearing on the reverse. Additionally, the fuser has reached the target temperature by the time printing ensues on the front of the ballot.

Maricopa County election officials have repeatedly claimed that the speckled/faded printer issue was fixed on election day and therefore no voters were disenfranchised. This is not the case. There are several independent data points which refute the county’s assertion, including the tabulator system log files which show timing mark

errors long after the polls closed, the call center Hotline logs, and a footnote in Justice McGregor's report, which states:

Settings were not changed at most sites that operated without issues. And, as we found during testing, settings were not successfully changed at all sites that reported problems.

The fact that "settings were not successfully changed at all sites that reported problems" suggests that either the changes were never initiated at some problem sites or that the changes were initiated but were not successfully accepted or realized. Regardless, the data shows that the problems were not fixed- not anywhere, and the speckled/faded printing persisted until after the polls closed.

Summary

The 100-pound paper Maricopa County chose to use for the 2022 General Election was too heavy and beyond the Oki B432dn manufacturer's specifications for duplex printing. This established a pre-condition which was exacerbated by the media-type erroneously set to PLAIN instead of CARDSTOCK, and further aggravated by the under-temp premature printing functions of ECO Mode.

In addition to extensive research, consultation with Oki-Data engineers and subject matter experts, this finding is based upon bench-testing performed using the same make/model Oki B432dn printer with the same Roland 100-pound Vote-Secure ballot paper as that used by Maricopa County. More specifically, we were able to reliably reproduce ballots with the speckled/faded deficiency as is consistent with those produced during the 2022 General Election. The defective ballots were recreated using the same PLAIN media-type and Eco-Mode enabled settings described herein. The same is evidenced as those used in the 2022 General Election with the pre-election BOD printer configuration records provided by Maricopa County in response to Arizona State Senate subpoena.

The combination of the three unforced errors proved fatal; however, the perfect storm was only made possible by the preceding failure of election officials to test the voting center tabulators using the Ballot on Demand printed ballots on October 11th as required by the Election Procedures Manual.

Resized Ballot Image Issue

The resized ballot image problem was the second Ballot on Demand failure experienced on Election Day. The condition resulted in a printed ballot image that had been resized to a point in which the ballot could not be authenticated. This resulted in ballots being rejected from the voting center tabulators.



Maricopa County officials claimed that paper-size settings were inadvertently changed to “print to fit” by technicians on Election Day who were attempting to address the speckled printing issue. Below is the relevant sworn testimony by Scott Jarrett, Maricopa County’s Elections Director, during the Kari Lake trial:¹²

A few of the other items that we've identified, though, as far as our ballot on-demand printers, we did identify three different locations that had a fit-to-paper setting that was adjusted on Election Day. So those were at our Journey Church in a north Glendale/Peoria area, that had about 200 or a little over 200 ballots had that setting on it out of about 1,500 ballots voted at that voting location. That would be the same with our Gateway Fellowship church, which is an east Mesa voting location. That had about 900 ballots out of just shy of 2,000 ballots voted at the voting location. And then we had LDS church, Lakeshore, in the heart of Tempe, that had about 60 ballots out of 1,500. So just shy of 1,300 ballots, and that was due to our temporary technicians, when they were trying to identify solutions on Election Day, adjusting a setting -- now this was not direction that we provided from the Maricopa County Elections Department - but adjusting that setting to a fit-to-paper setting, and that was -- that was one of the vote centers that was reviewed in the inspection by -- by the Plaintiffs in this trial on Monday.

Jarrett specifically identifies three sites that produced resized ballot images which could not be scanned by the tabulators:

1. Journey Church ~200
2. Gateway Fellowship Church ~900
3. Church of LDS at Lakeshore ~ 60

Mr. Jarrett also testifies that “...we did identify three different locations that had a fit-to-paper setting that was adjusted on Election Day”, and the issue “...was due to our temporary technicians, when they were trying to identify solutions on Election Day.”. Jarrett claims that the temporary technicians were seeking solutions for the speckled/faded printer problem, and while doing so accidentally caused another printing issue:

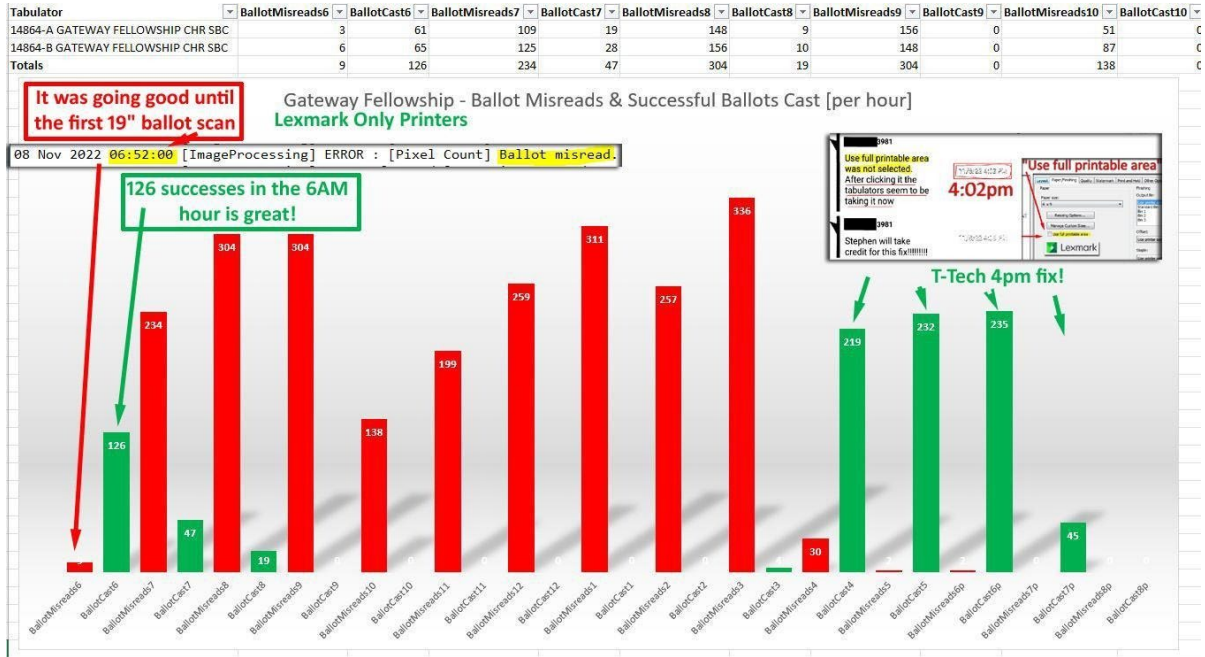
Q. *Is it your testimony that the printer set changes that gave rise to this so-called shrink-to-fit issue, was that done on Election Day?*

A. *That’s correct.*

The problem with Scott Jarrett’s explanation during testimony, under oath, as to what caused the resized ballot problem is that it is patently false. The speckled/faded printing issue was isolated to the Oki B432 printers- NOT the Lexmark printers; however, the second site Mr. Jarrett identified as having a resized ballot printing problem,

¹² A copy of the Lake v. Hobbs trial transcript is available upon request.

Gateway Fellowship Church, only had Lexmark printers.¹³ This is established by Maricopa County’s own records.¹⁴ The highlighted row shows Gateway Fellowship Church voting center:



ESTRELLA MTN SCHOOL/GOODYEAR	Yes	MARICOPA-215 and 216	Oki
Faith Baptist Church 10492	Review In Progress	MARICOPA-529, 530 and 531	Oki
FOOTPRINT CENTER	No	MARICOPA-336, 337 and 338	Oki
GATEWAY FELLOWSHIP CHR/SBC	Review In Progress	MARICOPA-729 and 760	Lexmark
GILBERT FREESTONE REC CENTER	Review In Progress	MARICOPA-478,479,744 and 745	Both
GLENDALE CHRISTIAN CHURCH	No	MARICOPA-719 and 720	Lexmark
GLENDALE COMMUNITY COLLEGE/STUDENT UNION	Yes	MARICOPA-661,762 and 763	Both

Because there are no speckled/faded printing problems associated with the Lexmark BOD printers, technicians would not have been dispatched to a voting center that didn’t have the printing problem Jarrett claims they were trying to solve. This is corroborated by email correspondence of election officials who were answering questions posed by a reporter from the Washington Post:

¹³ The report by Justice McGregor notes that no Lexmark printers were known to produce the speckled/faded print problem: “No Lexmark printers produced ballots that could not be read by the on-site tabulators on election day due to flaking or speckling.”

¹⁴ Extracted from “Exhibit 7” attached to Maricopa County’s November 27th letter to the office of the Attorney General.

From: Nate Young <nyoung@risc.maricopa.gov>
Sent: Thursday, November 10, 2022 6:13 PM
To: Megan Gilbertson (MCRO); Scott Jarrett (MCRO)
Subject: Re: Maricopa County polling sites with problems

You can comsify the red answers.

-Did the fuser/media weight problem that you mention affect both Lexmark 4150s and Oki B432s used on Tuesday? Or just one kind?

From our testing and post-election review, the Lexmark systems did not have the media weight issues. No Lexmark printer settings were changed to resolve this print issue.

Maricopa County's confirmation that "No Lexmark printer settings were changed..." is further confirmation that the cause of the Print to Fit issue could not have been caused by technicians attempting to troubleshoot printing problems as Scott Jarrett claimed. Lexmark printers did not produce the speckled/faded printing problem, Gateway Fellowship Church only had Lexmark printers and Maricopa County confirmed that No Lexmark printer settings were changed. Yet Gateway Fellowship Church produced Print to Fit ballots.

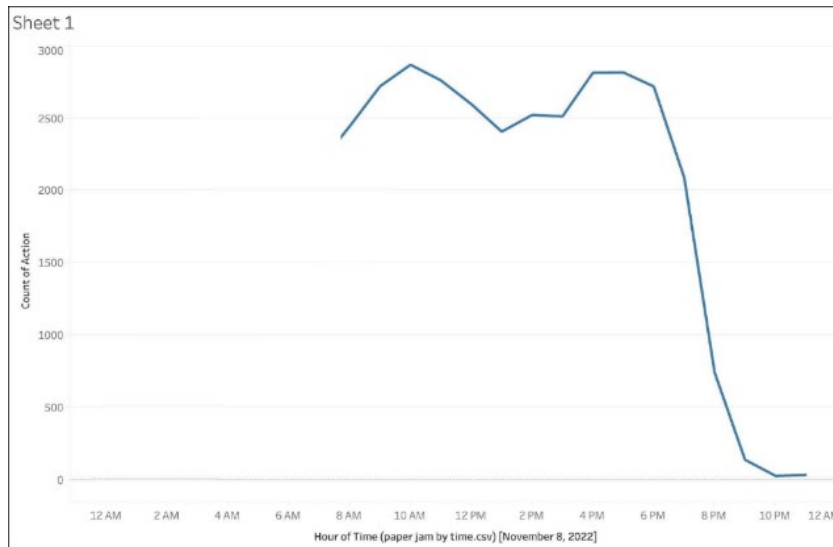
However, it does establish that both Lexmark and Oki printers were producing resized ballots. This is independently corroborated by Justice McGregor's report, albeit buried in a footnote:

"Unlike the problems involving the toner/fuser issue, the "print to fit" issue occasionally arose on election day with both Oki and Lexmark printers."

Mr. Jarrett and Maricopa County election officials had to have known that Lexmark printers were producing resized, defective ballots as they created the chart above showing which printers were at problem sites.

Plaintiff's voting systems expert, Clay Parikh testified during the trial that the rescaled ballot issue would cause the tabulator to yield false paper-jam errors, which is exactly what was found. False paper-jam errors are consistent with the rescaled ballot issue at low numbers but become increasingly exclusive with increase in frequency as natural occurrence is outperformed. The tabulator system logs reveal that the paper-jam errors began as soon as the polls opened and continued unabated until after the polls closed.

See the line graph below:



The errors charted above remove any possibility that the resized ballot problems could have been caused or initiated by technicians who had not yet been dispatched to address the speckled/faded print issue.

Second, Jarrett testified that the “fit to print” ballots were found at only 3 voting centers:

Q. So, and I believe your testimony was that you discovered this only in three vote center locations, correct?

A. That’s correct.

Mr. Jarrett’s assertion that resized ballots were produced at only three (3) sites is proven false by the following four (4) substantiated data points:

1. Plaintiff’s expert witness, Clay Parikh, testified that he identified resized ballots from all six (6) voting centers from where he inspected ballots, only one (1) of which was in common with the three (3) voting centers defined by Mr. Jarrett.
2. Justice McGregor’s report further corroborates that the rescaled ballot issue was identified at several voting centers on Election Day and produced by both Oki and Lexmark printers.
3. Maricopa County’s election hotline call log, video evidence and Goldenrod reports identify multiple instances of the resized ballot problem at dozens of voting centers.
4. The voting center tabulator system logs show errors specific only to the resized ballot issue (“No start marker found on either side of ballot”) at 110 of the 223 Election Day voting centers, totaling a minimum number in excess of over 8,000 rejected ballots.¹⁵

¹⁵ Other errors, such as false paper jams are also indicative of the resized ballot deficiency, and are in addition to those identified by the “No start marker” error.

The number of sites that produced the resized ballot images is important because, as Mr. Jarrett stated during his testimony, the resized ballots could not be read by the voting center nor central count tabulators:

- A.** ...but because of the fit-to-paper setting, that actually shrinks the size of that ballot. And then that ballot would not be tabulated onsite at the voting location and also cannot be tabulated onsite at central count.
- Q.** So if it couldn't be tabulated at the voting location and at central Count through the regular tabulators, what happened to those ballots?
- A.** So those ballots came back to the central count facility, and then we had hired duplication boards, a bipartisan team, Republicans and Democrats, to duplicate that ballot.

Justice McGregor's report affirms the same:

*Another printing anomaly occurred at several vote centers, where ballots were re-sized as "fit to page," a process that entirely changed the location of the timing marks on the ballots and assured that **neither the on-site tabulators nor the central count tabulators could read the ballots.***

The only way to tabulate the resized ballots was to copy the contest selections from each defective ballot to a new ballot of proper size through a process called duplication.¹⁶ The 2022 General Election duplication process is explored further in its own section.

The disingenuous explanations put forth by Maricopa County election officials and their concealment/failure to be forthcoming about the printer failures, raise red flags. What's also concerning is the following paragraph of Justice McGregor's report:

We could not determine whether this change resulted from a technician attempting to correct the printing issues, the most probable source of change, or a problem internal to the printers. During our testing, four printers randomly printed one or a few "fit to page" ballots in the middle of printing a batch of ballots. None of the technical people with whom we spoke could explain how or why that error occurred.

The four printers which produced the "fit to page" ballots during McGregor's testing were not from the three sites Jarrett claimed were the only ones to produce the resized ballots. This fact establishes that the resized ballots were produced at additional vote centers and could not be counted without being duplicated. This is explored further in the section titled "Duplication".

Using several data points, including Maricopa County's response to the Arizona Attorney General, sworn testimony of Scott Jarrett, sworn testimony of Election System's Expert, Clay Parikh, voting center tabulator system logs, and testing results

¹⁶ Duplication should not be conflated or confused with adjudication, a different process in which a panel tries to determine voter intent on an ambiguously marked contest or ballot.



as documented in the McGregor report, this investigation has established that the resized ballot anomaly was *not* caused by “...a technician attempting to correct the printing issues”.

Summary

Like that of Justice McGregor, our investigation has been unable to ascertain the specific cause of the resized ballot issue. Because it has now been established that both Oki and Lexmark BOD printers were afflicted, and not caused for the reasons provided by Maricopa County, the scope of investigation must be expanded to include the following four possible root causes or conduits:

1. Printer firmware
2. Printer drivers
3. Sentio BOD printer management system purchased from Runbeck Election Services
4. Maricopa County’s proprietary electronic poll books (SiteBook).

Although unresolved, the matter has inexplicably been dismissed by Maricopa County without referral for further investigation, expert inquiry, or any other means of review to determine the cause of the anomaly. Not an anomaly which remained elusive or that couldn’t be realized, but confirmed as it was reproduced by four (4) of the ten (10) participating Ballot on Demand printers during testing, albeit intermittently.

Machines are consistent, especially those managed by electronic processors. Failure of an electronic device is almost always isolated and due to component malfunction or end of life. Random or intermittent failures of multiple electronic devices across two (2) separate hardware platforms suggests malware, electronic manipulation, or in the instant context, potential malfeasance. This is bolstered by Justice McGregor’s statement, “*None of the technical people with whom we spoke could explain how or why that error occurred.*”. Likely because there are no known natural explanations or causes for printers to intermittently produce resized images, and the scope of potential causes is narrowed significantly when the anomaly occurs across two separate hardware platforms.

Conclusion

By all accounts, except those of Maricopa County election officials, both Ballot on Demand printer failures began as soon as the polls opened, and system logs definitively establish that the failures affected many more voting centers than Maricopa County or the McGregor report underestimate and admit. The records, system logs, hotline call logs, and poll workers conclusively establish that the printing problems were never mitigated, much less remedied. The speckled/faded printing issue was caused by a combination of unforced errors that were known to the county before Election Day. The Print to Fit, or resized ballot printing anomaly, intermittent and across two different brands of printers, strongly suggests malware, manipulation or malfeasance. Maricopa County’s dismissal of this condition without successful resolution is not an acceptable response especially considering the printers are part of, and tethered to, voting systems which have been deemed critical infrastructure.
