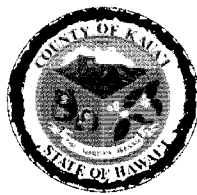


SIGNATURE VERIFICATION PROCEDURE



Elections Division
Office of the County Clerk
County of Kaua'i

(March 1, 2022, v1.1)

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1 Overview.

1.1 Introduction.

This procedure was developed from material presented during handwriting analysis training conducted by Mr. Reed Hayes, Certified Document Examiner and specifically from chapter 10 of his book, titled, "Forensic Handwriting Examination A Definitive Guide" (©2006 ReedWrite Press).

Mr. Hayes is a court certified handwriting and document examiner from Honolulu, Hawai'i, who has studied handwriting for over three decades. He is a graduate of the Andrew Bradley Training Course in Forensic Document Examination (beginning and advanced) and holds certifications from the National Association of Document Examiners and the American Institute of Applied Science.

1.2 Definitions.

Ballot Return Envelope means the envelope containing a voter's voted ballot.

Deficient Ballot Deadline means the deadline for curing deficient ballots pursuant to HRS § 11-16.

Envelope Signature means the voter's signature contained on the ballot return envelope.

Reference Signature means a voter's authenticated signature on file in the Elections Division.

1.3 Assumptions.

A. Signatures vary depending on the writing instrument, writing surface, writing environment, whether it was made while sitting or standing, the signer's physical and mental state, and numerous other factors.

B. Signature evaluation will focus on identifying similarities between the Envelope Signature and Reference Signature as opposed to focusing on identifying discrepancies.

i. Focusing on identifying signature similarities errs on the side of the voter and minimizes the impact of signature imperfections due to factors summarized in Item 1.3 (A).

ii. Conversely, focusing on identifying signature discrepancies penalizes voters by emphasizing signature imperfections due to factors summarized in Item 1.3 (A).

C. Printed Signatures.

- i. Printed signatures are becoming more common and shall be accepted if a Reference Signature is also printed.
- ii. Follow-up shall be conducted for voters who submit a printed Envelope Signature but who do NOT have a printed Reference Signature.

D. Common methods of forgery are summarized in Appendix 6.1.

2 Signature Verification.

2.1 Envelope Scanner / Sorter.

- A. The majority of Ballot Return Envelopes will be processed through a Runbeck Election Services AgilisDuo envelope scanner/sorter. The AgilisDuo:
 - i. Captures an image of the back (signature or affirmation) side of each Ballot Return Envelope;
 - ii. Crops and indexes voter signatures in the affirmation section of the back of the Ballot Return Envelope;
 - iii. Contains signature evaluation software which allows for a manual side-by-side comparison of a voter's Envelope Signature and Reference Signature; and
 - iii. Produces various files required to update the voter registration database.
- B. Not all Ballot Return Envelopes will be processed through the AgilisDuo. Small batches of Ballot Return Envelopes may be processed directly into the TotalVote using a hand-held barcode scanner to access the voter's Reference Signature and mark the voter as voted.

2.2 Process.

- A. Signature (evaluation) verification is a manual visual comparison of an Envelope Signature against the corresponding voter's Reference Signature.
- B. Election Division personnel shall be responsible for verifying ballot envelope signatures using AgilisDuo software, and shall render one of the following decisions:
 - i. MATCH (Signature Match);
 - ii. NMAT (Signature No Match);
 - iii. NSIG (Signature Missing);

- iv. NWIT (Witness Missing); and
- v. REF? (Reference Image Missing).

(The "TV Reject" option will appear on-screen but shall be reserved solely for file transfer protocols.)

- C. Envelopes containing signatures which match will be processed and the ballot will be counted.
- D. For envelopes containing non-matching signatures or other deficiencies:
 - i. The corresponding voters will be contacted to address the deficiency, if applicable.
 - ii. If the deficiency is cured before the Deficient Ballot Deadline the voter's ballot will be counted.
 - iii. If the deficiency is not cured before the Deficient Ballot Deadline the voter's ballot will not be counted.
- E. A signature verification workflow is depicted in Appendix 6.2.

3 Determining Authenticity.

3.1. Signature Evaluation Criteria.

- A. To be accepted an Envelope Signature must demonstrate reasonable similarity when evaluated against the corresponding voter's Reference Signature so that a reasonable person would determine that the Envelope Signature was made by the named individual.
- B. To be rejected an Envelope Signature must demonstrate significant differences when evaluated against the corresponding voter's Reference Signature so that a reasonable person would determine that the Envelope Signature was not made by the named individual.

3.2 Broad Characteristic Review.

- A. Evaluate the overall look of the Envelope Signature in comparison to the Reference Signature:
 - i. Type of writing (cursive v. print);
 - ii. Spelling;
 - iii. Alignment (placement w/ respect to printed line);
 - iv. Slant (slope);

- v. Capital letters;
 - vi. Overall size and proportions; and
 - vii. Writing speed.
- B. If the Broad Characteristics of the Envelope Signature are consistent with the Broad Characteristics of the Reference Signature, accept the signature and count the ballot.
- C. If the Broad Characteristics of the Envelope Signature are not consistent with the Reference Signature, review Local Characteristics.
- D. A sample review of Broad Characteristics is depicted in Appendix 6.3.

3.3 Local Characteristic Review.

- A. Evaluate the specific characteristics of the Envelope Signature in comparison to the Reference Signature:
- i. Internal spacing;
 - ii. Size/proportions of letters & letter combinations;
 - iii. Connecting strokes;
 - iv. Curves, loops & angles;
 - v. Presence or absence of pen lifts;
 - vi. Beginning & ending strokes; and
 - vii. Line quality.
- B. If the Local Characteristics of the Envelope Signature are consistent with the Local Characteristics of the Reference Signature, accept the signature and count the ballot.
- C. If the Local Characteristics of the Envelope Signature are not consistent with the Reference Signature, do not accept the signature.
- i. If it is prior to 7:00 p.m. on Election Day, follow-up with the corresponding voter immediately pursuant to Section 4 of this procedure.
 - ii. If it is after 7:00 p.m. on Election Day, document the rejected signature pursuant to section 5 of this procedure.
- D. A sample review of Local Characteristics is depicted in Appendix 6.4.

4 Voter Follow-up.

- 4.1 A Signature Evaluation Form (Form) shall be completed for the deficient envelope.
- A. The Form shall detail the reason(s) which prevents the voter's signature from being accepted.
 - B. A copy of the AppID reports from the AgilisDuo and TotalVote shall be attached to the Form, if available.
 - C. The Form and related documents shall be attached to the voter's deficient envelope and filed in alphabetical order.
 - D. A sample Form is depicted in Appendix 6.5.
 - E. Sample AppID reports are depicted in Appendices 6.6 and 6.7.
- 4.2 Voter Contact.
- A. Voters shall be contacted immediately if an issue prevents their ballot from being counted.
 - B. Initial voter follow-up shall be by phone and a written record shall be kept of the date(s) and time(s) phone contact was attempted.
 - C. If the voter fails to respond to phone calls and/or voice messages within 2 days:
 - i. A letter shall be sent to the voter to notify him/her of the issue which prevents the ballot from being counted and options for resolving the issue;
 - ii. A copy of the letter shall be attached to the Signature Evaluation Form and the voter's ballot envelope, and filed in alphabetical order;
 - iii. Ballot Return Envelopes from voters requiring follow-up shall not be commingled with envelopes that are ready to be opened; and
 - iv. The follow-up letter shall be the final effort made to contact the voter.
- 4.3 Envelope and Ballot Disposition.
- A. If a voter cures the deficiency by the Deficient Ballot Deadline the voter's ballot return envelope shall be forwarded to ballot preparation personnel and the ballot will be counted.

- B. If a voter fails to cure the issue(s) by the Deficient Ballot Deadline pursuant to HRS § 11-106, the voter's ballot will not be counted.

5 Invalid Ballot Documentation.

5.1 Invalid File.

- A. If a voter fails to resolve a deficient envelope by the deadline pursuant to HRS § 11-106, the voter's ballot will not be counted.
- B. Make copies of the front and back of the deficient envelope, and the Signature Evaluation Form and related documents and file alphabetically in the office.
- C. The Invalid File shall be maintained for 22 months pursuant to § 50 USC 20701.

5.2 Invalid Can.

- A. Attach the original Signature Evaluation Form and related documents to the deficient envelope and deposit them in the Invalid Can.
- B. The Invalid Can will be shipped back to the Office of Elections shall be maintained for 22 months pursuant to § 50 USC 20701.

6 Appendix.

6.1 Common Methods of Forgery.

A. Freehand simulation.

- i. The forger attempts to copy a genuine signature by looking at it while trying to reproduce it.
- ii. This process entails looking back and forth between the genuine signature and the forgery, which tends to result in hesitation, inaccurate lines, and/or distortions.
- iii. Rehearsed simulations are apt to be somewhat smoother but will still show signs of uncertainty or movements that are not consistent with the genuine signature.
- iv. It is difficult to simultaneously adopt writing movements required to accurately forge a genuine signature, while suppressing one's own writing habits.
- v. Signs of simulated signatures.
 - 1) Slowly executed letters and shapes.
 - 2) Poor line quality.
 - 3) Uncertain, interrupted lines.
 - 4) Wavering strokes (gross or muscular tremors).
 - 5) Blunt starts and stops.
 - 6) Pen rests.
 - 7) Touched up letters.
 - 8) Marked variation of slant.
 - 9) Disproportionate letter sizes and loops.

B. Tracing.

- i. Tracing is a drawn reproduction taken directly from a genuine signature.
- ii. Tracing methods.
 - 1) Light transmission.

6 Appendix.

- Light transmitted below a document containing a genuine signature with a false document immediately above.
- The light will cast an outline of the genuine signature onto the false document.
- The forger traces the outline of the genuine signature onto the false document.
- Requires considerable concentration so the forged signature often lacks fluidity and good line quality.

2) Heavy tracing.

- A genuine signature is traced heavily over a false document to create an impression on a false document beneath it.
- Once the impression is created on the false document, the forger carefully writes over the impression lines.
- More difficult than light transmission forgery.

3) Carbon paper.

- Carbon paper is placed beneath a genuine signature and above a false document.
- Genuine signature is traced, which transfers an image of the signature to the false document beneath it.
- The carbon image of the genuine signature on the false document is then traced by the forger.
- Once the carbon image is traced, there may be attempts to erase it so there may be smear marks or the paper's fiber may be damaged/disrupted.

4) Pin pricks.

- Pin pricks are made to outline a genuine signature on a false document beneath it.
- The forger follows the pin pricks on the false document to forge the genuine signature.

6 Appendix.

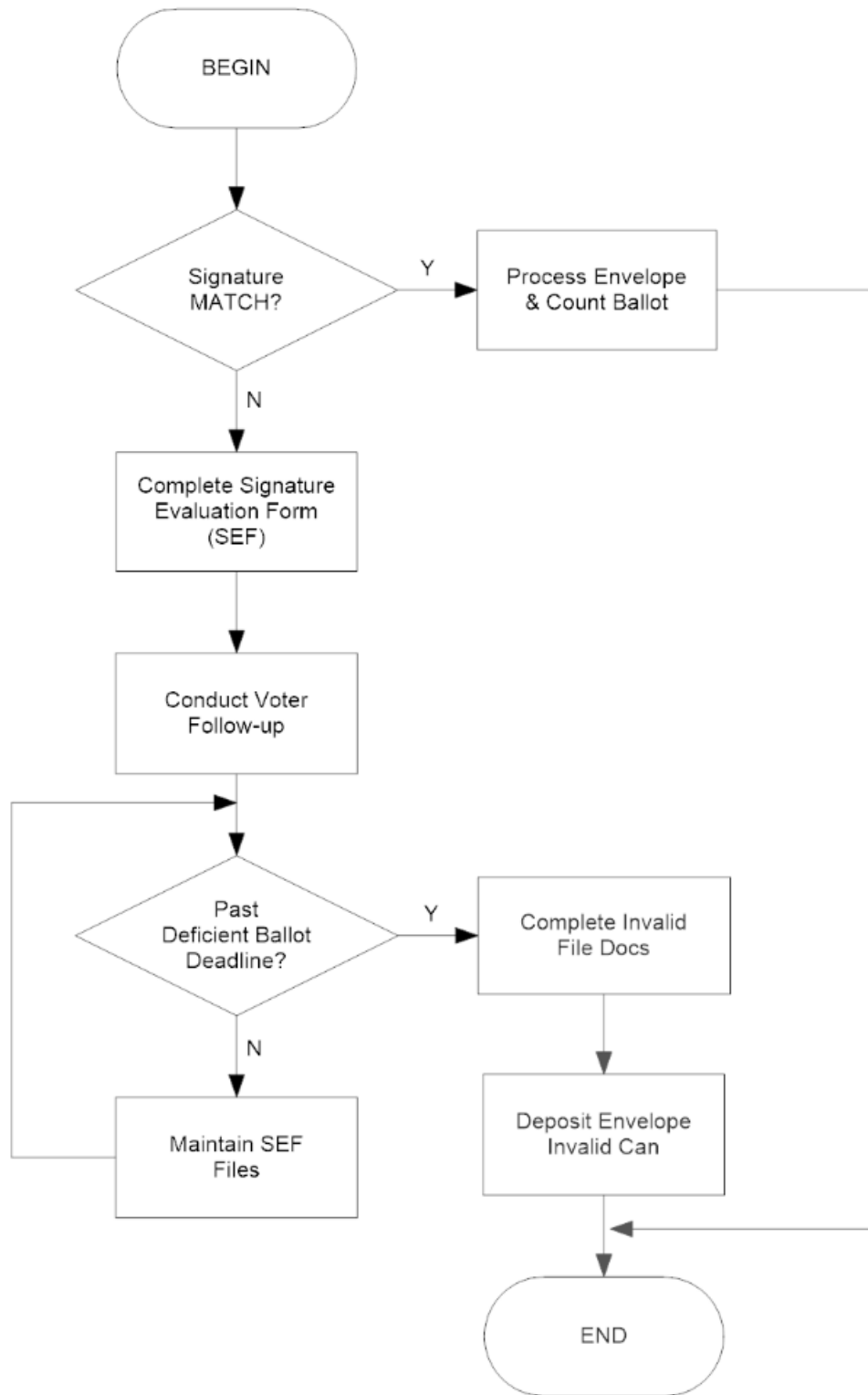
- Uncommon method, which is unlikely to produce an accurate reproduction and will leave obvious pin holes in the false document.

iii. Signs of tracing.

- 1) Deliberate appearance because the writing hand is not moving freely across the paper.
 - 2) Evidence of gross tremor, which results in inferior line quality.
 - 3) Writing pressure is generally constant and heavy (non-variable) and shading of strokes is absent.
 - 4) Blunt initial and terminal strokes.
 - 5) Slight deviation in line direction possibly accompanied by pen lifts.
 - 6) Abrupt starts and stops of the pen.
 - 7) Ink blotches indicating pen rests.
- 8) Corrections or retouching of strokes, sometimes subtle, sometimes written in the wrong direction.

6 Appendix.

6.2 Signature Verification Workflow.



6 Appendix.

6.3 Sample Broad Characteristics Review.

SEPARATE DOCUMENT.

6 Appendix.

6.4 Sample Local Characteristics Review.

SEPARATE DOCUMENT.

6 Appendix.

6.5 Signature Evaluation Form.

Elections Division Office of the County Clerk	County of Kaua'i	
SIGNATURE EVALUATION FORM		
Voter Name	Voter ID	Date
Election Year: _____ <input type="checkbox"/> Primary <input type="checkbox"/> General <input type="checkbox"/> Other (specify): _____		Staff Initials
RECORD OF CONTACT		
Date	Description	
INVALID CONDITION		
<input type="checkbox"/> Signature MISSING <input type="checkbox"/> Signature NO MATCH (provide details below) <input type="checkbox"/> Signature WRONG AREA <input type="checkbox"/> Mark with NO WITNESS <input type="checkbox"/> Witness with NO MARK		
Complete the section below to document Signature NO MATCH conditions. Check all applicable conditions and describe Envelope Signature features which prompted the Signature NO MATCH determination.		
<u>Broad Characteristics</u>		
<input type="checkbox"/> Type of writing (print vs. cursive): _____		
<input type="checkbox"/> Spelling: _____		
<input type="checkbox"/> Alignment (position with respect to printed line): _____		
<input type="checkbox"/> Slant (slope): _____		
<input type="checkbox"/> Capital letters: _____		
<input type="checkbox"/> Overall size & proportions: _____		
<input type="checkbox"/> Writing speed: _____		
<u>Local Characteristics</u>		
<input type="checkbox"/> Internal Spacing: _____		
<input type="checkbox"/> Size/proportion of letter/number combinations: _____		
<input type="checkbox"/> Connecting strokes: _____		
<input type="checkbox"/> Curves, loops & angles: _____		
<input type="checkbox"/> Presence or absence of pen lifts: _____		
<input type="checkbox"/> Beginning & ending strokes: _____		
<input type="checkbox"/> Line quality: _____		
<u>Notes</u>		
IMPORTANT! AppID reports from the AgilisDuo and TotalVote or copies of paper election documents must be attached to this form.		
v1.0 (11-July-20)		

6 Appendix.

6.6 Sample AgilisDuo AppID Report

AppID 1-497661

App ID	[REDACTED]	Expiring Scan Date	06/26/2020 02:28 PM
Water ID	[REDACTED]	First Name	[REDACTED]
Tray Number	2	Last Name	[REDACTED]
Tray Sequence	7	Phone	1501
Mail Source			

Pulled

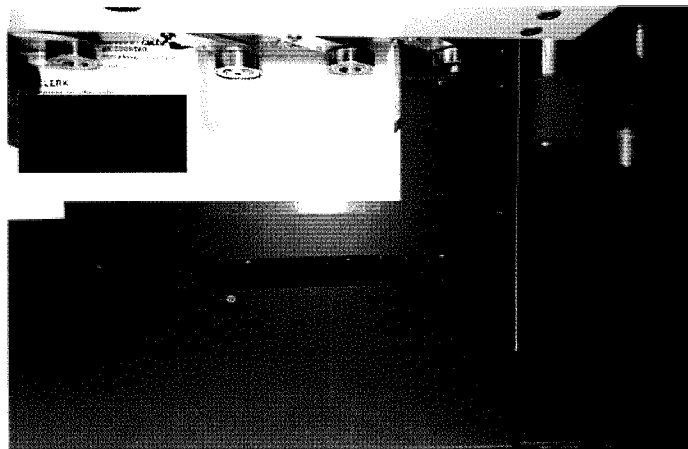
Pulled Date		Pulled Operator	0
-------------	--	-----------------	---

SigVer

SigVer Checkin Time	06/26/2020 02:30 PM	SigVer Operator	[REDACTED]
SigVer Checkin Time	06/26/2020 02:30 PM	Disposition	[REDACTED] <input type="button" value="Edit"/>
		Reset	<input type="button" value="Reset to Never Been Scanned"/>

Sorter Signature [REDACTED] Reference Signature [REDACTED]

Sorter Image



6 Appendix.

6.7 Sample TotalVote AppID Report

The screenshot displays the 'Office of Elections Hawaii' website interface. At the top, there is a navigation menu with links for Home, Voter, Reports, Elections, and County Offices. A 'TOTAL VOTE' logo is visible in the header. The main content area is titled 'AB Signature Comparison and Ballot Return'. Below the title, there is a table with the following columns: Voter ID, Elec Year, Elec Type, County, Voter Name, App Received, Bal Sent, Bal Received, and AB Record. The table contains one row of data with the following values: [Redacted], 2018, General, Kauai, [Redacted], 11/06/2018, 11/06/2018, and [Redacted]. To the left of the table is a large black redaction box. To the right of the table, the text 'Absentee Ballot Marked RECEIVED 11/06/2018' is displayed, with a 'Close' button below it.

Voter ID	Elec Year	Elec Type	County	Voter Name	App Received	Bal Sent	Bal Received	AB Record
[Redacted]	2018	General	Kauai	[Redacted]	11/06/2018	11/06/2018	[Redacted]	[Redacted]

Absentee Ballot Marked RECEIVED 11/06/2018

Close

Document History

Date	Version	Comments
06/15/2020	1.0	Origination v1.0
03/01/2022	1.1	Correct typos & other non-substantive edits

Determining Authenticity

Step 1: Review of Broad Characteristics

- Type of writing (cursive v. print)
- Spelling
- Alignment (placement w/ respect to printed line)
- Slant (slope)
- Capital letters
- Overall size & proportions
- Writing speed

Determining Authenticity

Broad Characteristics—Spelling


Genuine

Michael

Suspect

iMichael

Genuine ~~Jonnie~~ Cecelia Monts 

Suspect ~~Jonnie~~ Cecelia Monts 
JONNIE CECELIA MONTS

Appendix 6.3 - Sample Broad Characteristics Review.

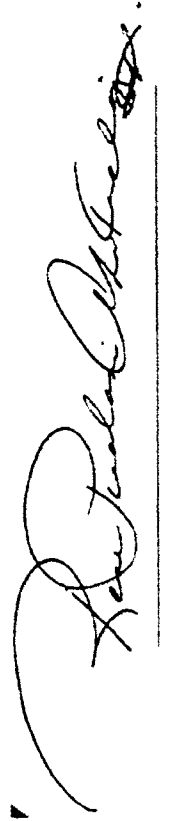
~~Jonnie~~ Cecelia Monts


Determining Authenticity

Broad Characteristics—Alignment

A. 
A. ISABEL LUJAN CRUZ.

B. 
B. Felicia D. Dennis

C. 
C. Felicia D. Dennis

D. 
D. Felicia D. Dennis

Determining Authenticity

Broad Characteristics—Alignment

Secretary

Secretary

Determining Authenticity

Broad Characteristics—Slant (Slope)

Barbara Bush

Jim Baffer

Tom Alford

Lee Humphrey

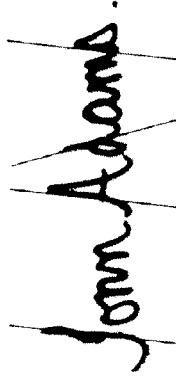
Determining Authenticity

Broad Characteristics—Slant (Slope)

Genuine

A cursive signature of "John Adams" written in black ink. The letters are slanted to the right, and the "A" has a distinct loop.

Suspect

A cursive signature of "John Adams" written in black ink. The letters are slanted to the left, and the "A" has a distinct loop.

Determining Authenticity

Broad Characteristics—Size (absolute)

Truman Capote

Truman Capote

Barbara Bush

Barbara Bush

Frances Farmer

Frances Farmer

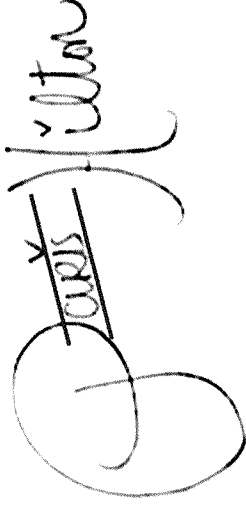
Anthony Bordain

Anthony Bordain

Determining Authenticity

Broad Characteristics—Size (midzone)

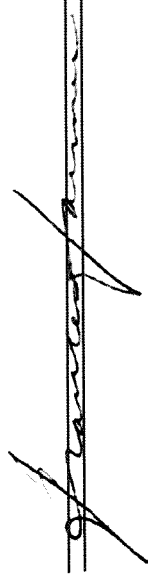
Paris Hilton

A handwritten signature in cursive script that reads "Paris Hilton". The word "Paris" is written in a smaller, more compact style, while "Hilton" is larger and more expansive, with a large, looping 'H' and 'l'.

Barbara Bush

A handwritten signature in cursive script that reads "Barbara Bush". The word "Barbara" is written in a smaller, more compact style, while "Bush" is larger and more expansive, with a large, looping 'B' and 'h'.

Frances Farmer

A handwritten signature in cursive script that reads "Frances Farmer". The word "Frances" is written in a smaller, more compact style, while "Farmer" is larger and more expansive, with a large, looping 'F' and 'r'.

Determining Authenticity

Broad Characteristics—Proportions

Jessie Rogers

Jim Baker

Clara Thelen

Chavis

Gene Alford

L. J. Green Wood

My life. My ce

Francis James

Determining Authenticity

Broad Characteristics—Speed

Fast Writing

Spontaneous, free-flowing

Natural look

Smooth line quality

Tapered initial & terminal strokes

“Flying” i-dots

Slow Writing

Hesitant

Awkward, poor rhythm

Jerky, shaky

Blunt initial & terminal strokes

Static or heavy i-dots

Determining Authenticity

Broad Characteristics—Speed

David David

Genuine

Suspect

Yolanda Yolanda

Genuine

Suspect

Determining Authenticity

If the broad characteristics of the signature are clearly consistent with the broad characteristics of the reference signatures, accept the signature as valid.

If the broad characteristics are not in agreement with reference signatures, a local characteristics review.

Determining Authenticity

Step 2: Review of Local Characteristics

- Internal spacing
- Size/proportions of letters & letter combinations
- Connecting strokes
- Curves, loops & angles
- Presence or absence of pen lifts
- Beginning & ending strokes
- Line quality

Determining Authenticity

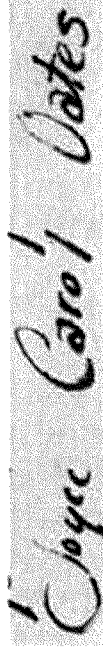
Local Characteristics—Spacing (word)

A handwritten signature in cursive script that reads "David Patraeus".

David Patraeus

A handwritten signature in cursive script that reads "Luciano Pavarotti" followed by the number "86".

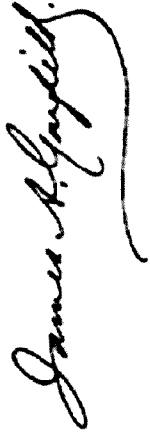
Luciano Pavarotti

A handwritten signature in cursive script that reads "Joyce Carol Oates".


Joyce Carol Oates

Determining Authenticity

Local Characteristics—Spacing (word)

A cursive signature of James A. Garfield. The letters are well-spaced and connected in a fluid, consistent manner. The 'A' in 'James' and the 'G' in 'Garfield' are clearly defined and integrated into the overall flow of the signature.

Genuine

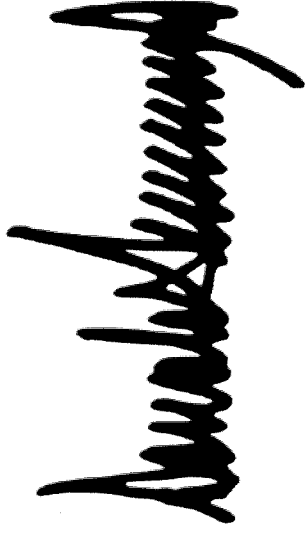
A cursive signature of James A. Garfield that appears suspicious. The spacing between the letters is irregular and inconsistent, with some letters being more widely spaced than others. The overall appearance is less fluid and more disjointed compared to the genuine signature.

Suspect

Determining Authenticity

Local Characteristics—Spacing (letter)

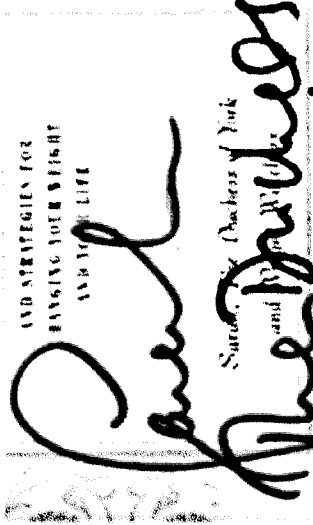
Donald Trump

A handwritten signature of Donald Trump in black ink, showing a stylized, cursive script with a prominent 'D' and 'T'.

Joe Biden

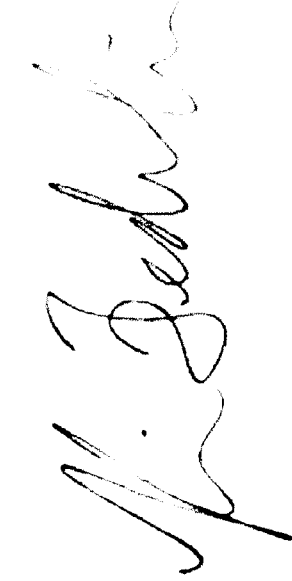
A handwritten signature of Joe Biden in black ink, featuring a large, looped 'J' and 'B'.

Benazir Bhutto

A handwritten signature of Benazir Bhutto in black ink, with a cursive style and a large 'B'.A handwritten signature of Sarah Ferguson in black ink, with a cursive style and a large 'S'.

Sarah Ferguson

Kevin Federline

A handwritten signature of Kevin Federline in black ink, with a cursive style and a large 'K'.

Determining Authenticity

Local Characteristics—Spacing (letter)

John Adams.

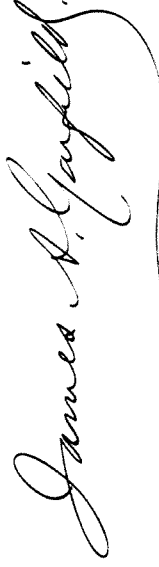
Genuine

John Adams

Suspect

Determining Authenticity

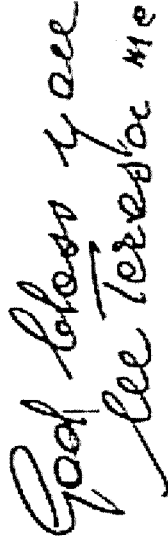
Local Characteristics—Connecting Strokes (Garlands)

A handwritten signature in cursive script that reads "James A. Garfield". The signature is written in black ink and features a prominent, sweeping flourish at the end of the name.

James Garfield

A handwritten signature in cursive script that reads "Nelson Mandela". The signature is written in black ink and has a distinctive, slightly jagged appearance.

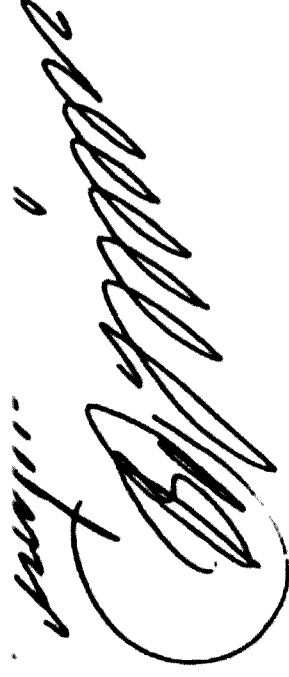
Nelson Mandela

A handwritten signature in cursive script that reads "Mother Teresa". The signature is written in black ink and is highly stylized, with the words "Good Bless You" and "See Teresa Me" written above the main signature.

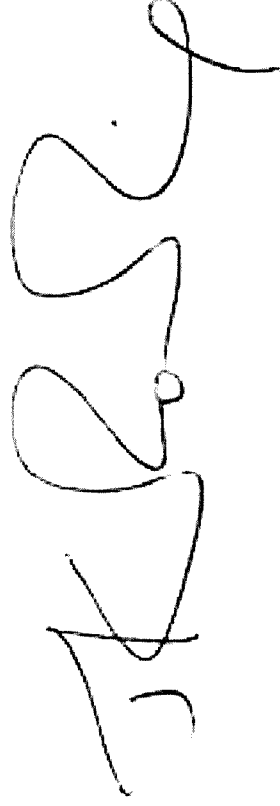
Mother Teresa

Determining Authenticity

Local Characteristics—Connecting Strokes (Arcades)

A handwritten signature in black ink, featuring a large, stylized initial 'V' and 'P' that are connected to each other and to the rest of the signature. The signature is written in a cursive style.

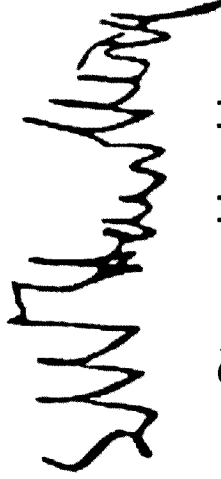
Vladimir Putin

A handwritten signature in black ink, consisting of the letters 'JKR' followed by a long, flowing tail that loops back to the end of the signature. The signature is written in a cursive style.

J. K. Rowling

Determining Authenticity

Local Characteristics—Connecting Strokes (Angles)

A handwritten signature in black ink, appearing to read "S. Hawking". The letters are connected, with a prominent loop at the end of the last name.

Steven Hawking

A handwritten signature in black ink, appearing to read "R. Polanski". The letters are connected, with a large loop at the end of the last name.

Roman Polanski

A handwritten signature in black ink, appearing to read "A. Hitler". The letters are connected, with a large loop at the end of the last name.

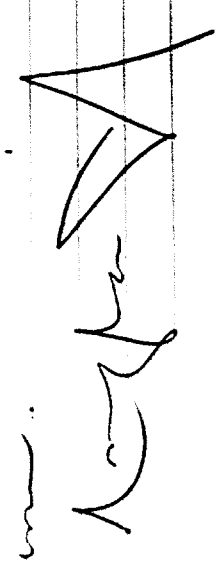
Adolf Hitler

Determining Authenticity

Local Characteristics—Connecting Strokes (Threads)

A handwritten signature in cursive script that reads "S. Irwin". The letters are connected, and the signature is written on a set of horizontal lines.

Steve Irwin

A handwritten signature in cursive script that reads "Angelina Jolie". The signature is written on a set of horizontal lines.

Angelina Jolie

A handwritten signature in cursive script that reads "Yoko Ono". The signature is written on a set of horizontal lines.

Yoko Ono

Determining Authenticity

Local Characteristics—Curves v. Angles

A handwritten signature in black ink, appearing to read "Barack Obama". The signature is fluid and cursive, with a large, sweeping 'B' at the beginning and a long, horizontal tail stroke.

Barack Obama

A handwritten signature in black ink, appearing to read "Donald Trump". The signature is highly stylized and cursive, with a large, bold 'D' at the beginning and a long, horizontal tail stroke.

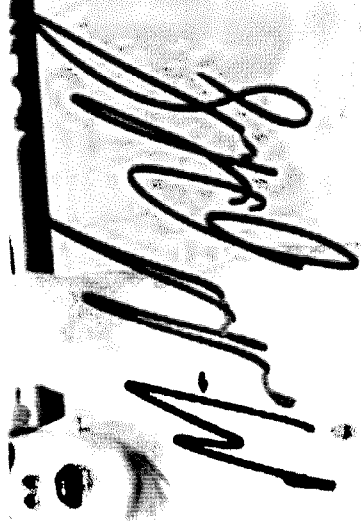
Donald Trump

Determining Authenticity

Local Characteristics—Curves v. Angles



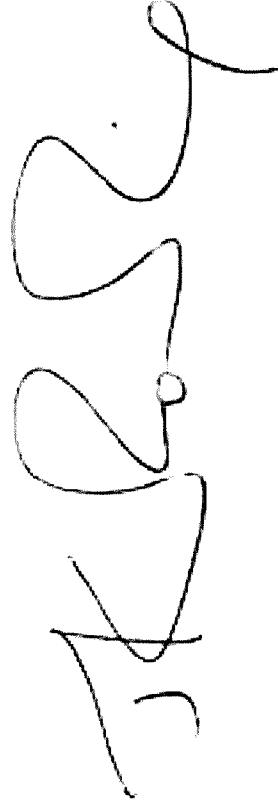
Ronnie Biggs



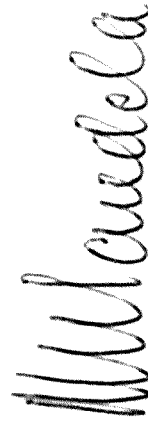
Michael Phelps

Determining Authenticity

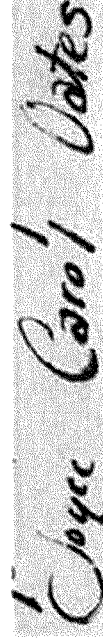
Local Characteristics—Pen Lifts

A handwritten signature in black ink, consisting of the letters 'JKR' followed by a long, sweeping flourish that loops back to the right.

J. K. Rowling

A handwritten signature in black ink, featuring a large, stylized 'M' followed by the name 'Mandela' in a cursive script.

Nelson Mandela

A handwritten signature in black ink, with the name 'Joyce Carol Oates' written in a cursive script. The signature is set against a light gray background.

Joyce Carol Oates

Determining Authenticity

Local Characteristics—Beginning Strokes

Handwritten signature of Barbara Bush in cursive script.

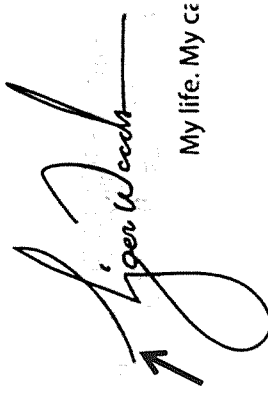
Barbara Bush

Handwritten signature of Babe Ruth in cursive script. A black arrow points to the downward stroke at the beginning of the word 'Babe'.

Babe Ruth

Handwritten signature of Bernie Siegal in cursive script. A black arrow points to the downward stroke at the beginning of the word 'Bernie'.

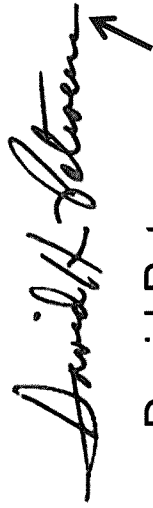
Bernie Siegal

Handwritten signature of Tiger Woods in cursive script. A black arrow points to the downward stroke at the beginning of the word 'Tiger'. To the right of the signature, the text 'My life. My c' is written.

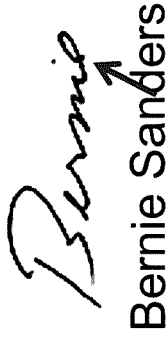
Tiger Woods

Determining Authenticity

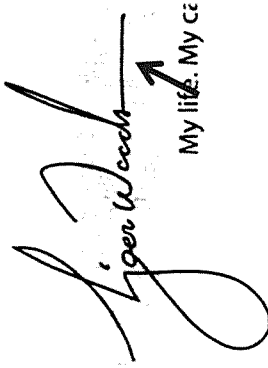
Local Characteristics—Ending Strokes



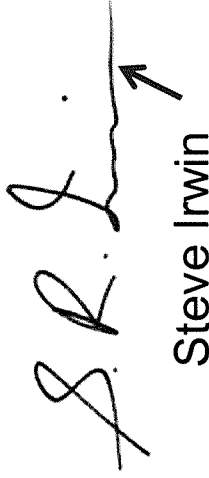
David Patraeus



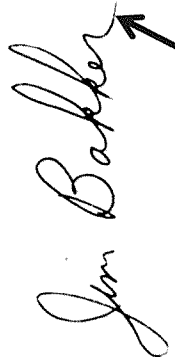
Bernie Sanders



Tiger Woods



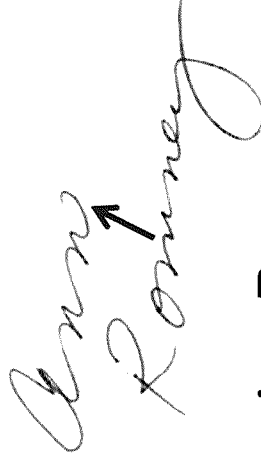
Steve Irwin



Jim Bakker



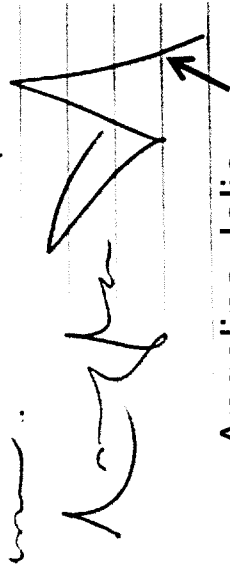
Nelson Mandela



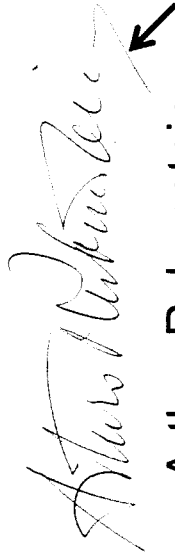
Ann Romney

Determining Authenticity

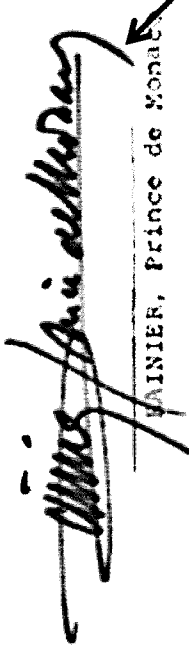
Local Characteristics—Ending Strokes



Angelina Jolie



Arthur Rubenstein



RAINIER, Prince de Monaco



Oliver Sacks



Brigham Young

Local Characteristics—Line Quality

- Physical attributes of a written line or stroke
- The degree of fluency & speed
- “The visual record of the path of motion traced by the pen or pencil on the writing surface.”

—Klara Roman, *Encyclopedia of the Written Word*

Local Characteristics—Line Quality

The writing line may be:

- Smooth, fluid and consistent
- Irregular, halting and inconsistent
- Heavy or light
- Firm or uncertain

Local Characteristics—Line Quality

The writing line:

- Might involve tremor
- May be influenced by the writing surface
- May show writing instrument anomalies such as a leaky or faulty pen
- Is subject to internal and external influences (health, age, medications, circumstances)

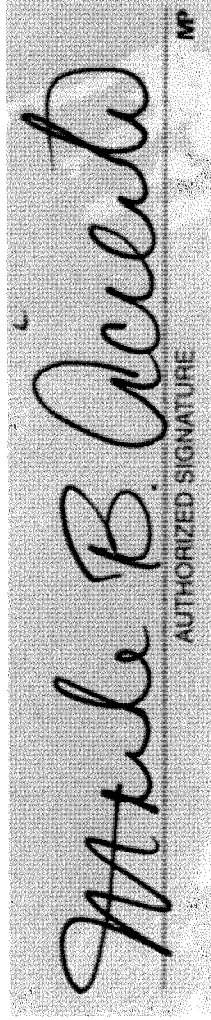
Local Characteristics—Line Quality

Good line quality:

- Smoothness of movement
- Evenness or consistency of pressure
- Smoothly written curves
- Free of tremor, jerkiness, sudden changes in pressure
- No broken or patched strokes

Local Characteristics—Line Quality

Good line quality:



Gertrude Harriet Tsugawa
GERTRUDE HARRIET TSUGAWA

Sincerely yours,

A cursive signature, likely "Gertrude Harriet Tsugawa", written in a fluid, handwritten style.

Local Characteristics—Line Quality

Poor line quality:

- Irregularity
- Jerkiness
- Tremor
- Haphazard or sudden changes in curvature
- Lack of smooth transition from one formation or letter to another

Local Characteristics—Line Quality

Poor line quality may be caused by:

- Underdeveloped writing skills
- Illness / health issues / fatigue
- Poor muscular control
- Tension
- Alcohol or drugs
- Forgery or disguise

Local Characteristics—Line Quality

Poor line quality:

E. thub y. d. f. g.

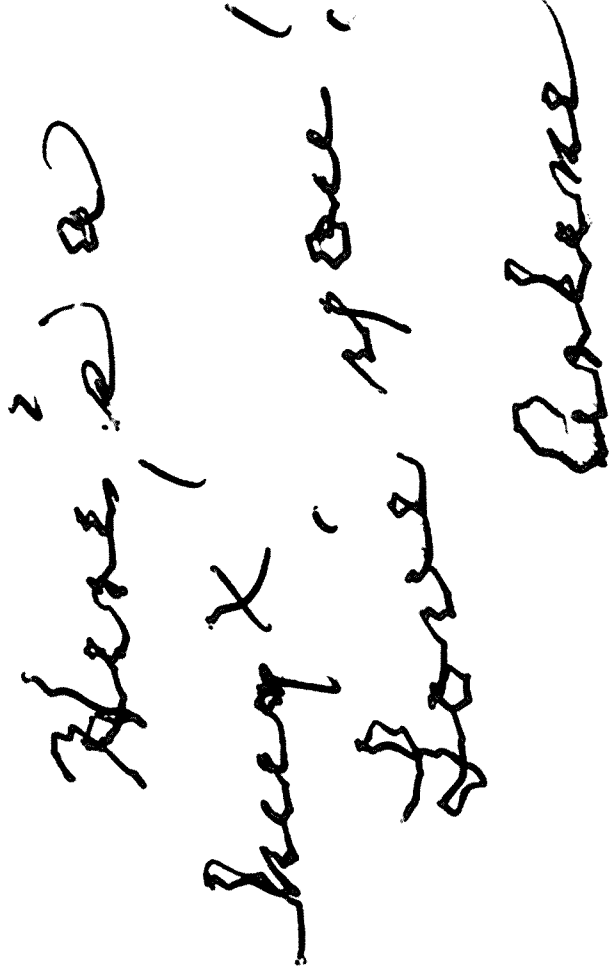
Tolson Poston Vagvik
[REDACTED] R

Local Characteristics—Line Quality

- Fine Tremor (Essential Tremor)
 - Usually related to one's health or physical condition
 - Shaky, zigzagged
- Gross Tremor (Muscular Tremor)
 - Excessive control of writing muscles as in unskilled, simulated or disguised writing
 - Longer wave length, gradually deviates

Local Characteristics—Line Quality

Fine tremor due to illness



There is
a
fine
tremor
in
the
lines

Local Characteristics—Line Quality

Gross tremor (poor skill level)

That is a useful tool.