

SUPPLEMENTAL VERIFICATIONS

AKA: THE ONES THAT GAVE US HEARTBURN!

SUPPLEMENTAL VERIFICATION

- This is a policy enacted by the Baltimore Police Department which adds an extra layer of Quality Assurance to complex prints, or to assist in conflict resolution.
- A print that is marked
 - Suitable
 - Identified by the initial examiner
 - Verification process initiated

SUPPLEMENTAL VERIFICATION

- Verification performed by a qualified examiner.
- Primary Examiner or Verifier can initiate this process
- A 3rd qualified examiner performs a blinded comparison, without knowledge of the results of the previous 2 examiners.
- 3rd Examiner is provided with the latent print and a known print, typically just one subject.

SUPPLEMENTAL VERIFICATION

Prints which may fall into this workflow:

- Impressions where fewer than 8 second-level features were documented.
- Impressions which experience distortion, low quality, background noise or other factors where one of the examiners involved feel this print could be considered "complex".
- Prints needing Conflict Resolution (Impressions where the primary and verifier had a profound difference in opinion: one said Identification, one said Exclusion)

SUPPLEMENTAL VERIFICATION

- The print and a blank copy of the known is provided to the Supervisor, who assigns it to another competent examiner.
- All examiners involved are required to document features used during comparison using GYRO-style markup at a minimum. (Required in all Identifications, not just Supplemental Verifications)
- All examiners generate a worksheet regarding their conclusions and the digital images generated are retained for the case file.

BIG PICTURE

The purpose of this presentation is to demonstrate examples of impressions which entered this workflow.

All of these impressions were subjected to Supplemental Verification, whether due to less than 8 second level features, or determined otherwise complex by one of the examiners involved.

DISCLAIMER

This presentation discusses impressions which may have caused disagreement between latent examiners.

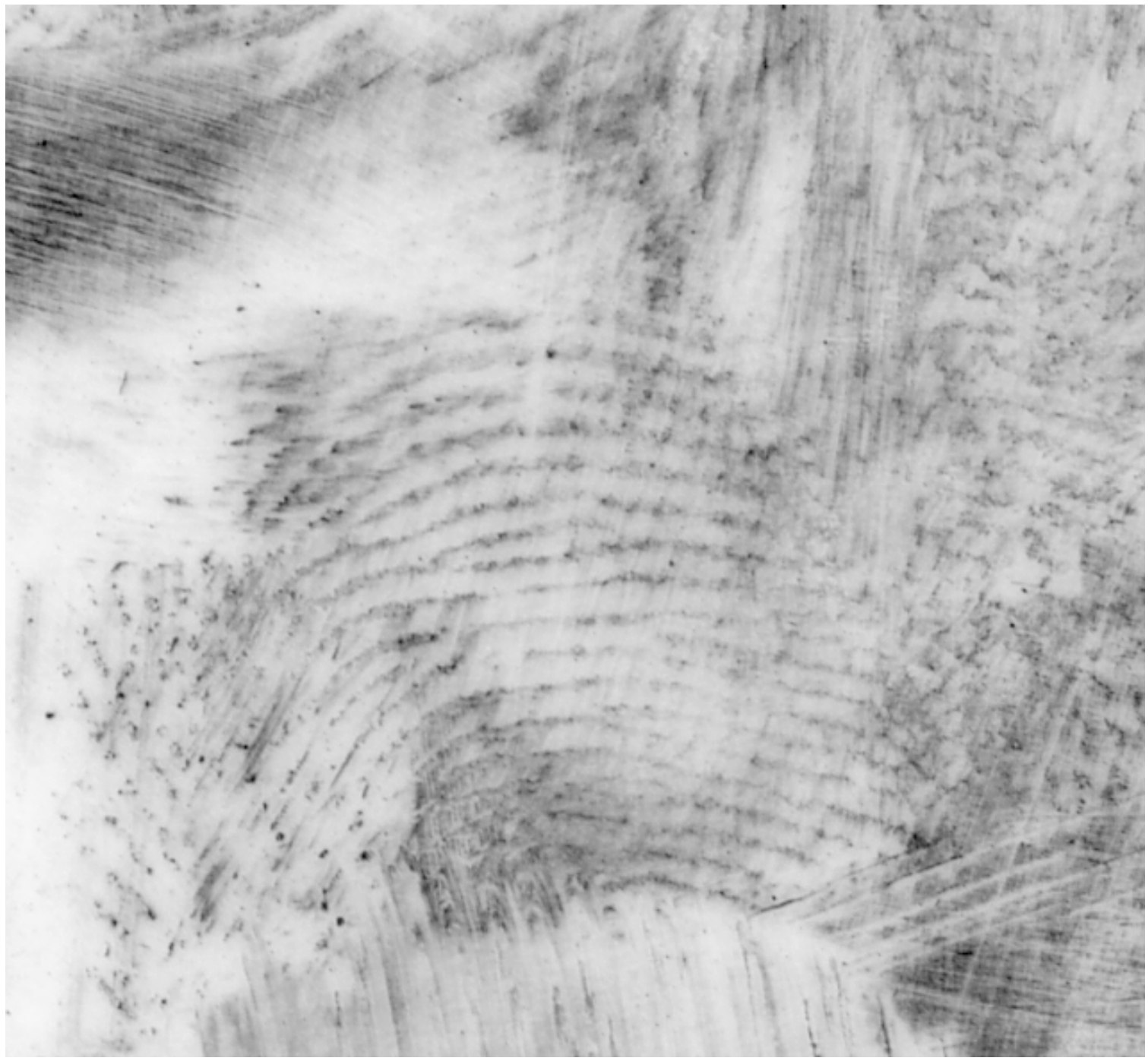
We don't know ground truth, all markups are interpretations by the individual.

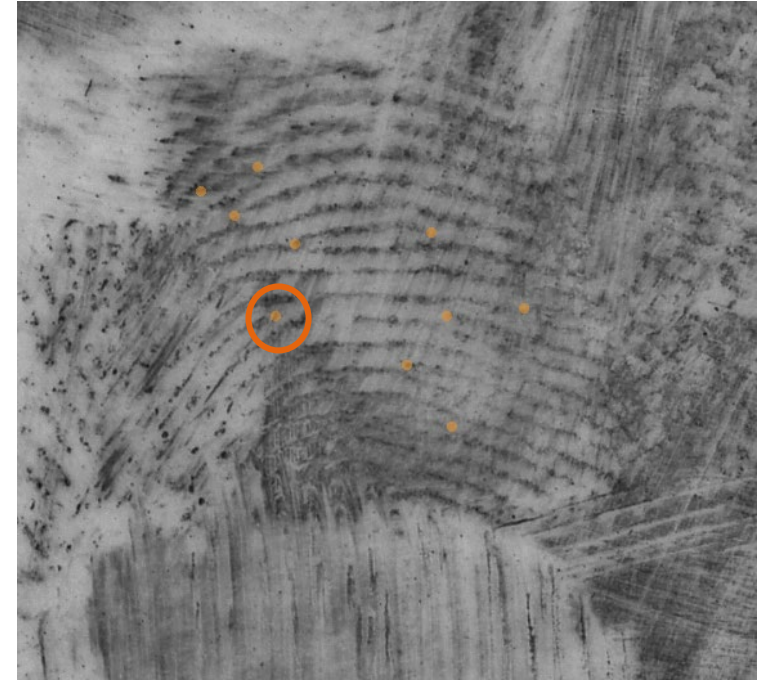
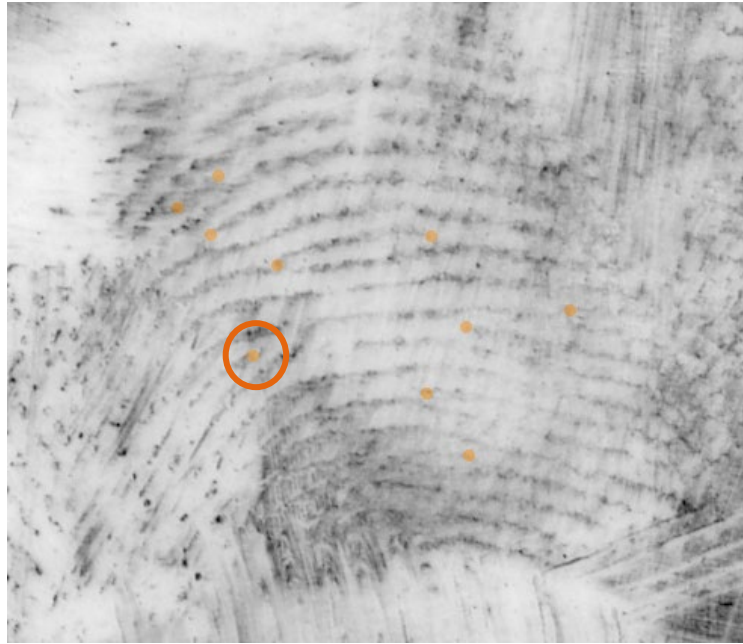
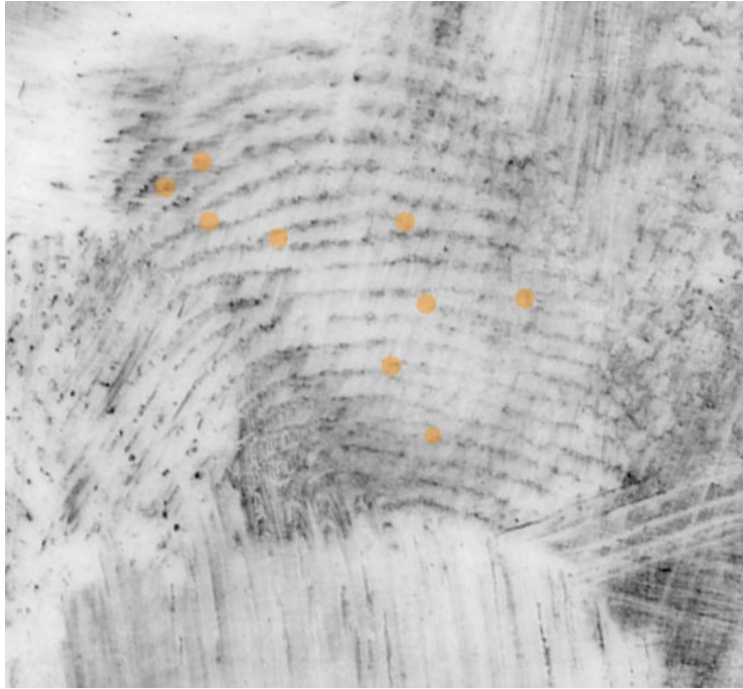
We will not be discussing individual examiner's conclusions by name or ultimate decision.

Features used by an examiner may not have been marked (1st and 3rd level, or additional 2nd level not necessary to support their conclusion)

All latents are fragmentary with very limited information, and some features added during comparison.

All dots have been changed to 50% opacity and orange for visibility and to remove AFIS/contextual bias

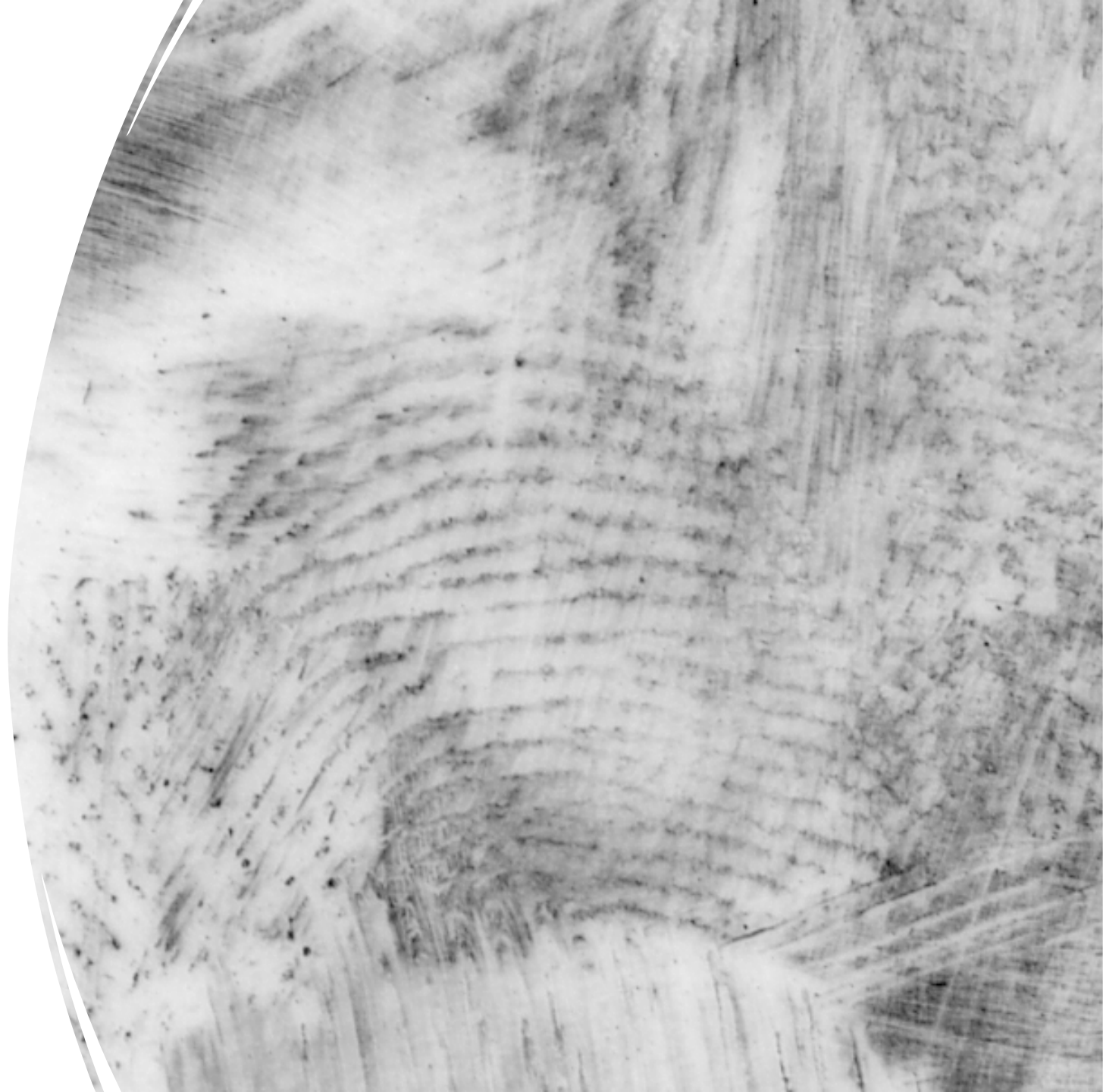




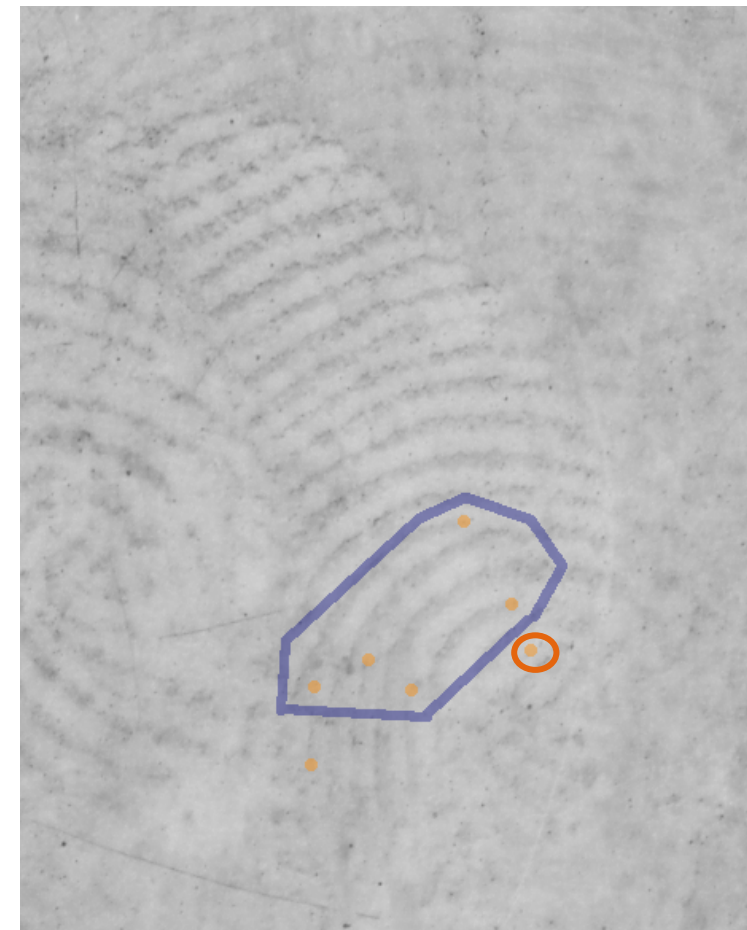
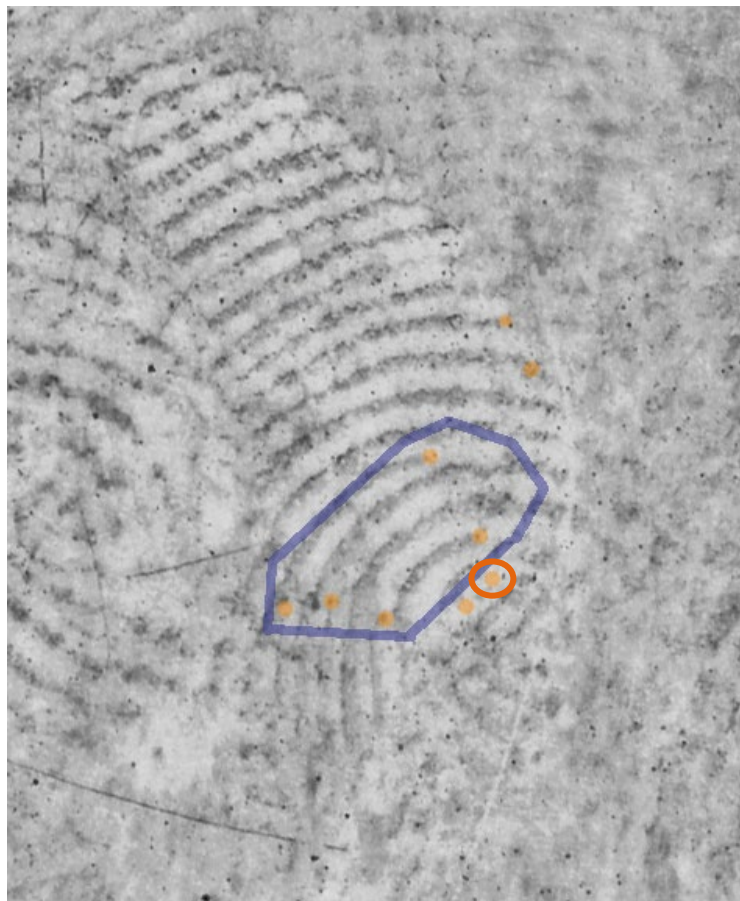
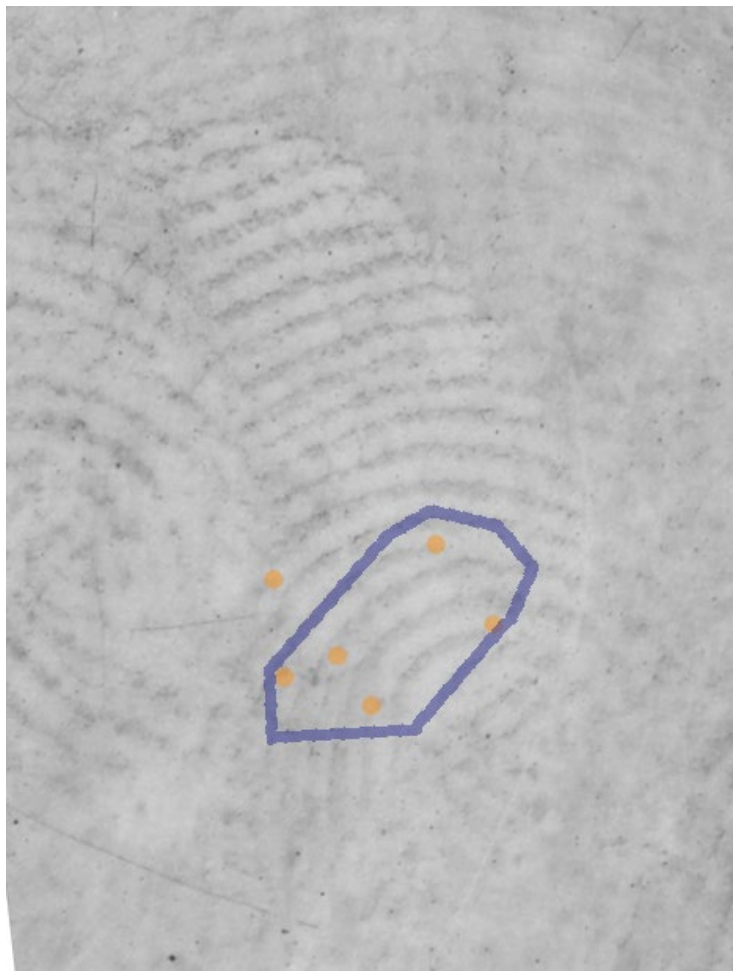
There is remarkable similarity between all of these annotations. It looks like all examiners relied upon the same 9 features, with 2 of the examiners adding an additional 10th point, circled in orange.

COMMON GROUND?

Almost everything! Very consistent interpretation between all 3 examiners.



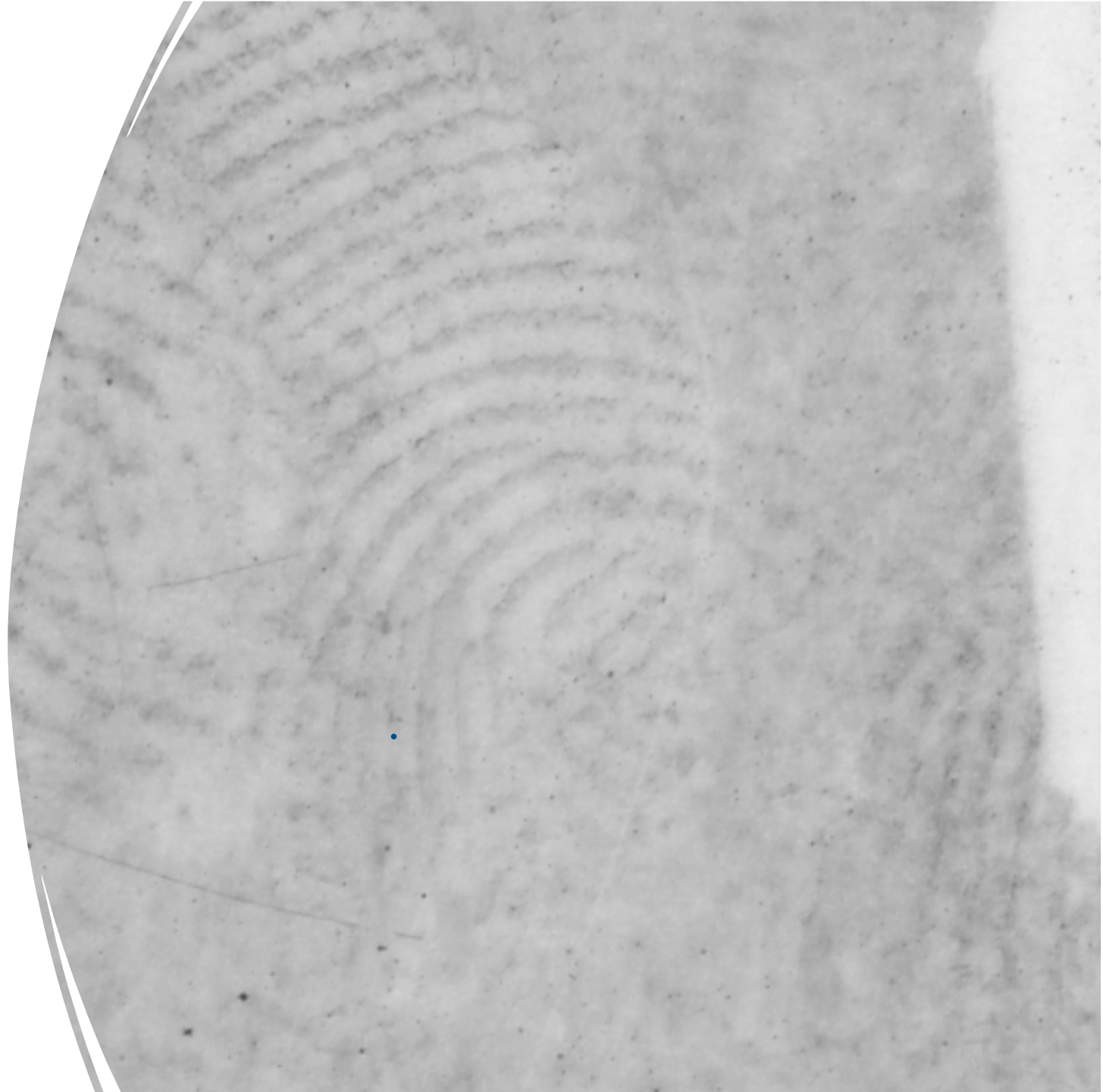




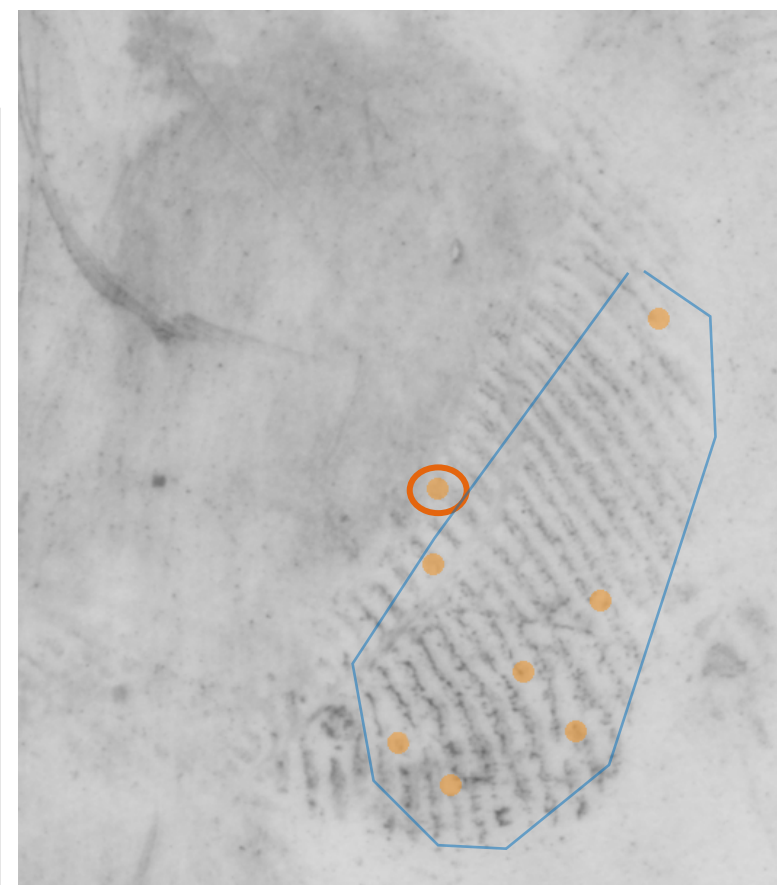
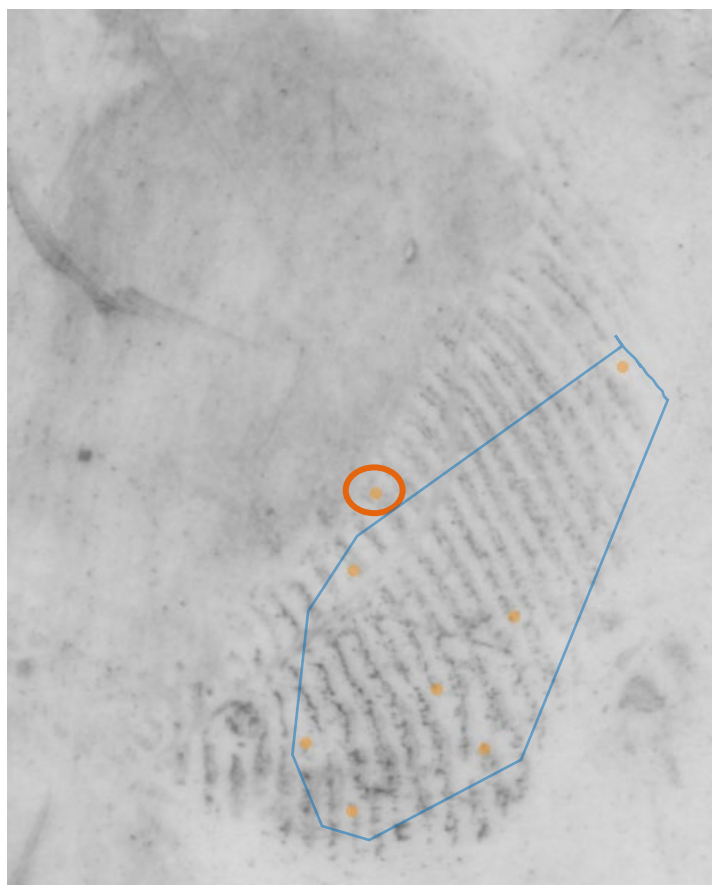
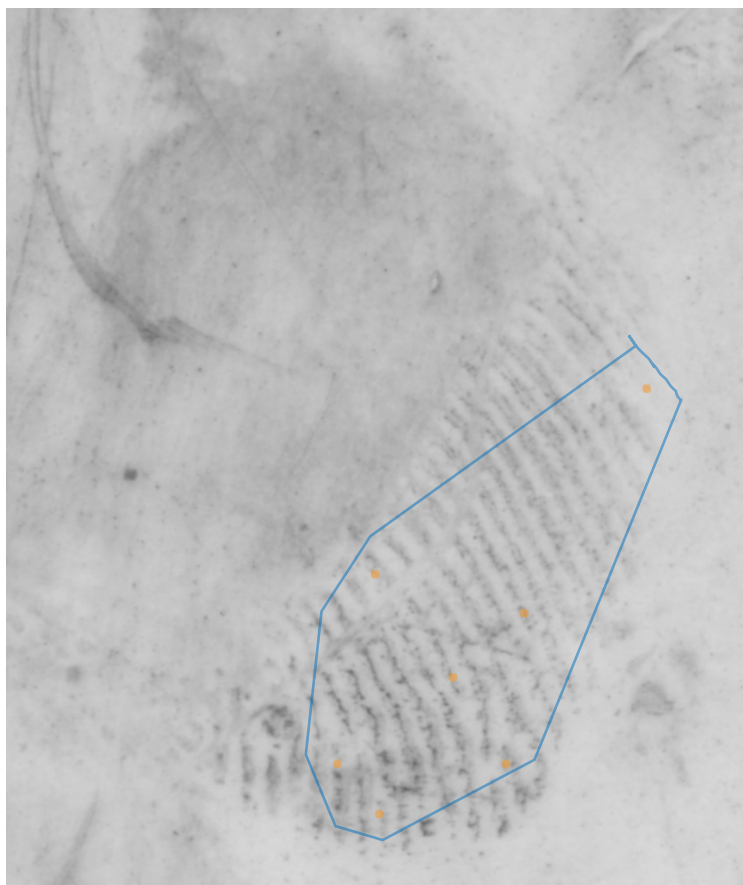
The blue region was agreed upon by all examiners as containing the 5 features. Two of the examiners agreed on one other feature (circled in red), but all the rest were unique to each interpretation.

COMMON GROUND?

Strong correlation of features at the top of the core. Each examiner picked up a few extra around the edges.



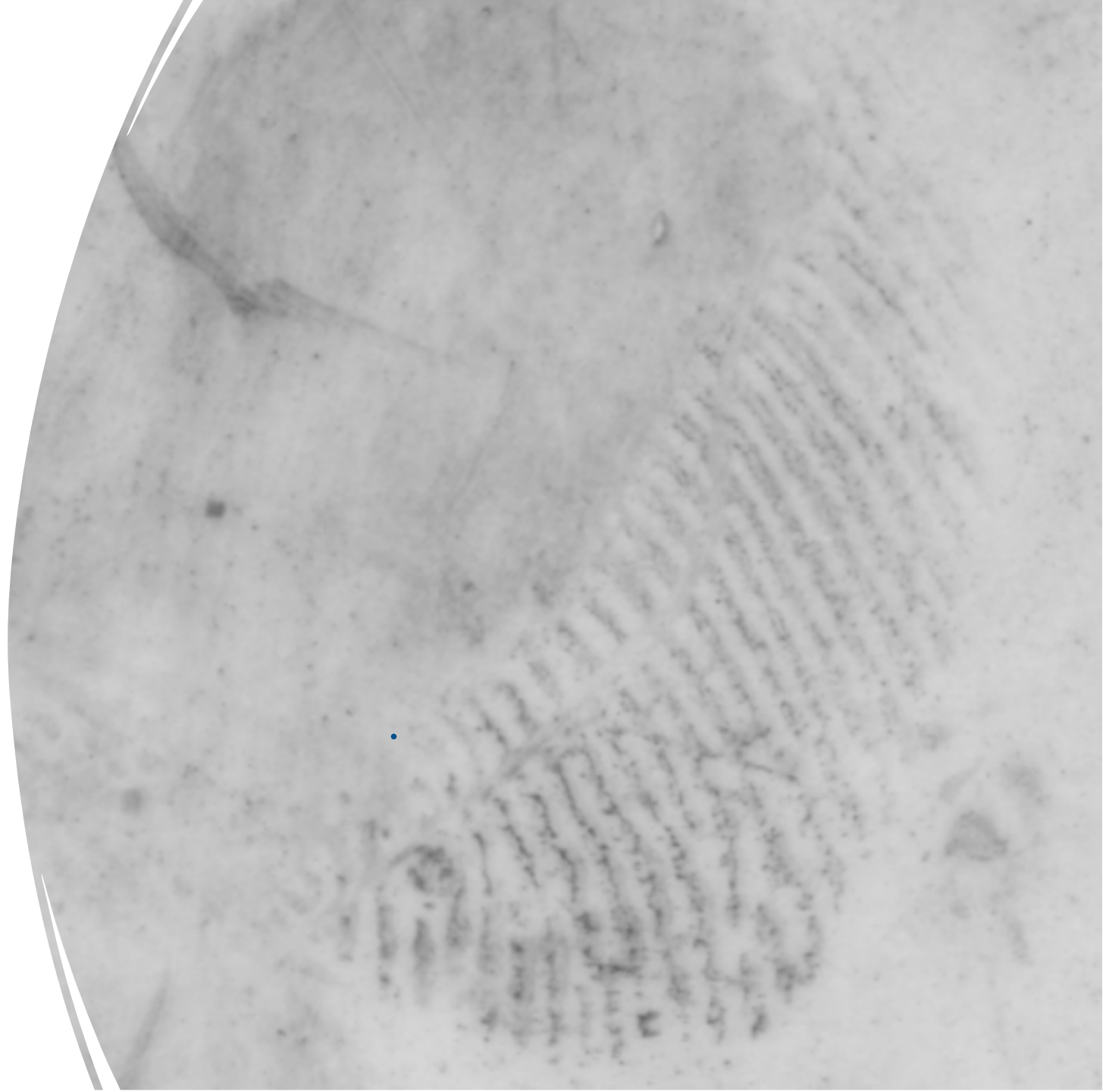




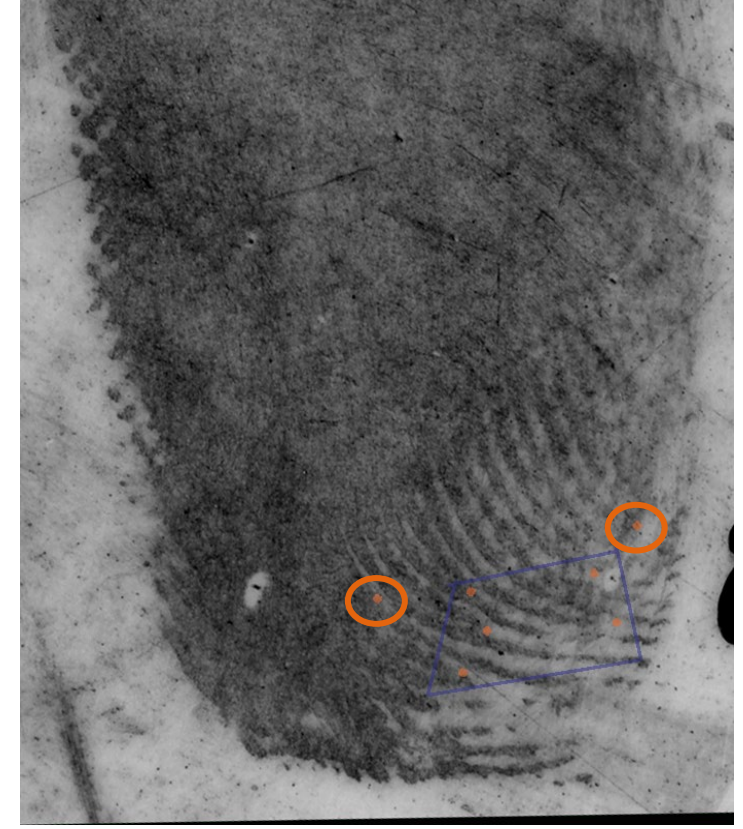
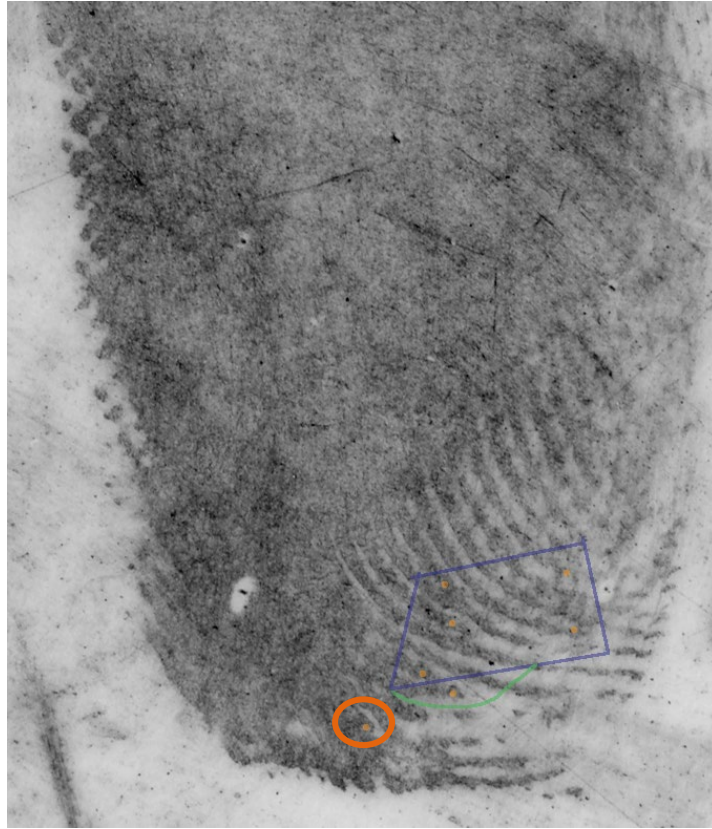
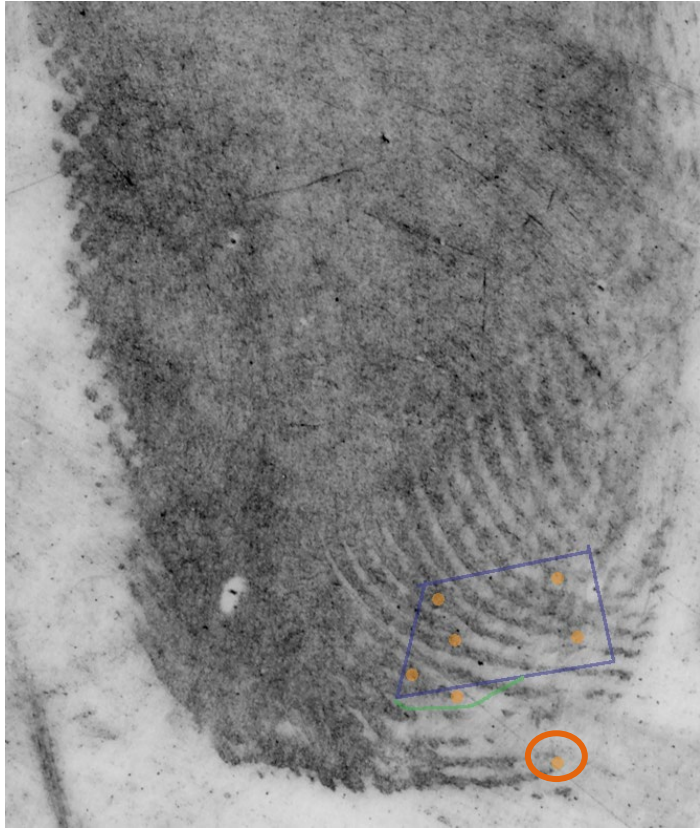
Only one addition between all 3 comparisons, remarkably similar interpretation of the same 7 second level features. Additional 8th feature added in two interpretations (circled in orange)

COMMON GROUND?

The same 7 second level features were used with remarkable correspondence between examiners, one feature added by two examiners.







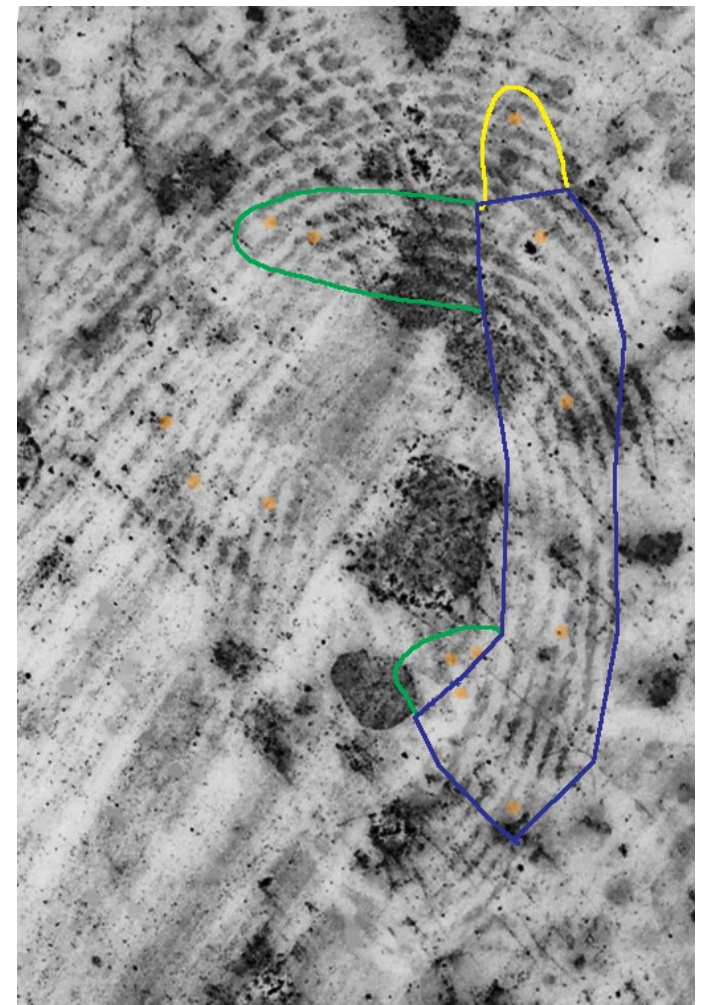
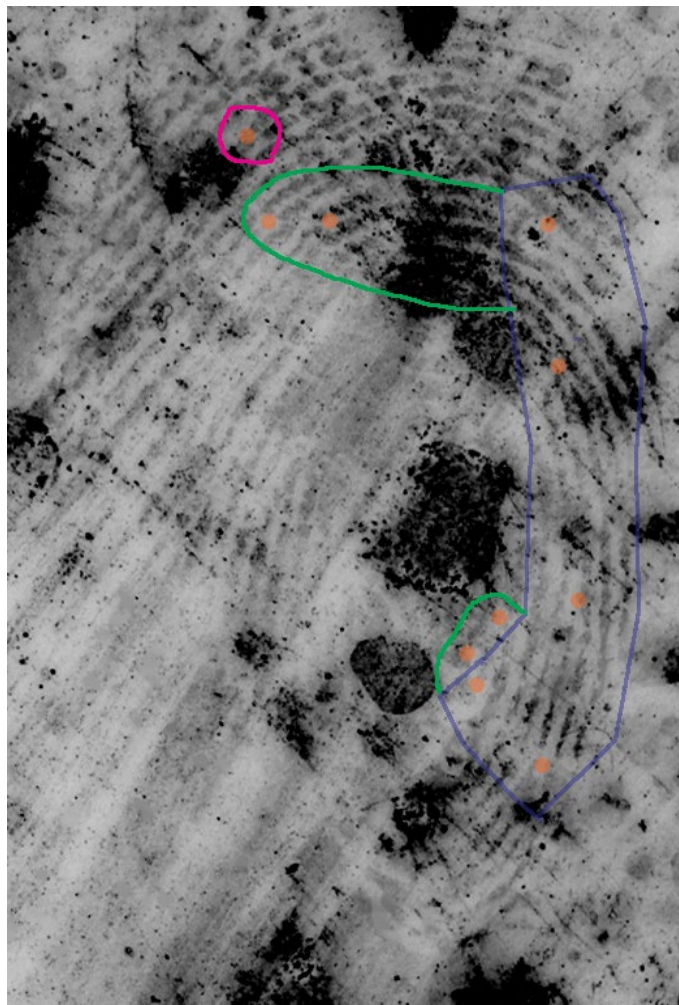
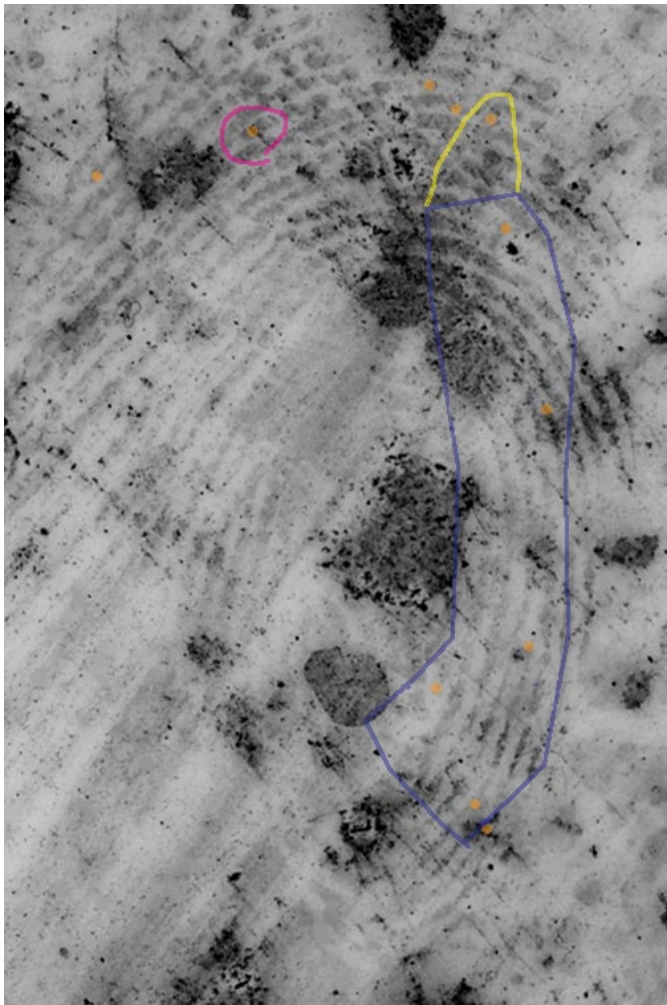
All examiners agreed on 5 second level features (blue box). 2 of the 3 agreed on one additional feature (green area). Each examiner marked at least one additional feature unique to just them. (orange circles)

COMMON GROUND?

All examiners agreed on 5 specific features, and every examiner saw 7 second level features. If all of the points that all examiners saw were combined, we would have 10 second level features.







Lots of variation in the interpretation

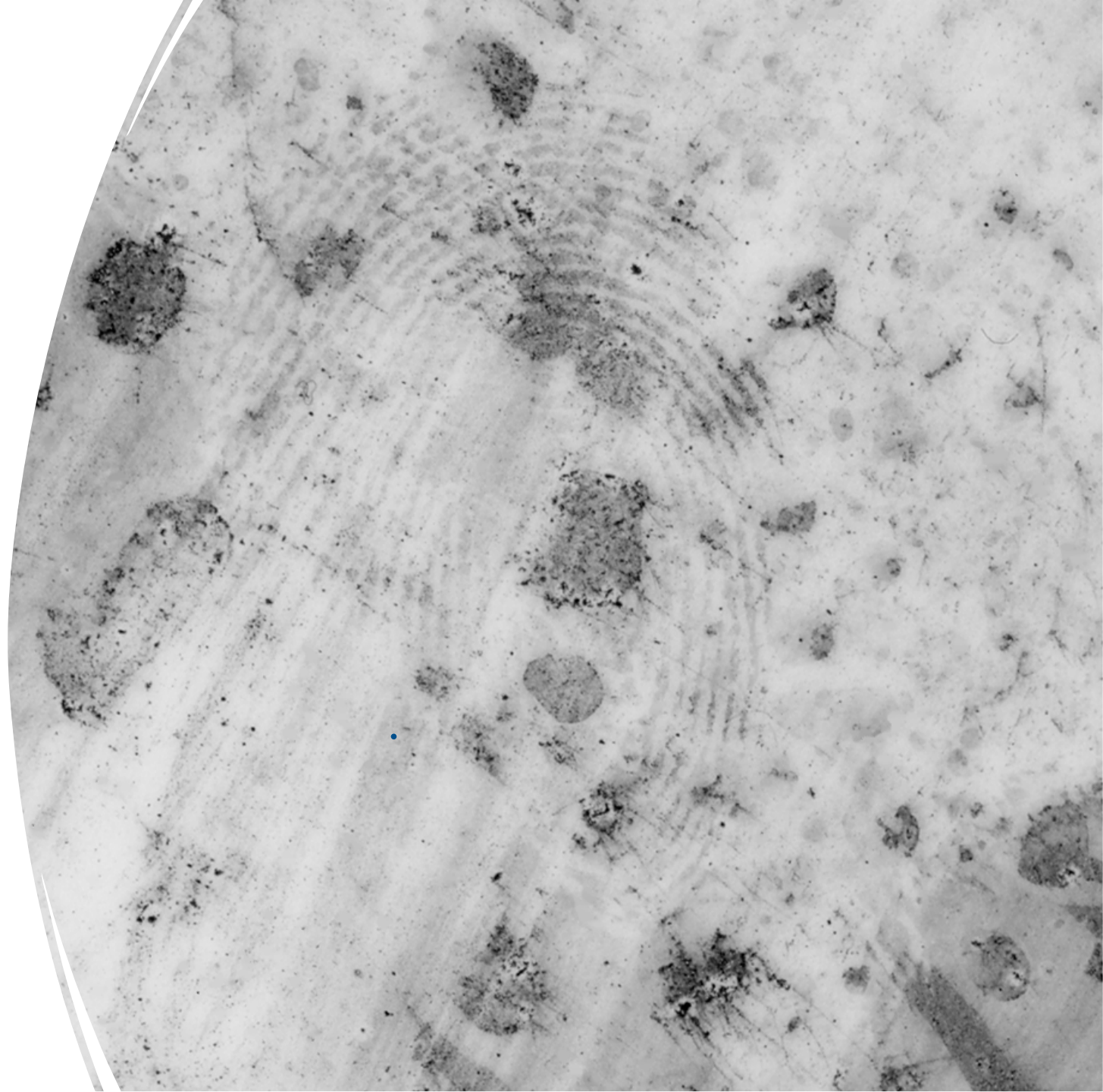
Blue box - 5 second level features in area of agreement with all 3 examiners

Green box - 2 examiners added the same 4 second level features

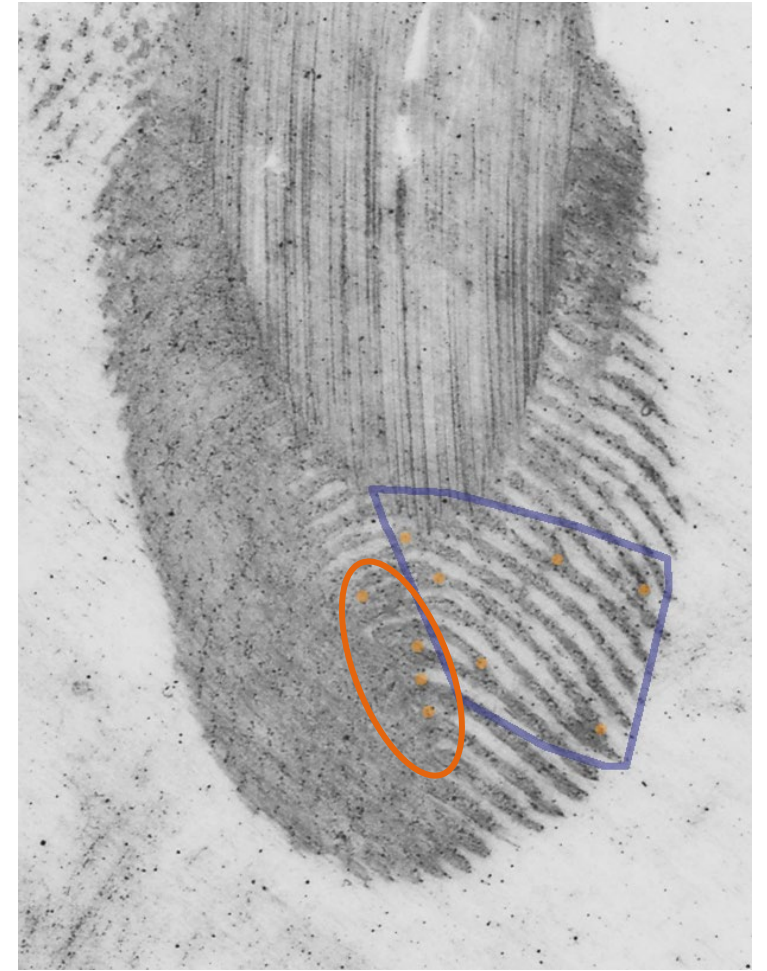
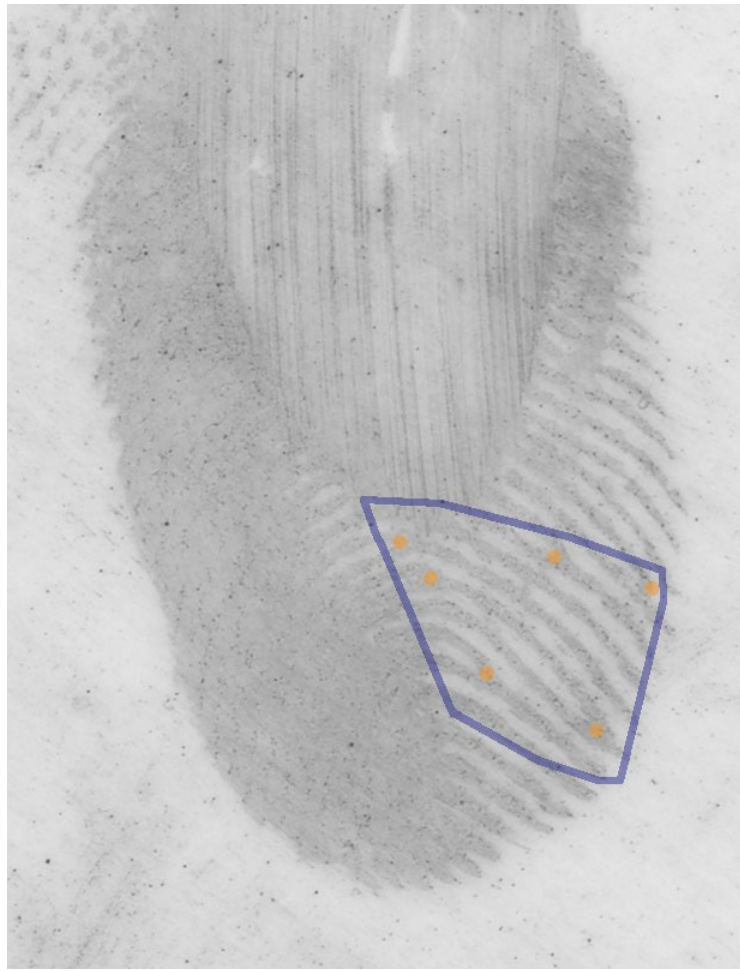
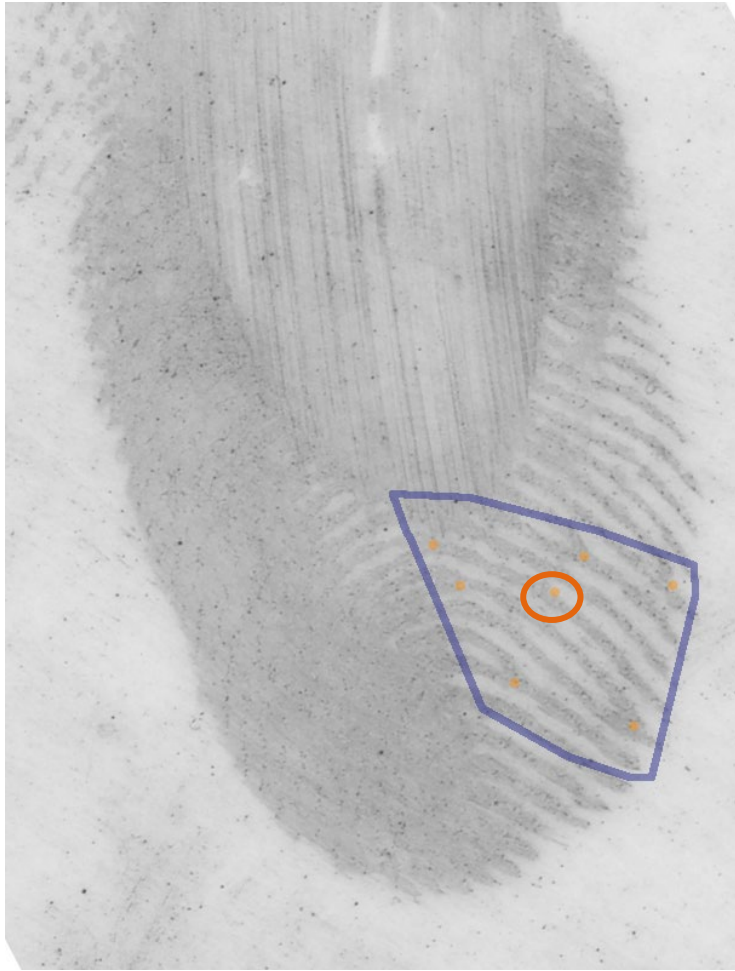
Yellow and Pink boxes - 2 examiners added the same 1 second level feature

COMMON GROUND?

Mark-ups ranged from 10-13 features, at least 2 people agreed that 11 features were present. This print was Supplementally Verified due to complexity, since every examiner found more than 8 features. 14 features if all examiner markings are combined.







Area encapsulated in blue demonstrates agreement of all 3 examiners of 6 second level features. One feature (left image—marked with red) within this area is not demonstrated in the other markups. Additional features marked in the right image are at the edge of the visible impression. This impression also had additional contrasting steps performed.

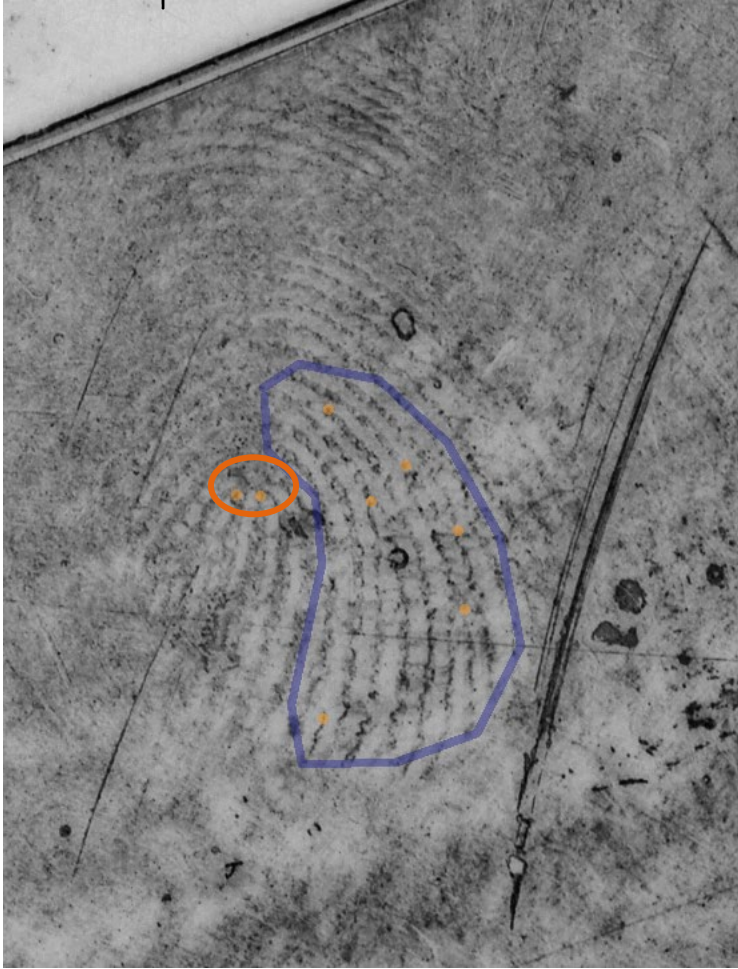
COMMON GROUND?

Small area of relatively high quality. Not many Level 2 details to work with, limited variations in interpretation.

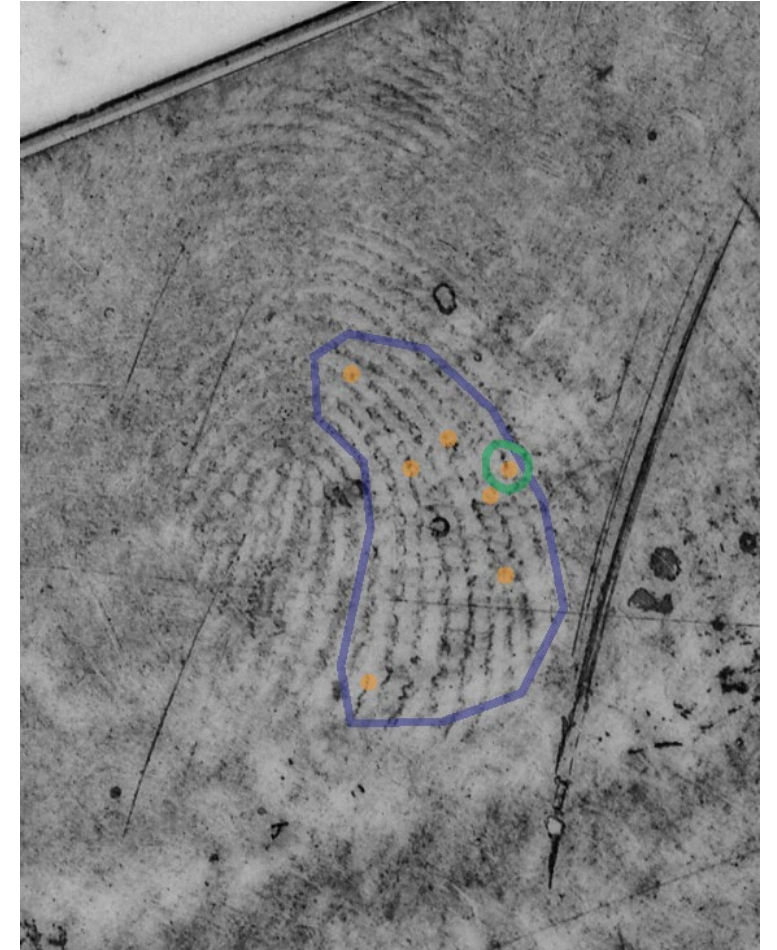
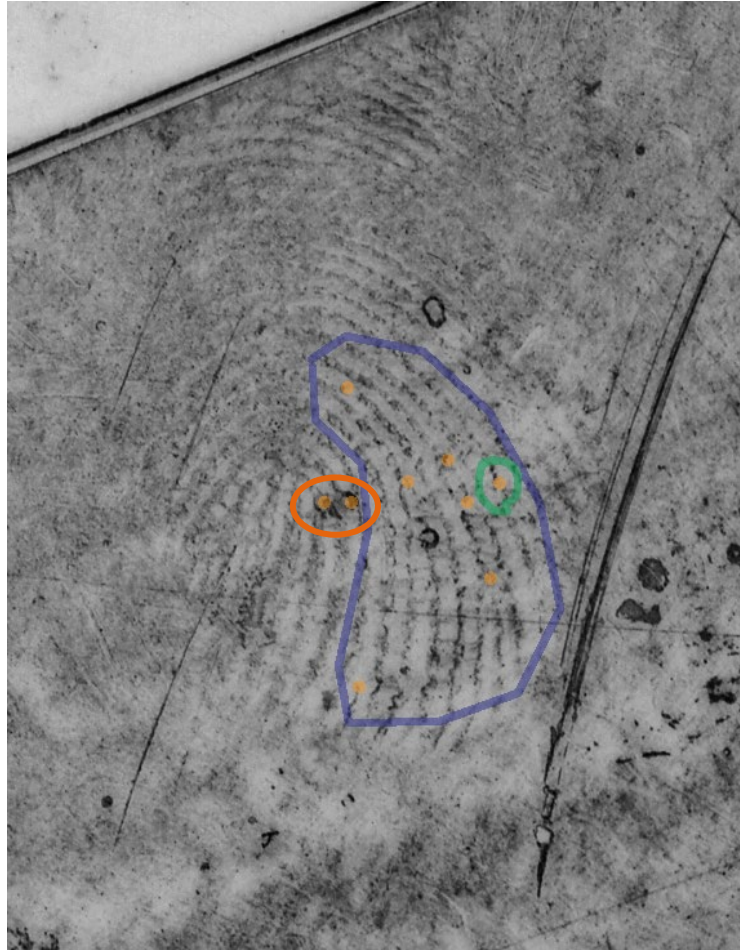




2 unique features in core marked



2 unique features in core marked

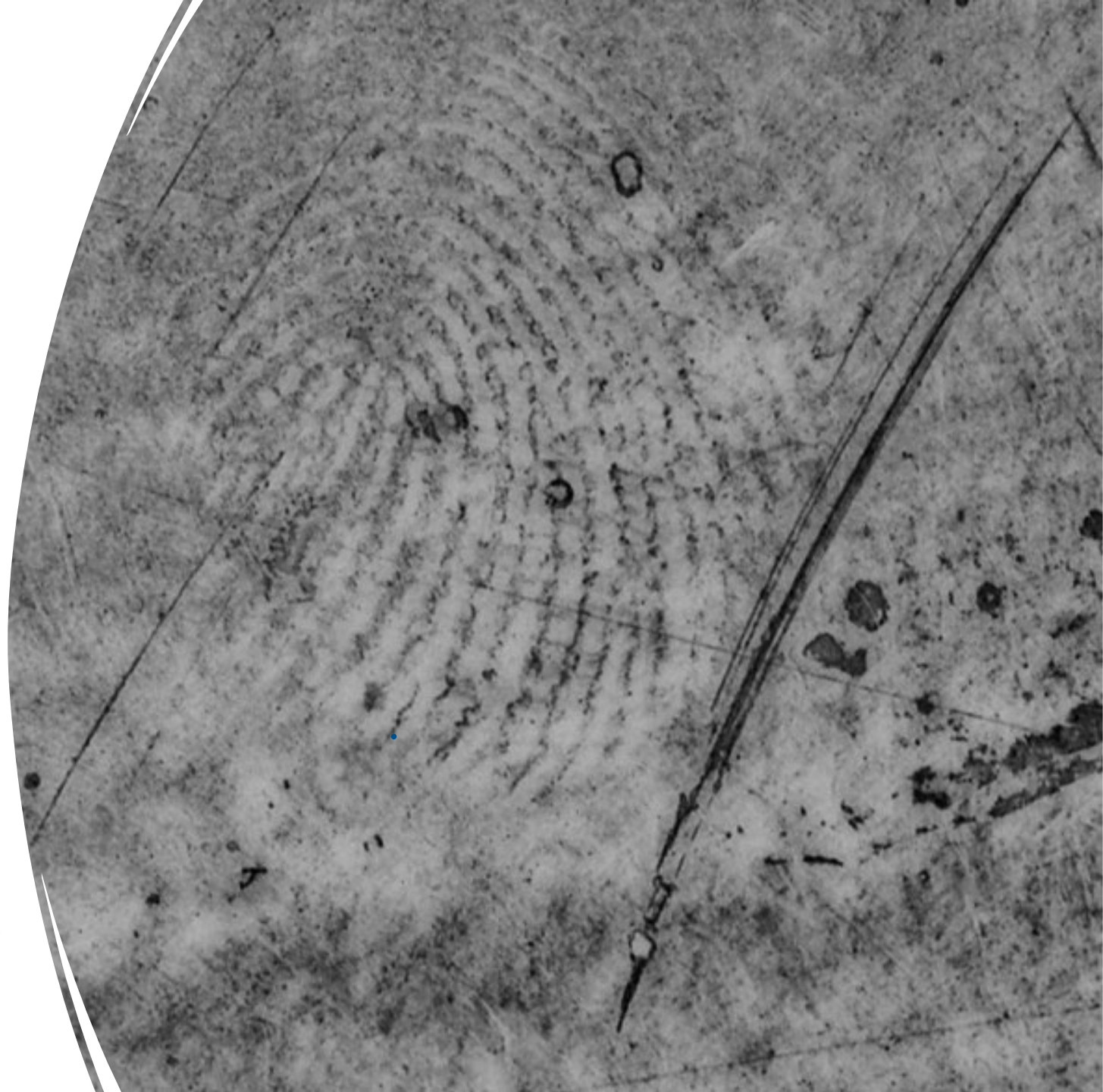


Blue area in common contains 6 second level features in agreement with all 3 examiners.
Additional feature marked by 2 of the 3 examiners (marked in green).

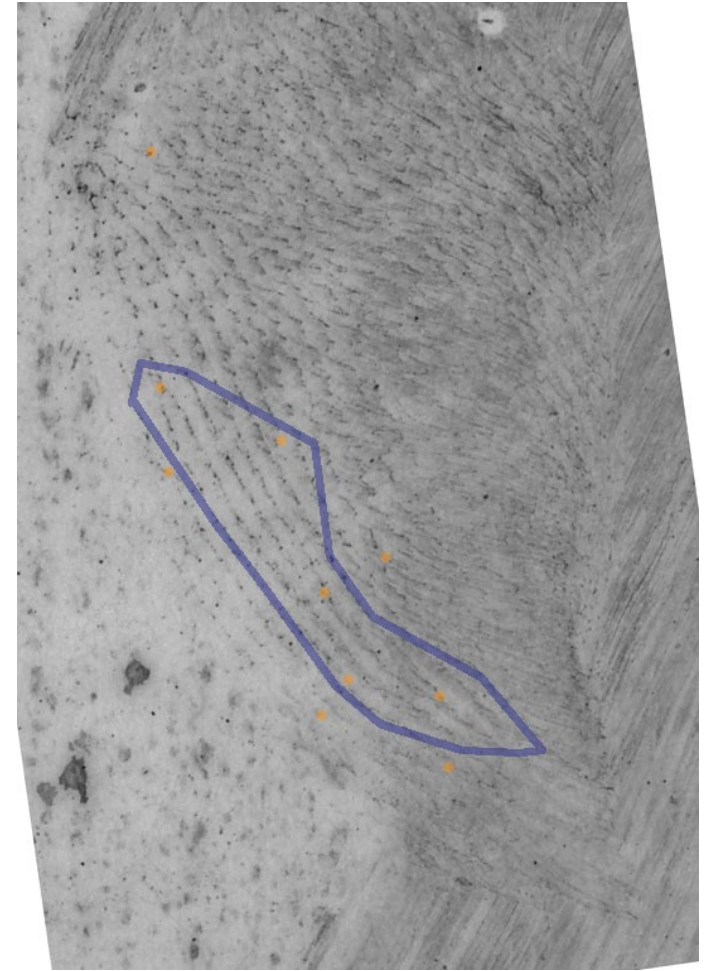
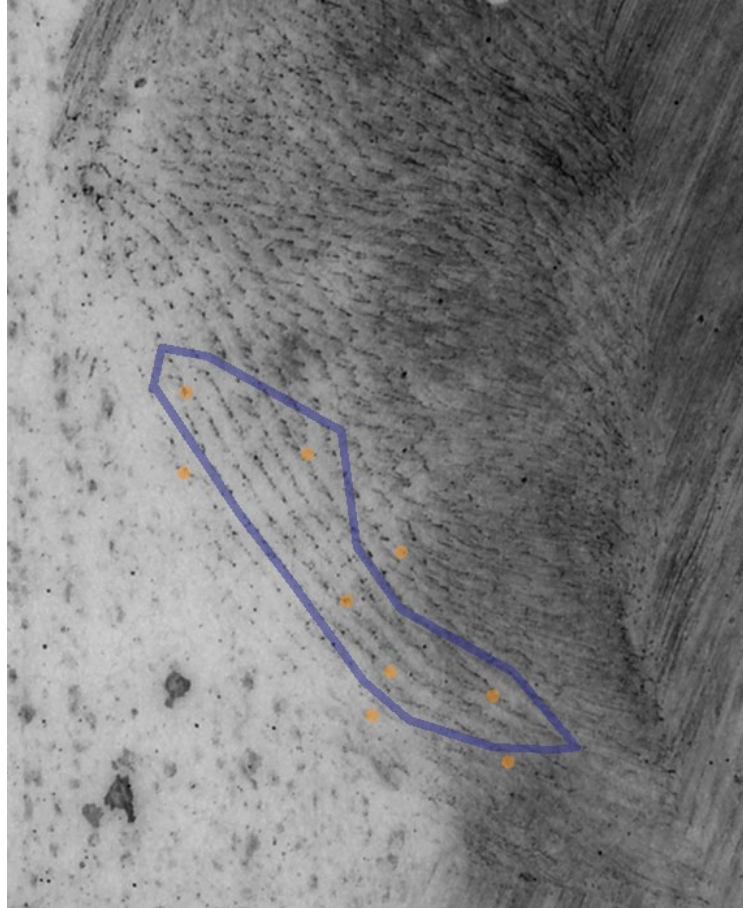
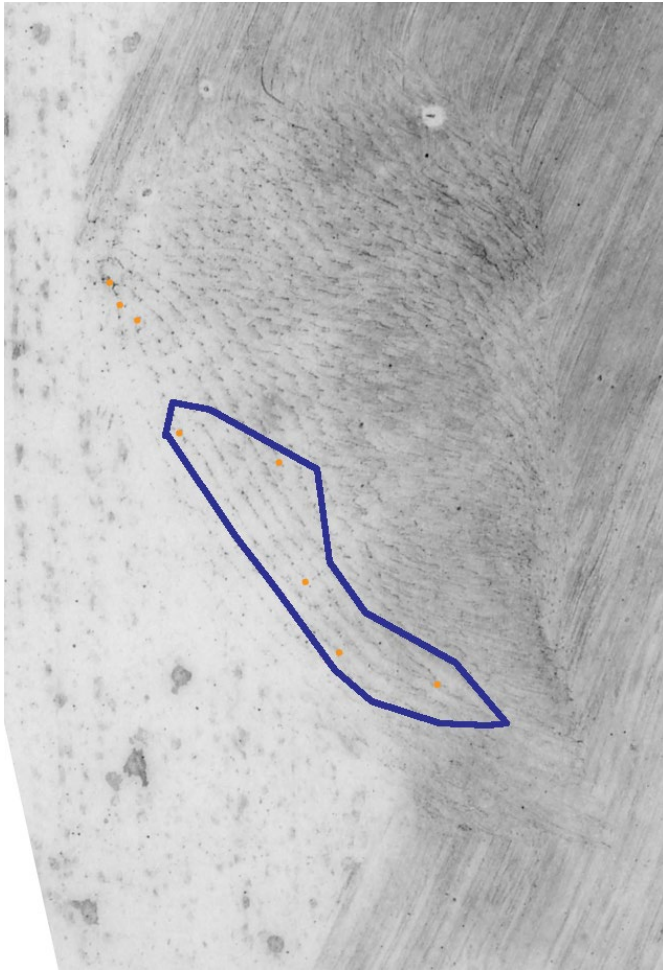
COMMON GROUND?

Small area of relatively high quality.
(Visible pores)

Two examiners marked more than 8 features therefore this may not have entered Supplemental Verification.

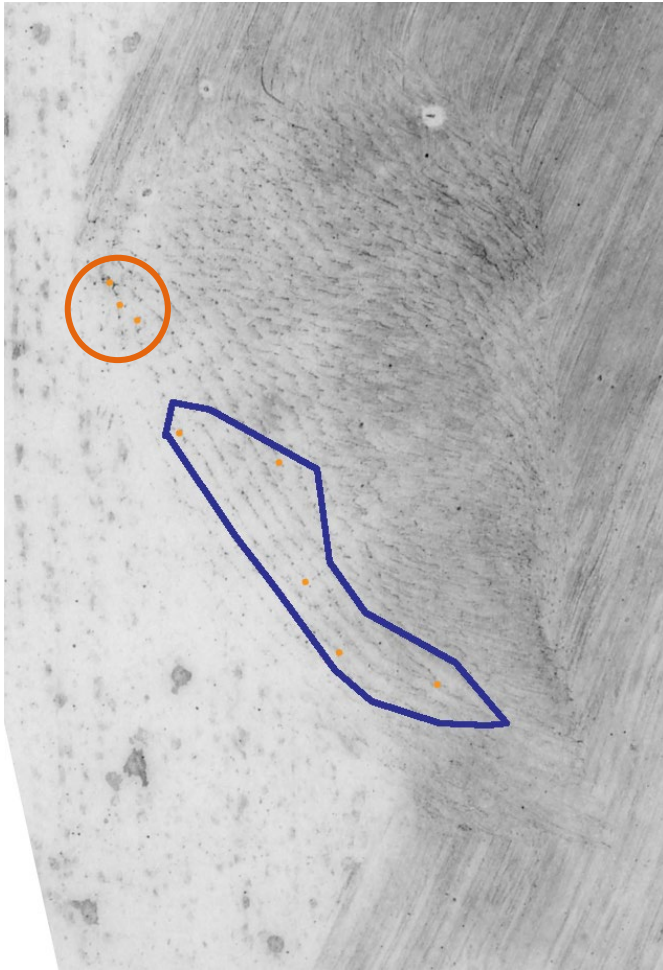




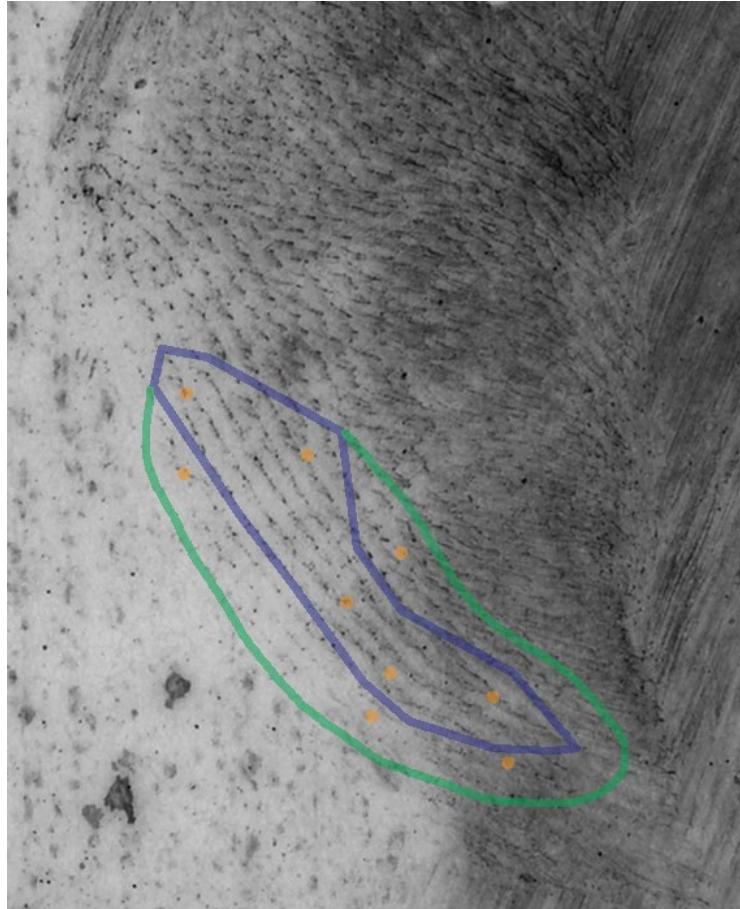


Uniform agreement on 5 second level features with all 3 examiners

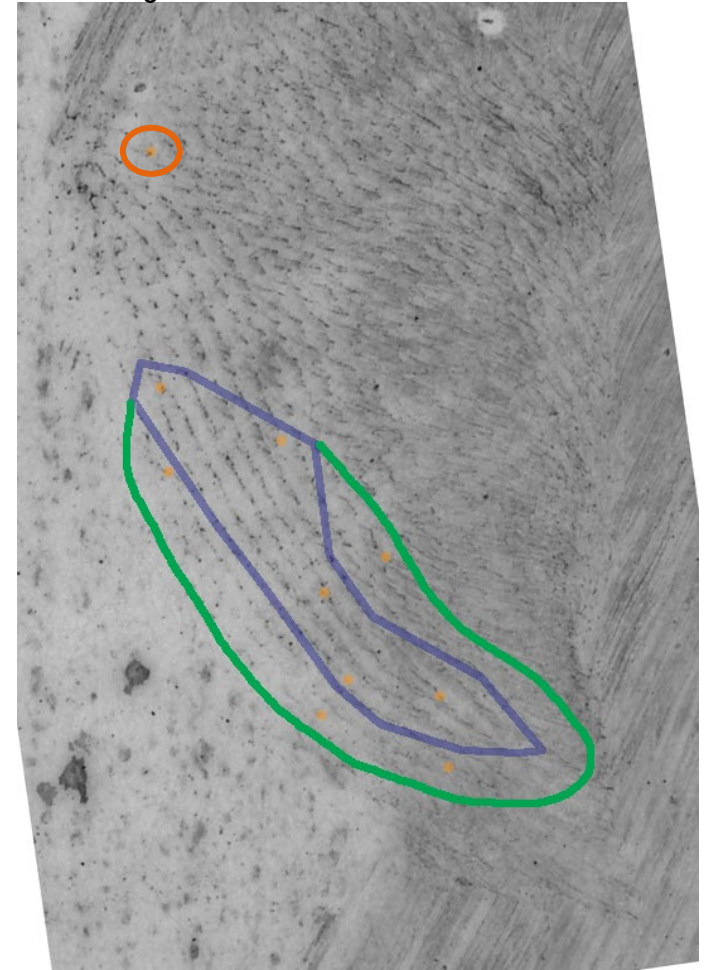
3 features marked in the core



5 in agreement with all examiners
4 in agreement with right examiner



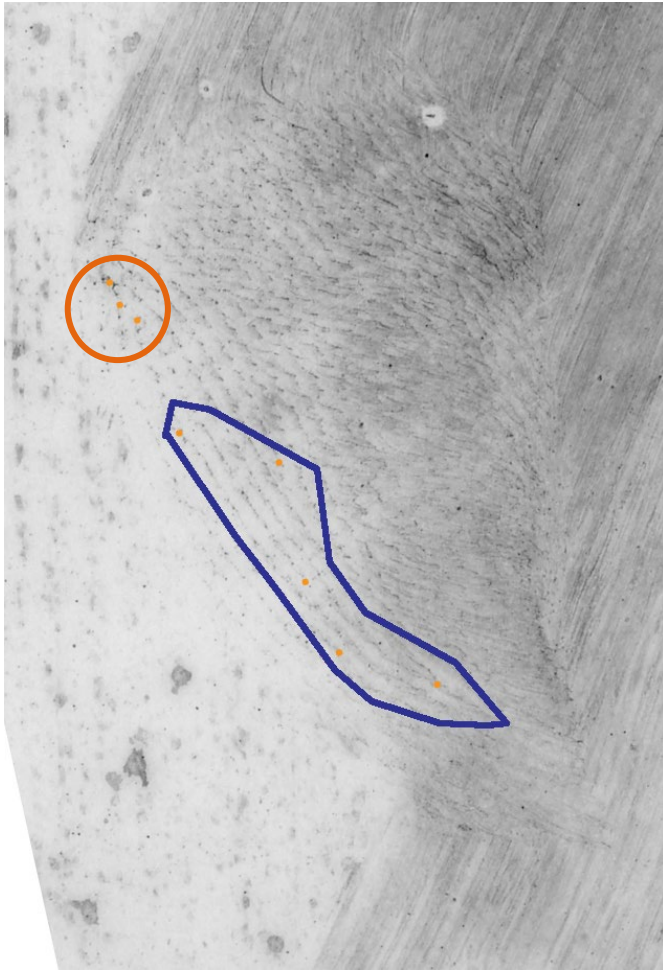
5 in agreement with all examiners
4 in agreement with 1 other examiner



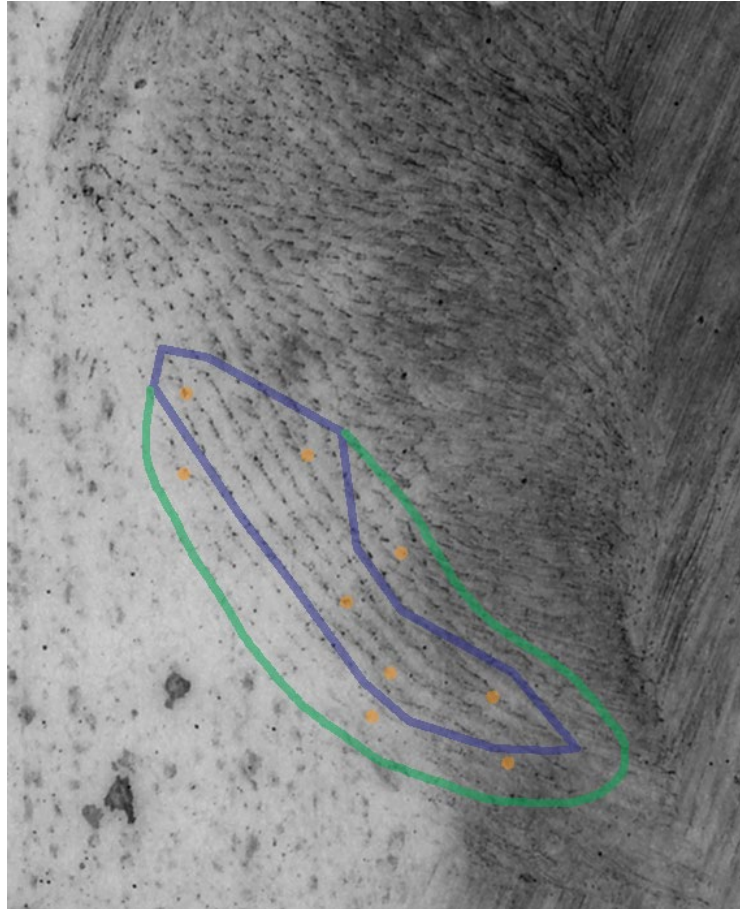
Additional agreement on 4 second level features with 2 examiners (9 total features in agreement)

Unique features marked with orange circles

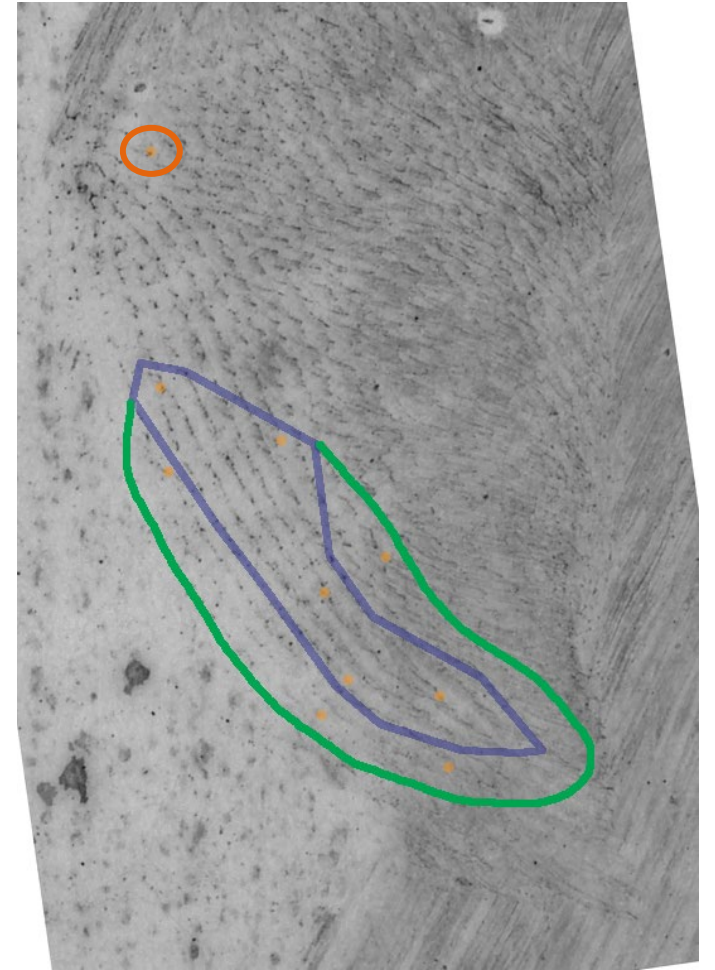
No Contrast Tools Used



Curves Tool



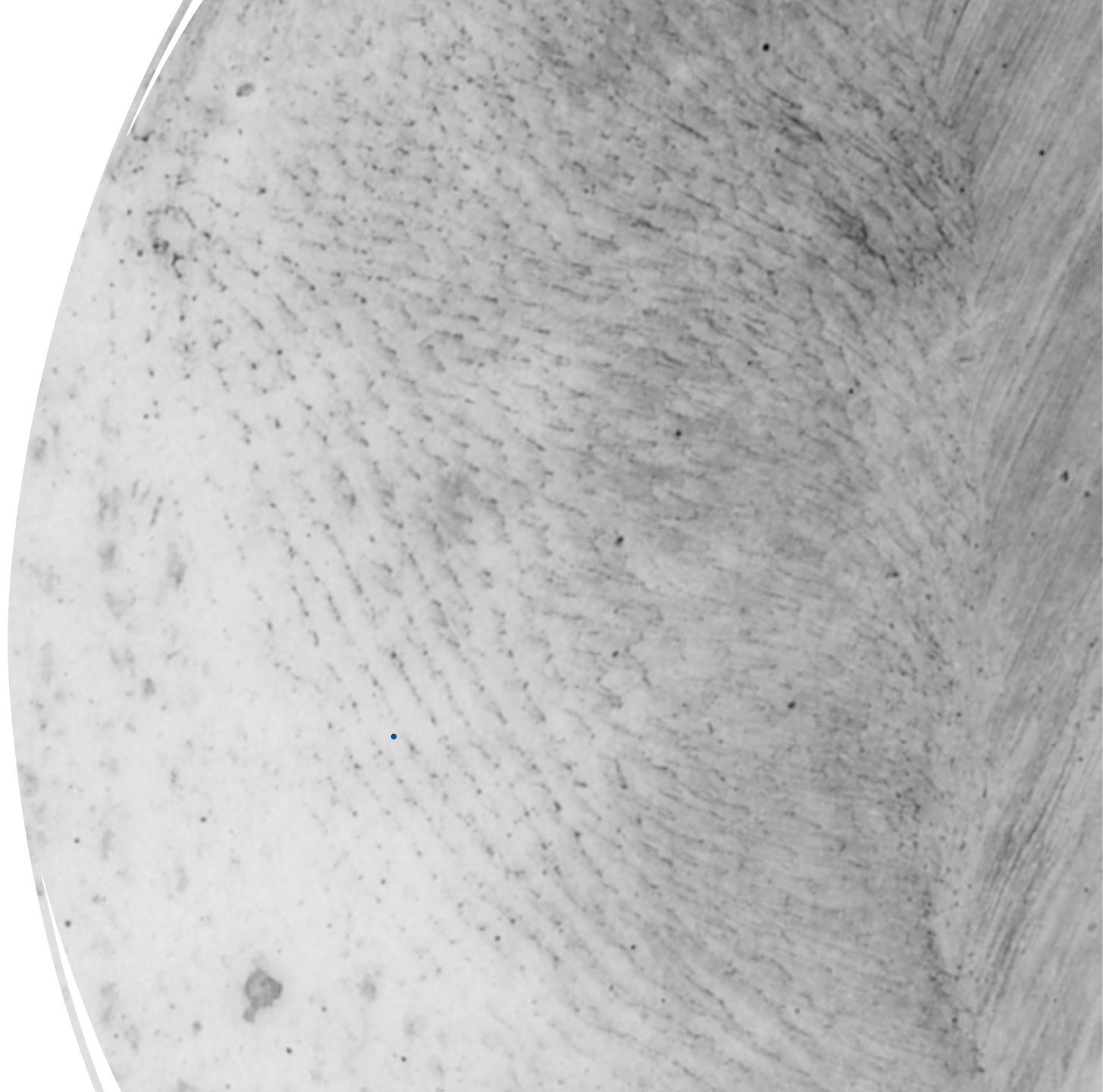
Shadows/Highlights Tool



A possible explanation for the difference in interpretation is the relative contrast. Each examiner was working under a different final contrast.

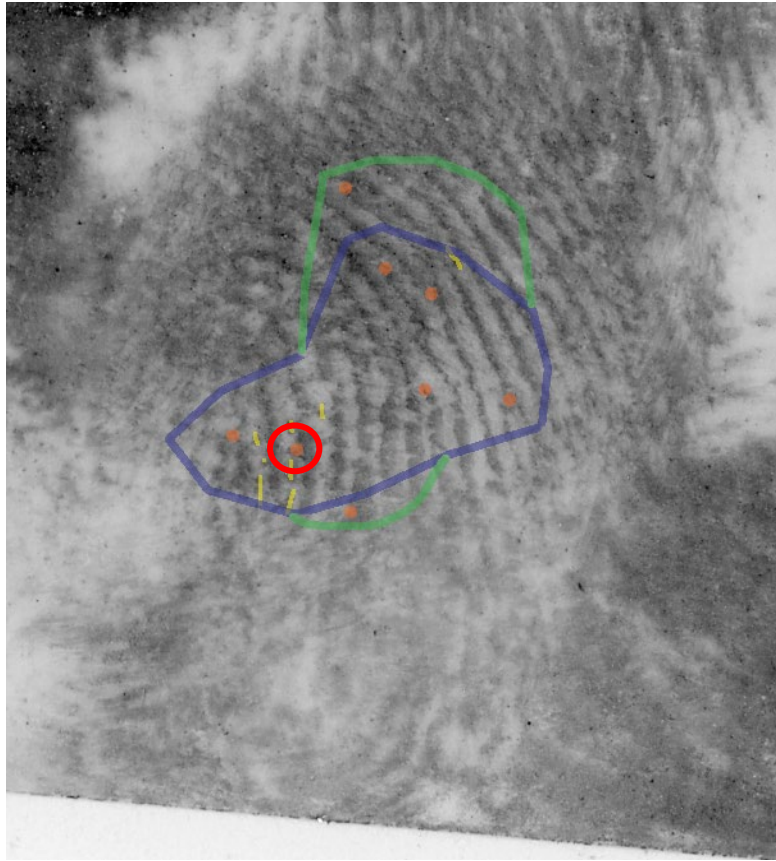
COMMON GROUND?

There was a fair amount of agreement between two of the three examiners. There is a valid argument for promoting the use of contrast tools on light prints like this one.

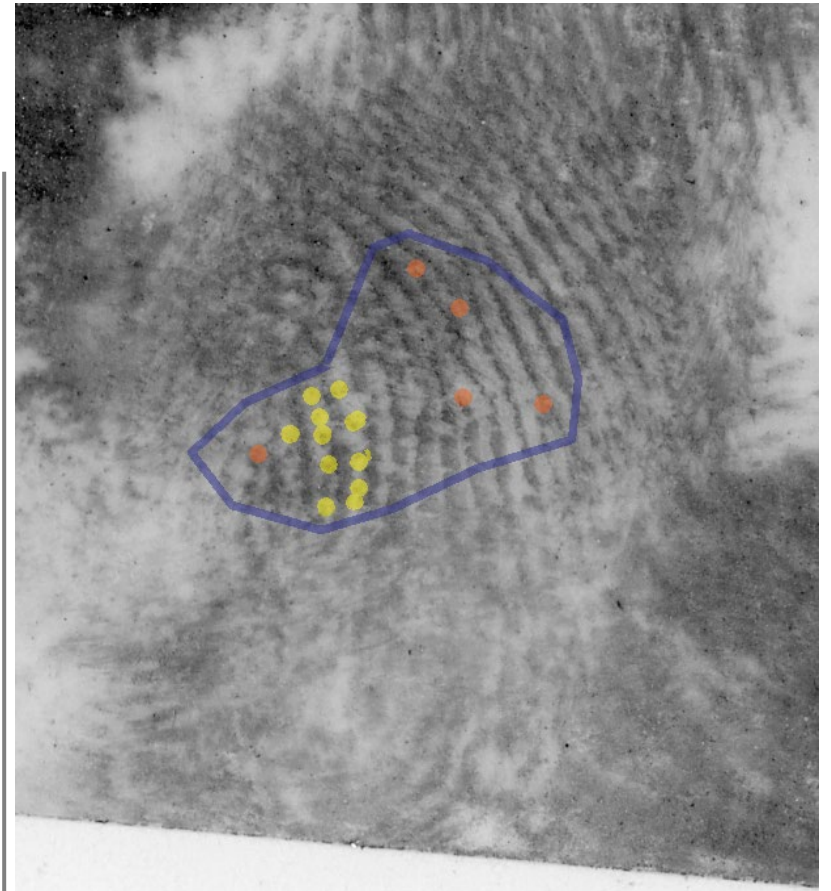
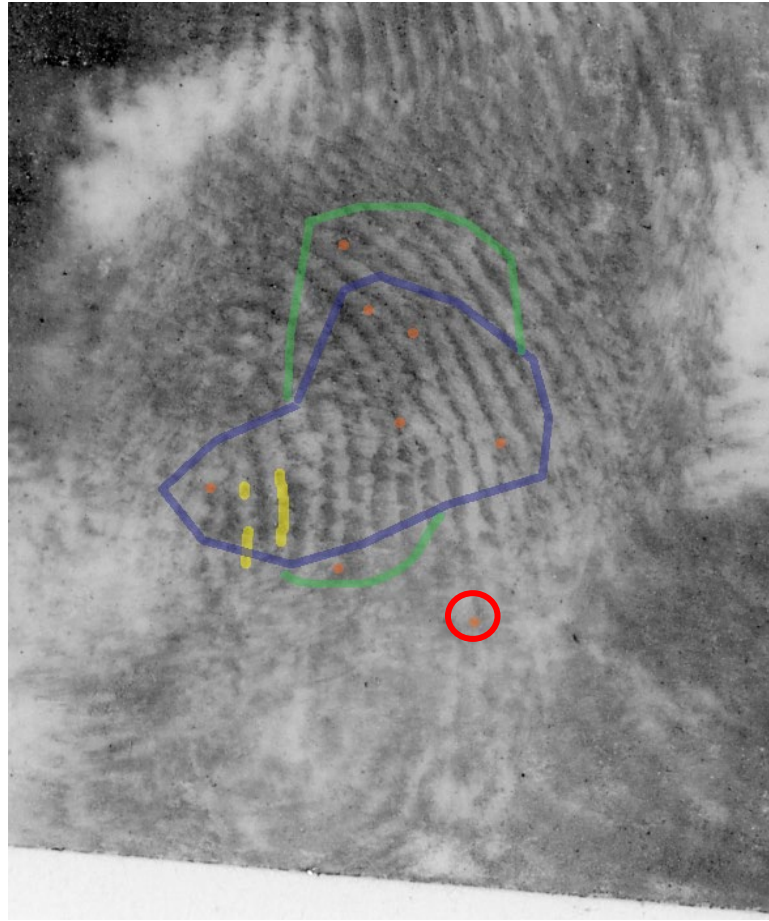




One additional feature inside blue box

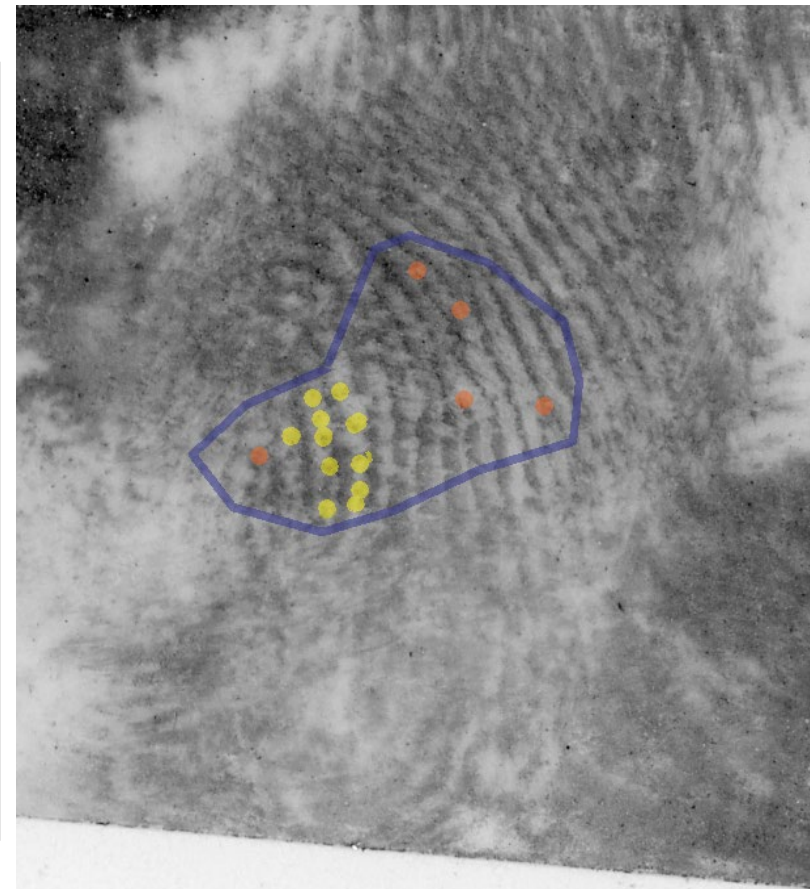
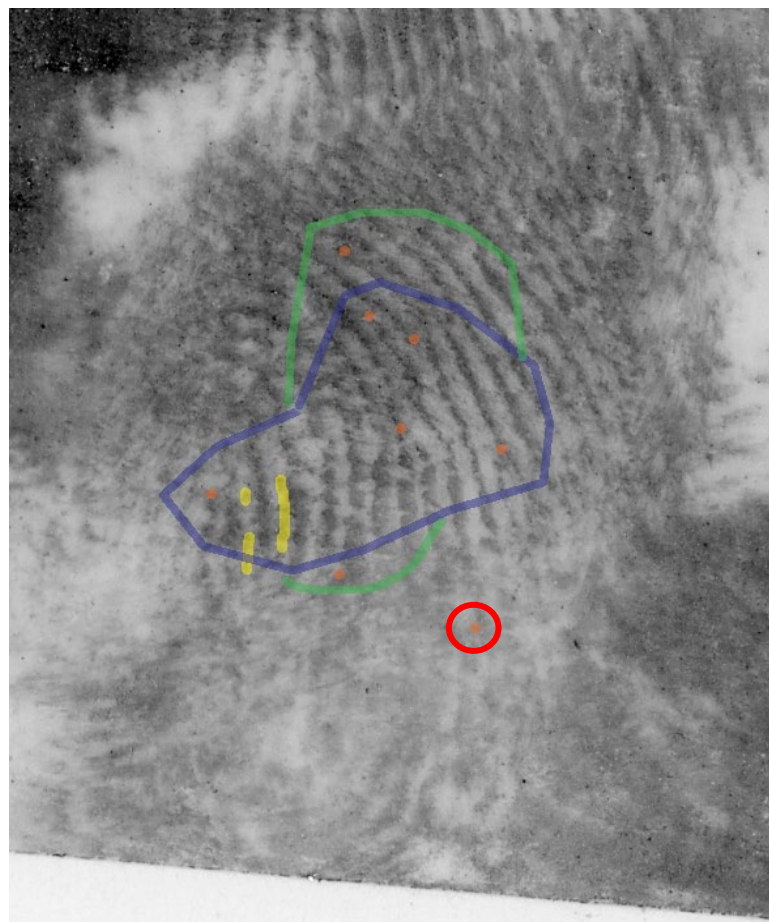
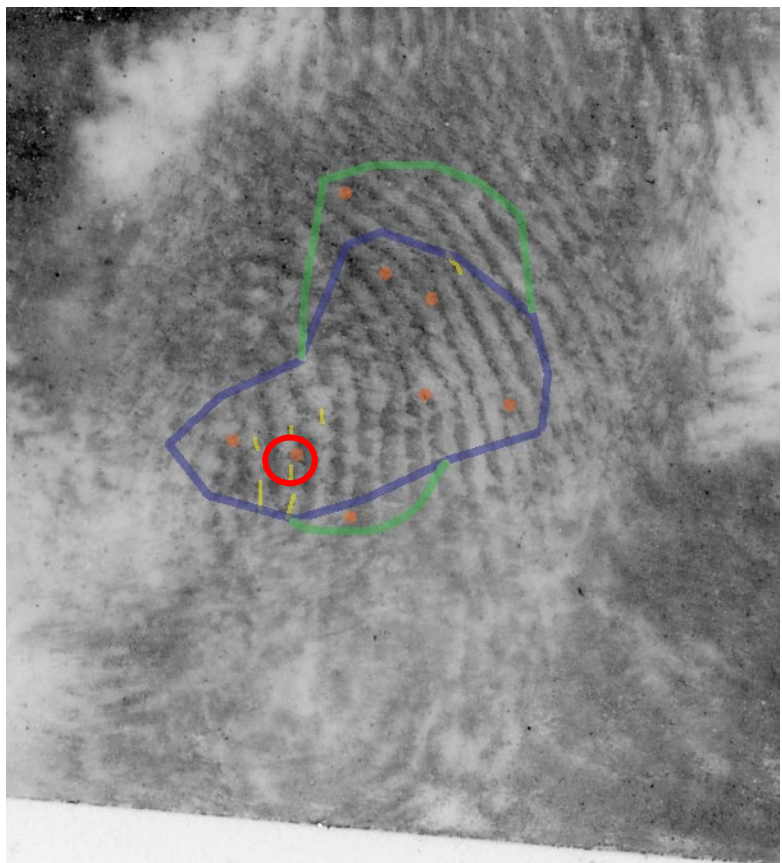


One additional feature outside blue box



There are 5 Second level similarities marked by all 3 examiners (blue box) with an additional 2 features agreed upon by two of the examiners (green boxes).

Total features marked range from 5 to 8.



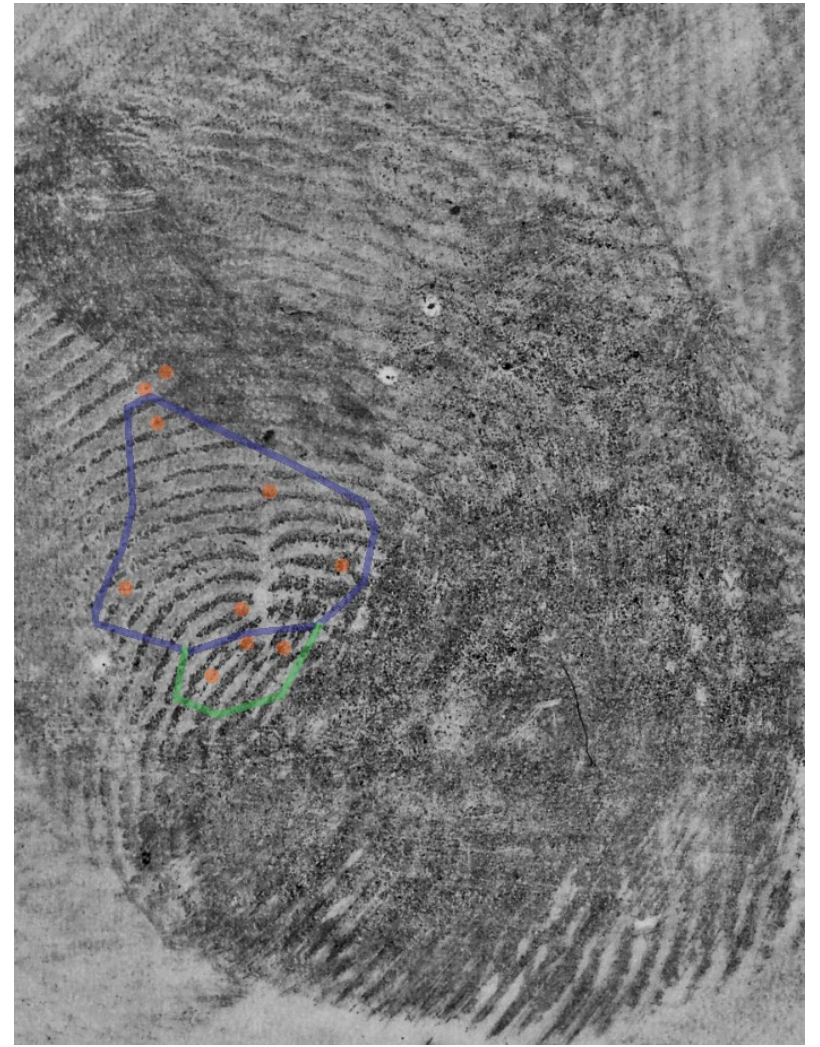
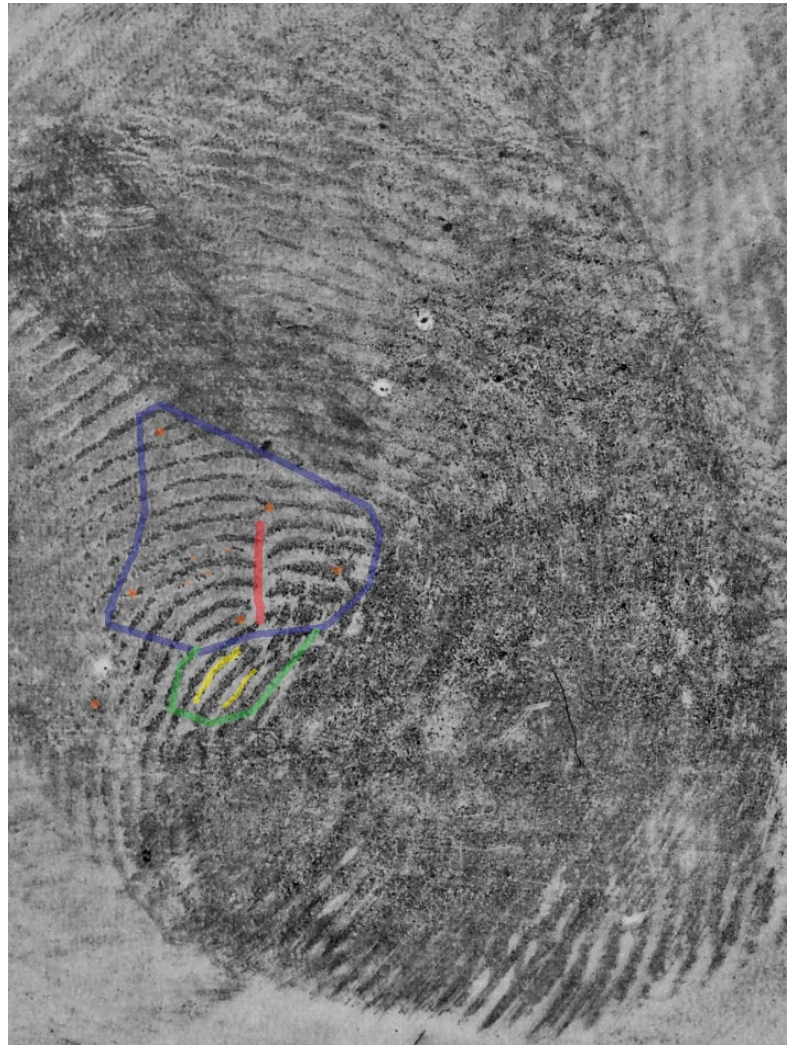
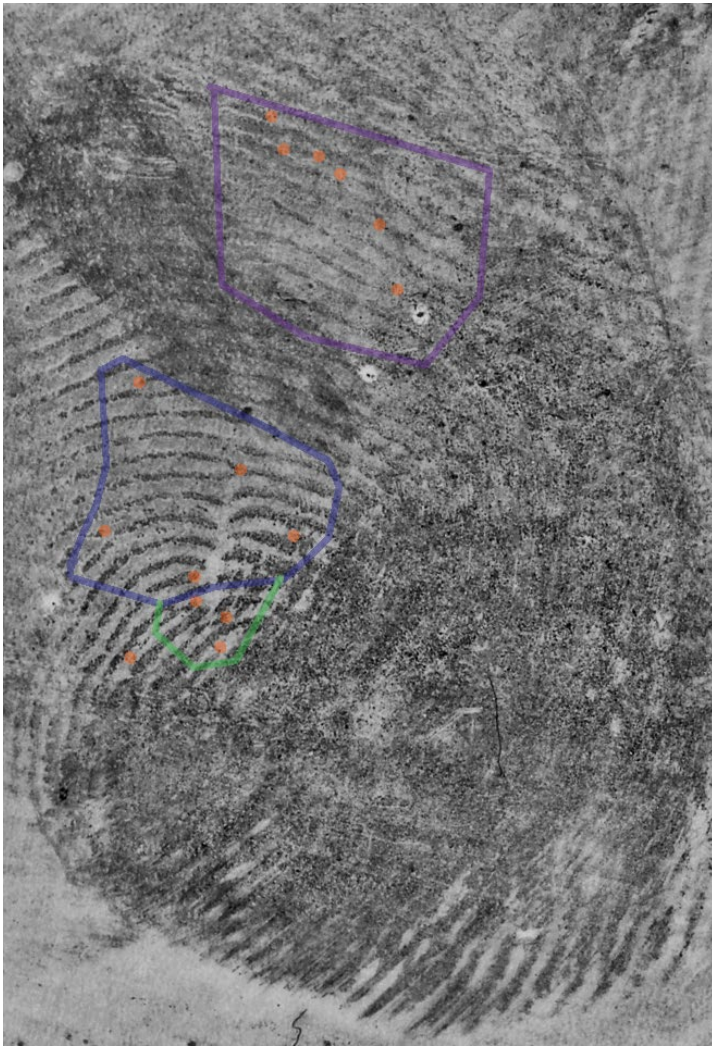
The Yellow markings indicate what the examiners had labeled as 3rd level details. While 3rd level features are commonly seen as "icing on the cake", every examiner marked them in this comparison! Some of them were marked in Analysis while others were marked in Comparison, but they were documented by every examiner.

COMMON GROUND?

All examiners relied on the incipient ridges to reach their conclusions, 2 of the 3 examiners had nearly identical markups.

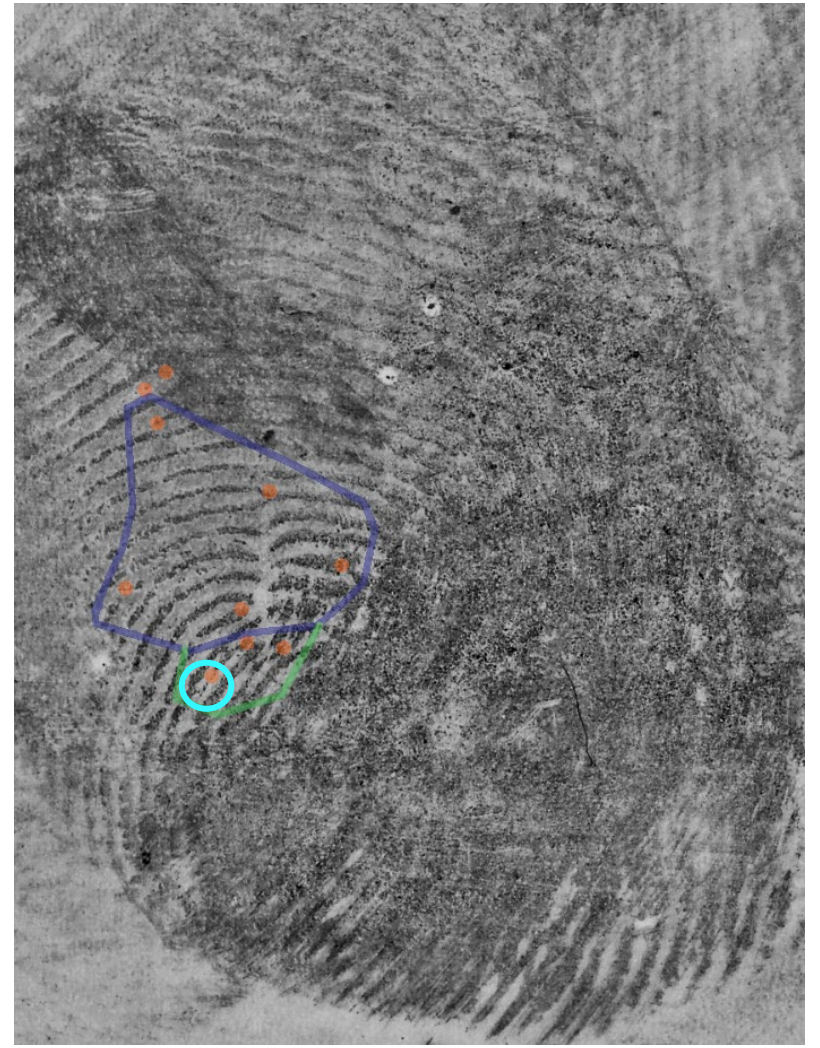
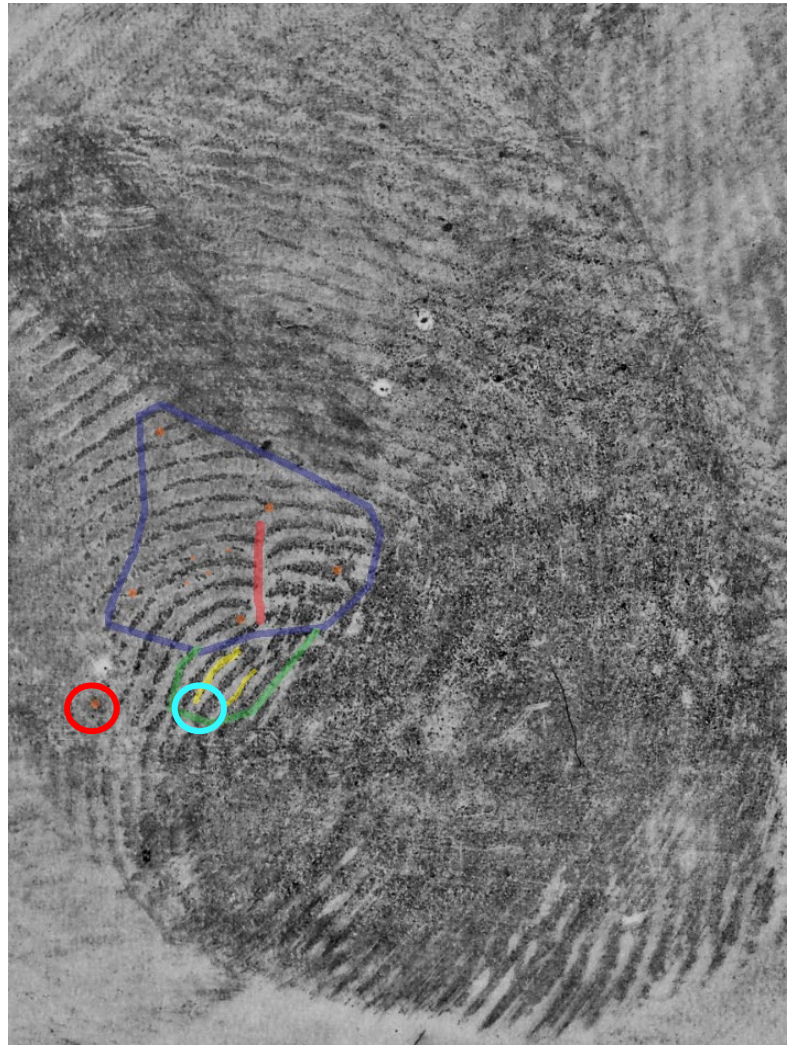
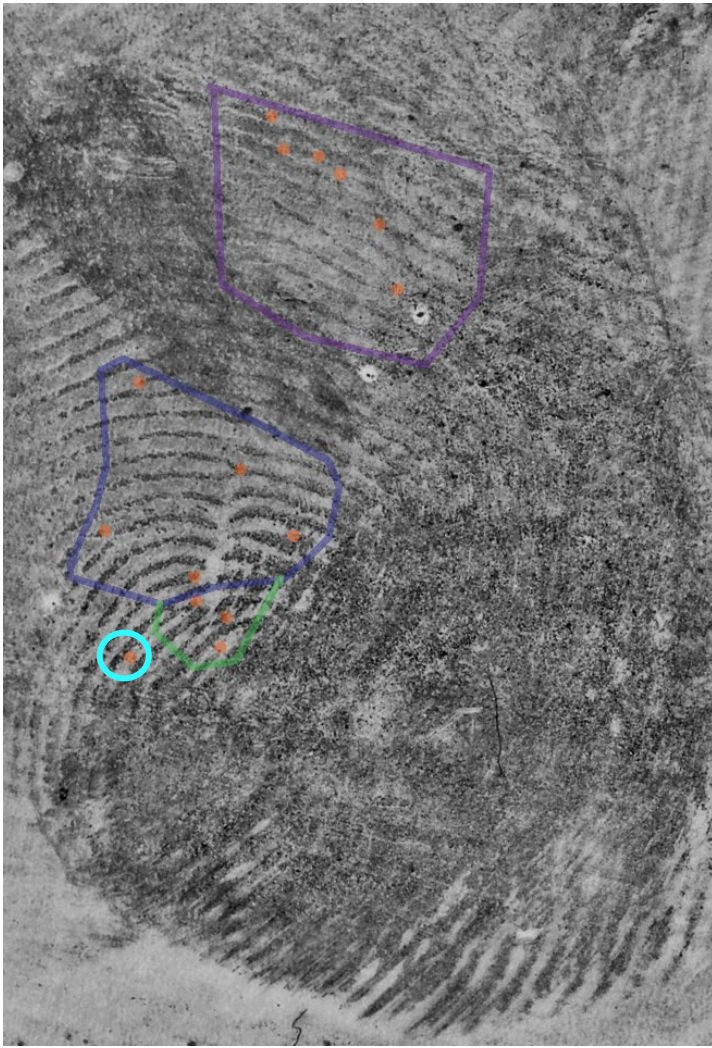






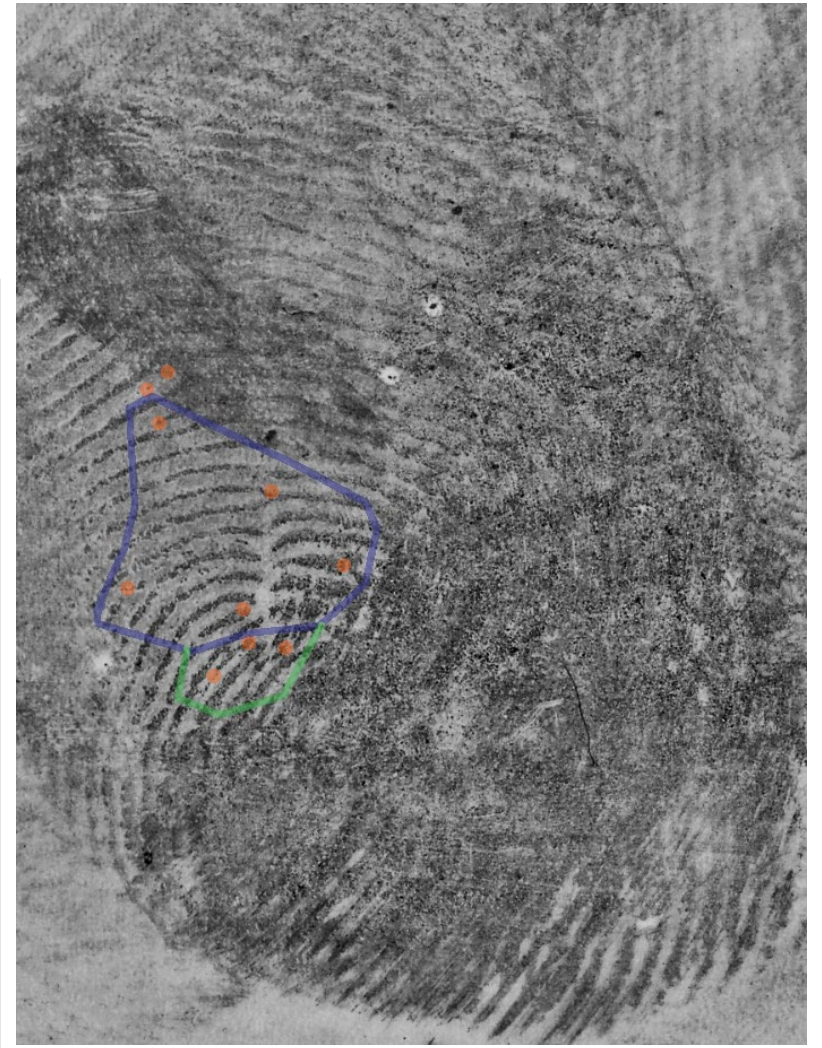
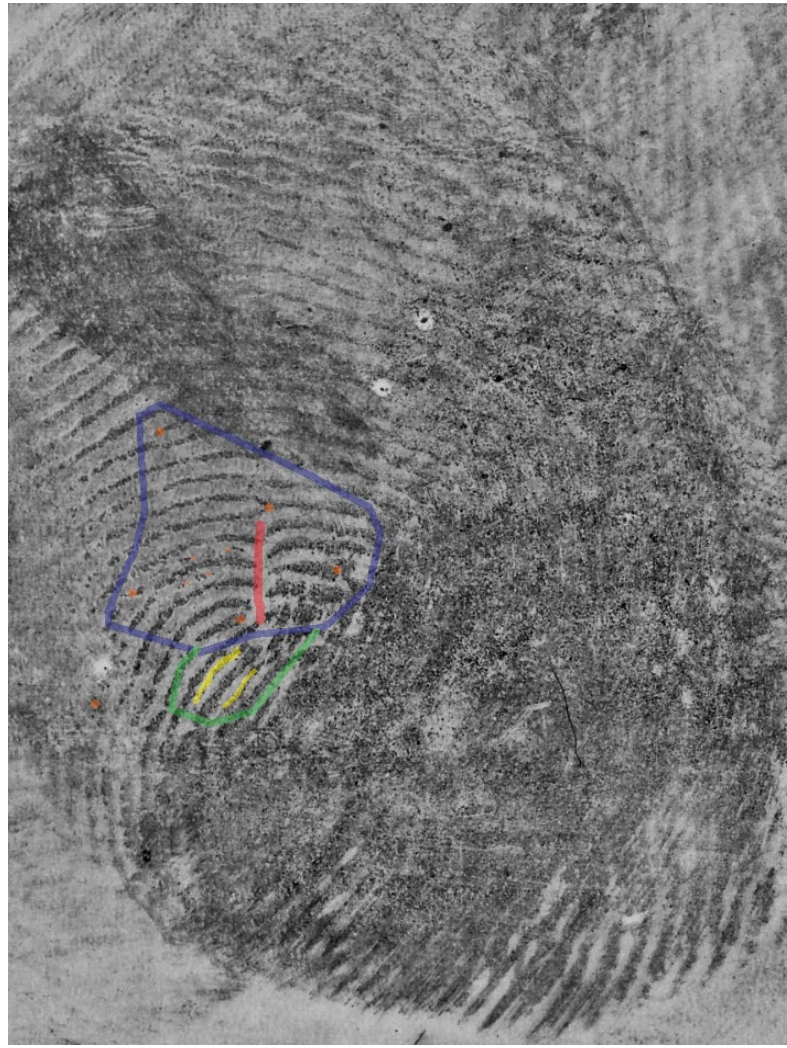
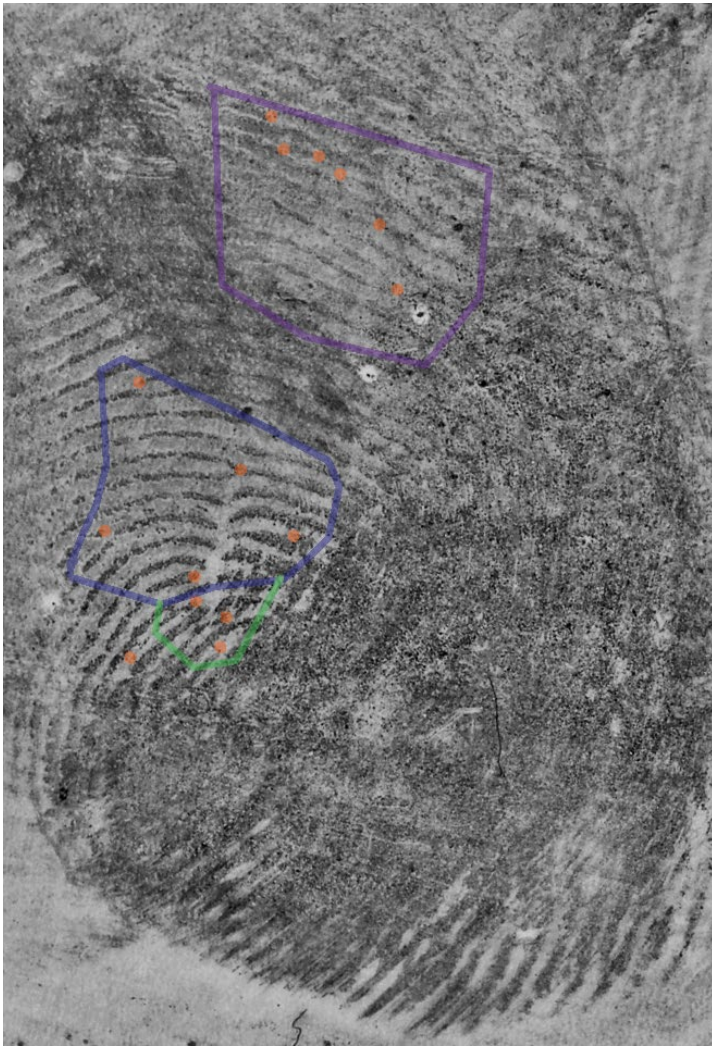
Blue box - All examiners agreed on 5 second level features. If each end of the incipients (in yellow) are counted, 8 features are in agreement between all 3 examiners.

Green box - All examiners marked features in this area, one examiner marked them as incipient ridges (changed to yellow), while the other two examiners marked them as second level features.



Purple Box – One examiner continued to the upper region, and marked an additional 6 features.

Blue circle - All 3 examiners agreed that this ridge ended with variation as to where (or whether it counted as a second level feature or an incipient ridge).



If each end of the incipients (in yellow) are counted as 1 feature each, 8 features are in agreement between all 3 examiners. Features marked range from 6 (10 if incipient ends are counted as "points"), to 15 second level features depending on the decision to mark incipients as 2nd level or 3rd level features.

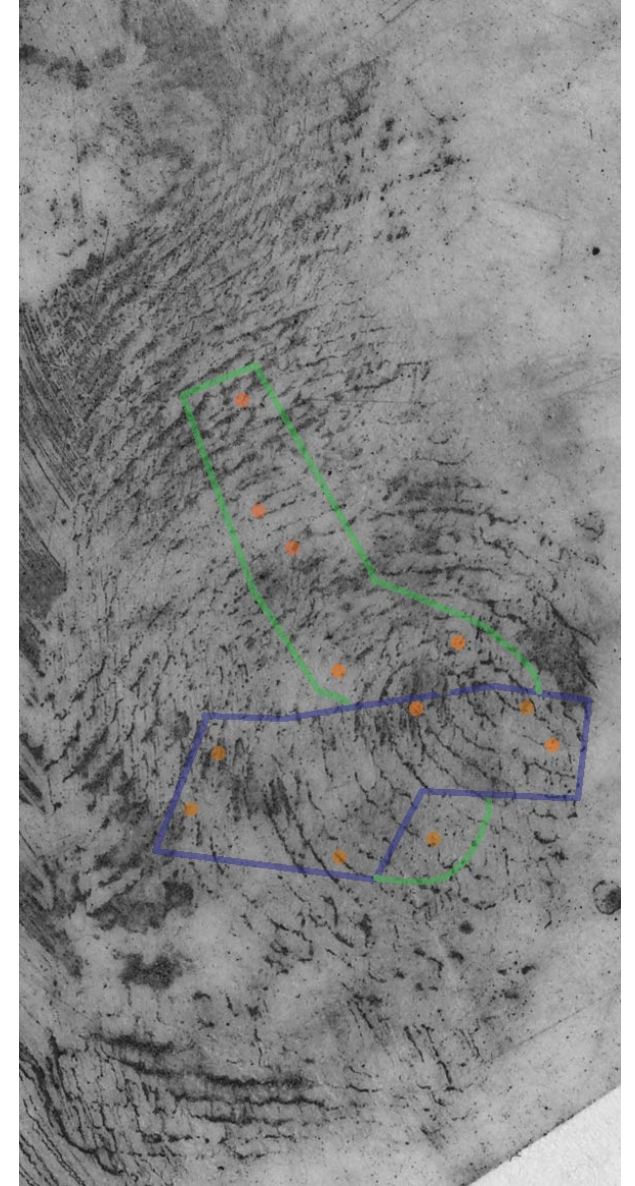
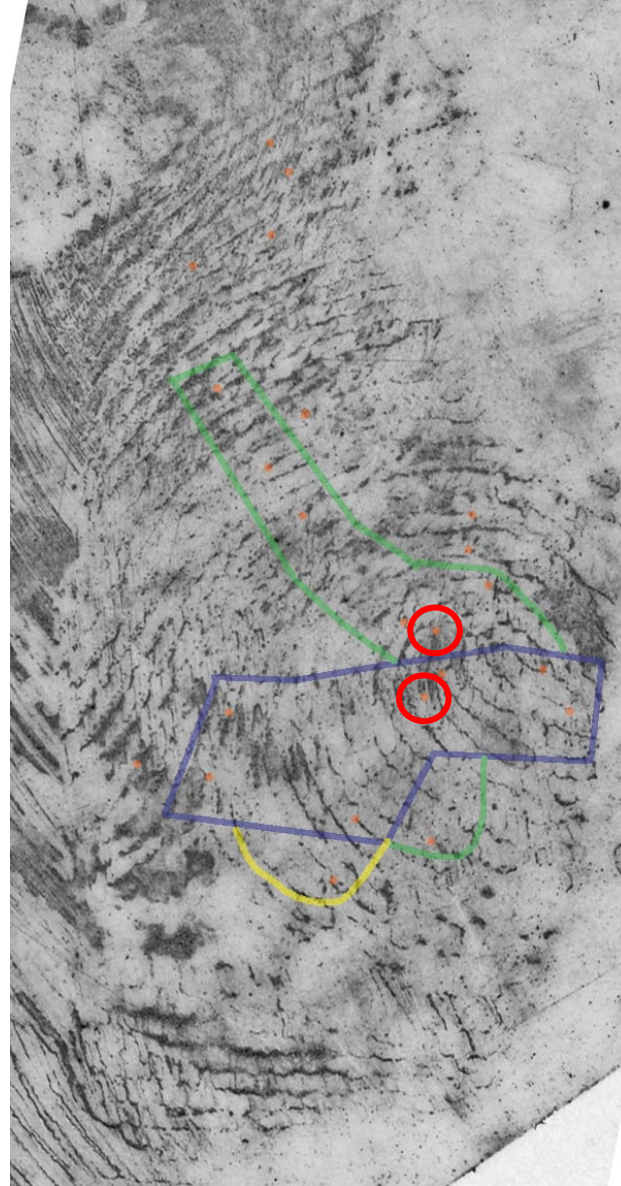
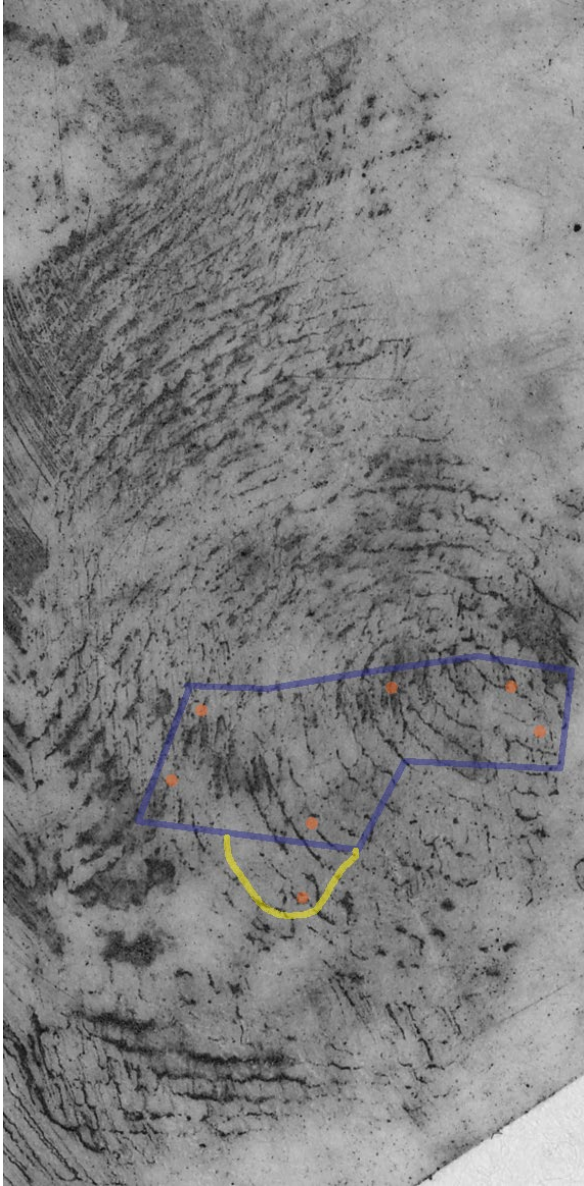
COMMON GROUND?

2 of the 3 examiners stayed in the lower part of the impression. How features are marked can affect the total number of features that can contribute to the "count" (whether the ends of incipients are considered 2nd level or 3rd level).

This impression had both the primary examiner and verifier marking more than 8 features but still moved to Supplemental Verification due to complexity. Other prints in this case also moved to Supplemental Verification (this was the 3rd in this case).



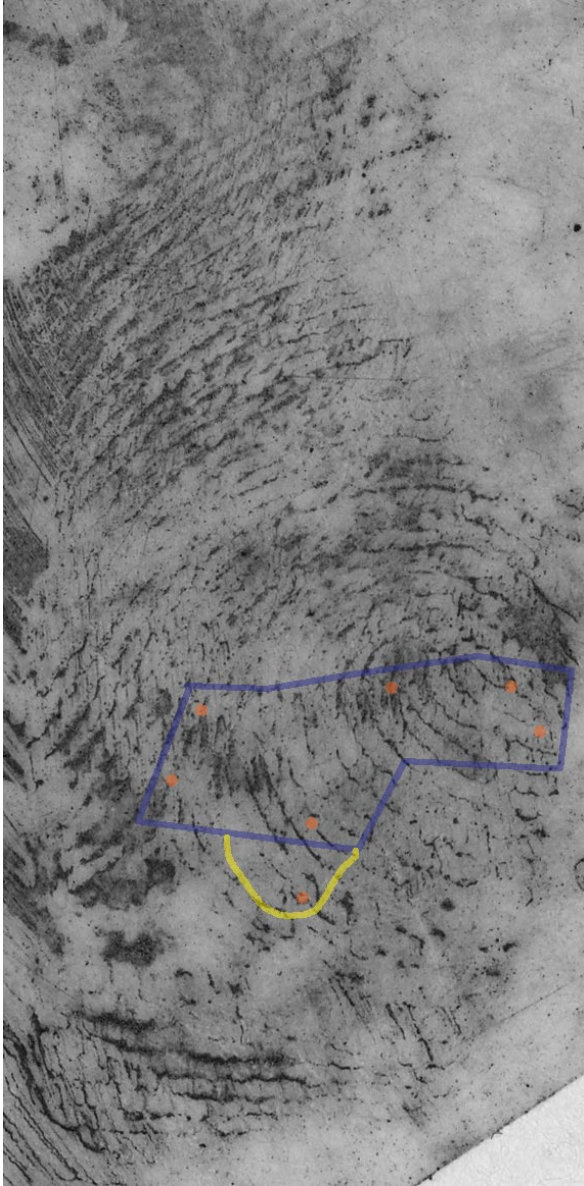




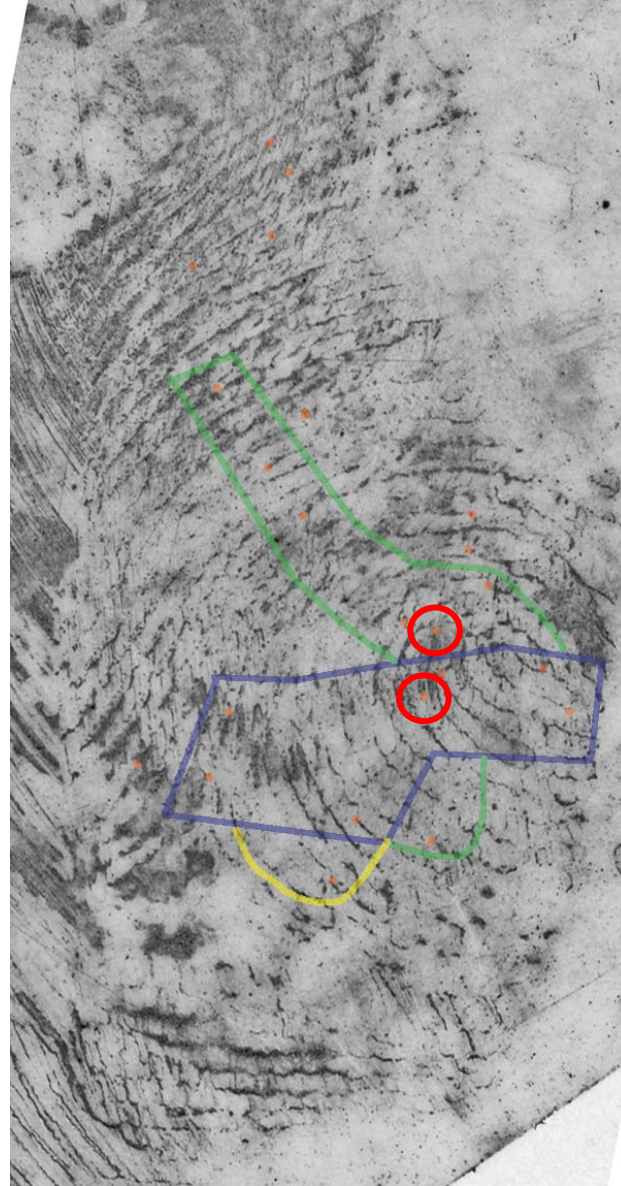
Blue box – all examiners agreed on 6 second level features (one extra within this area in middle example)

Green Boxes – 2 of the 3 examiners agreed on 6 additional second level features (one extra in middle example)

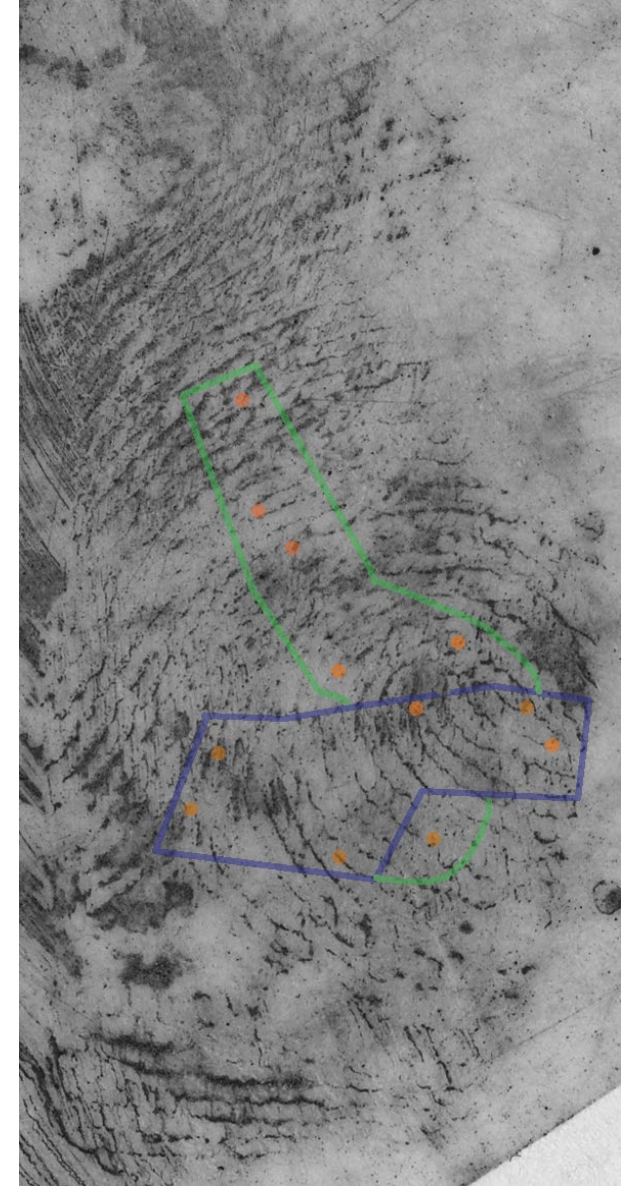
Yellow Box – 2 of the 3 examiners agreed on 1 additional second level feature



7 features marked
No contrast changes



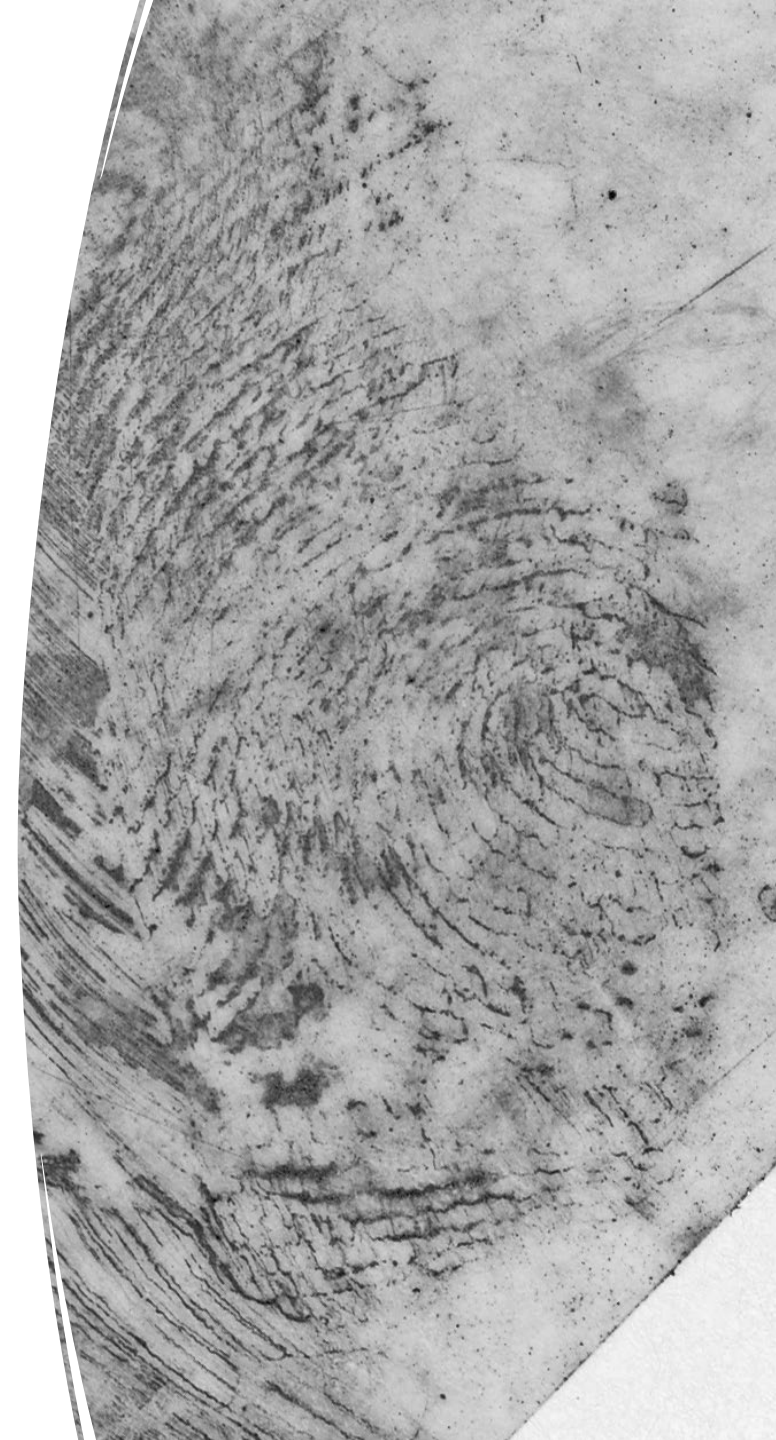
23 features marked
Shadows/Highlights



12 features marked
Apply Image > Multiply

COMMON GROUND?

- 2 of the 3 examiners were comfortable moving up into the more distorted area above the core, with one examiner marking 7 additional features.
- This impression had the primary examiner marking more than 8 but the initial verifier marked less than 7. This print entered Supplemental Verification, with the Second Verifier marking more than 8
- Lots of disagreement between experts on this print. These are the ones we should be using in training and discussion.



TAKE HOME MESSAGES



Anyone could have been the primary, making decisions with these impressions.



There is nothing personal about the interpretations verifiers make on cases.



We tend to agree that the same points are useful in making conclusions.



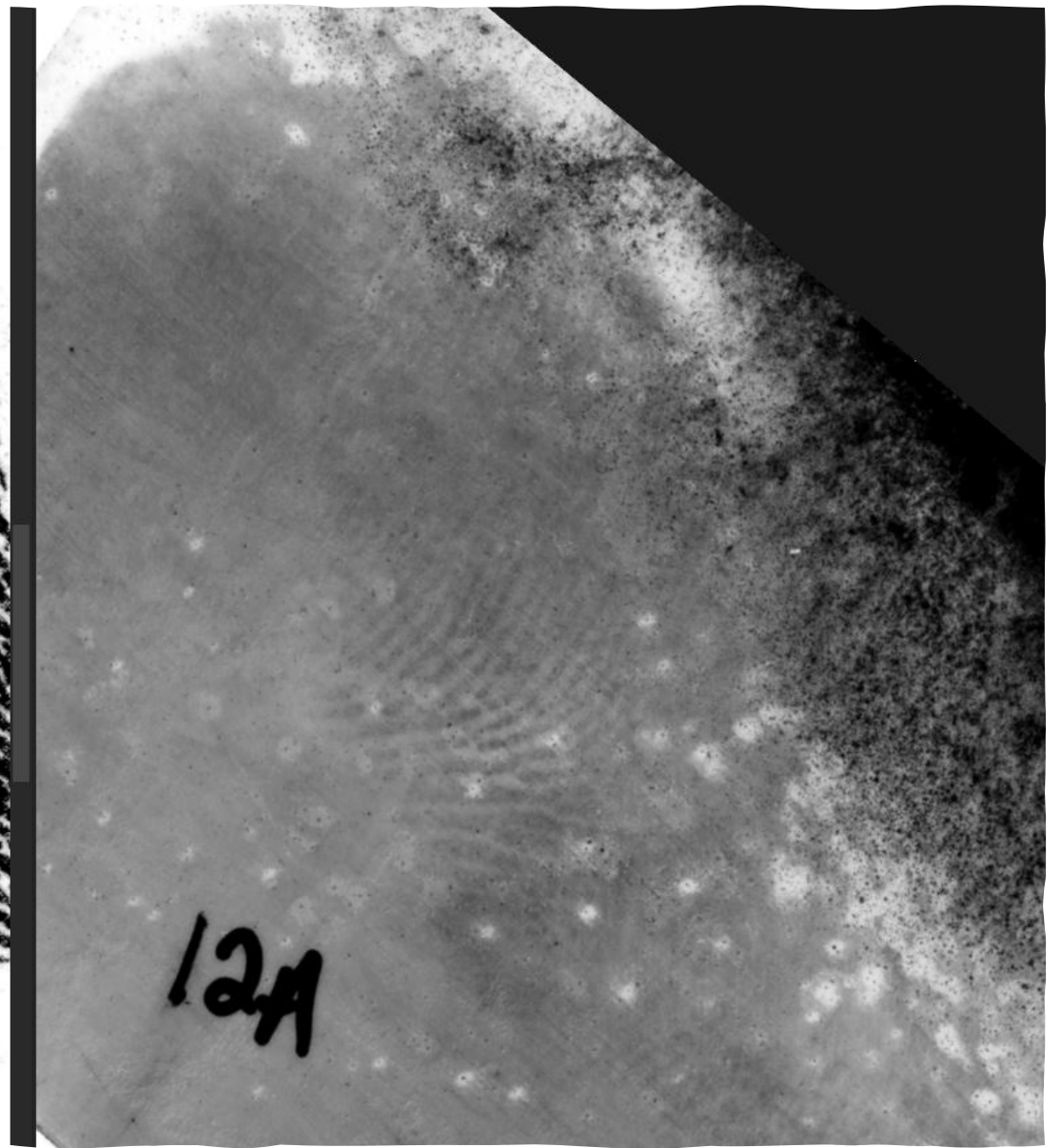
Each examiner's opinion is useful and group discussions help everyone learn.

IS 8 THE RIGHT NUMBER?

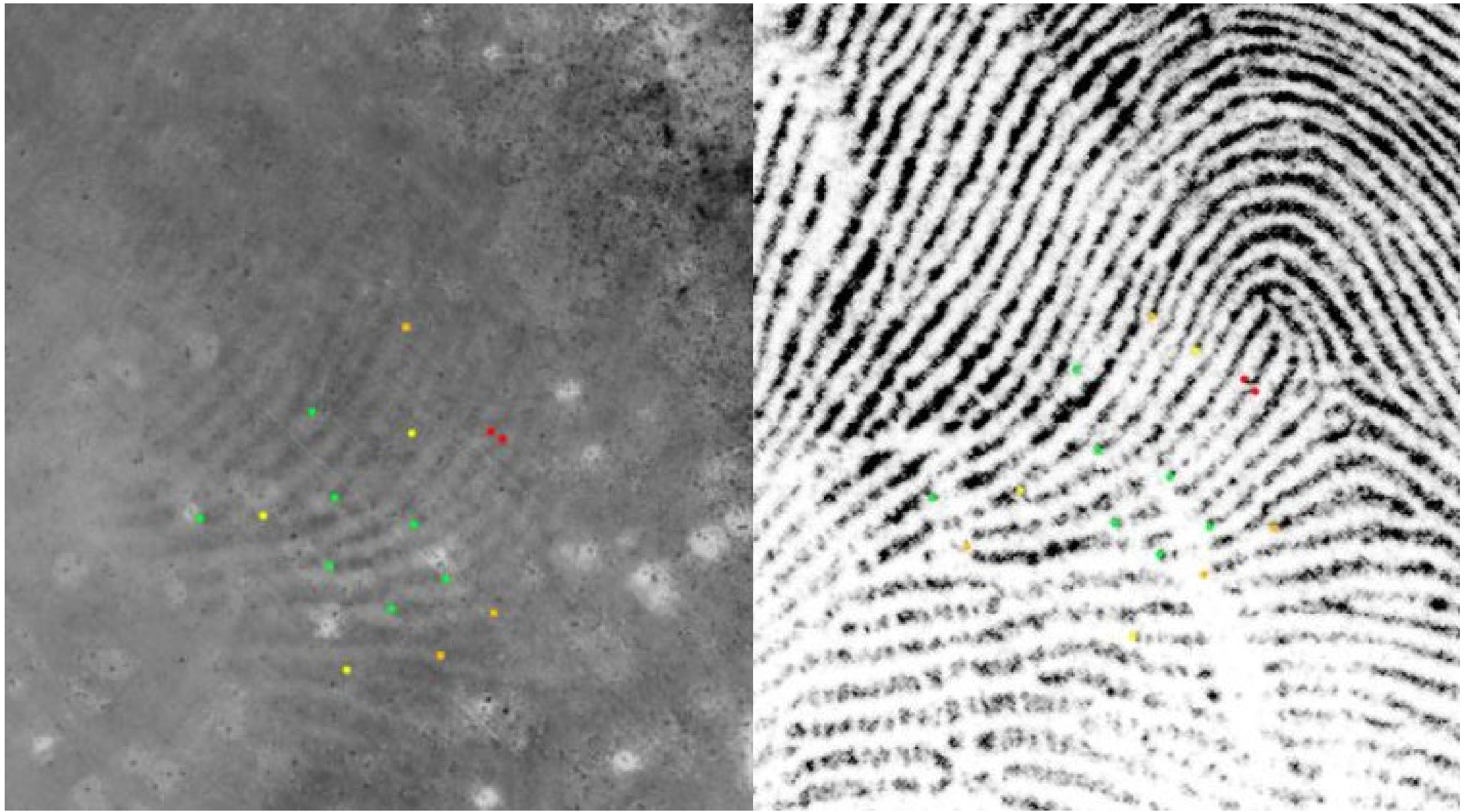
CLOSE NON-MATCH



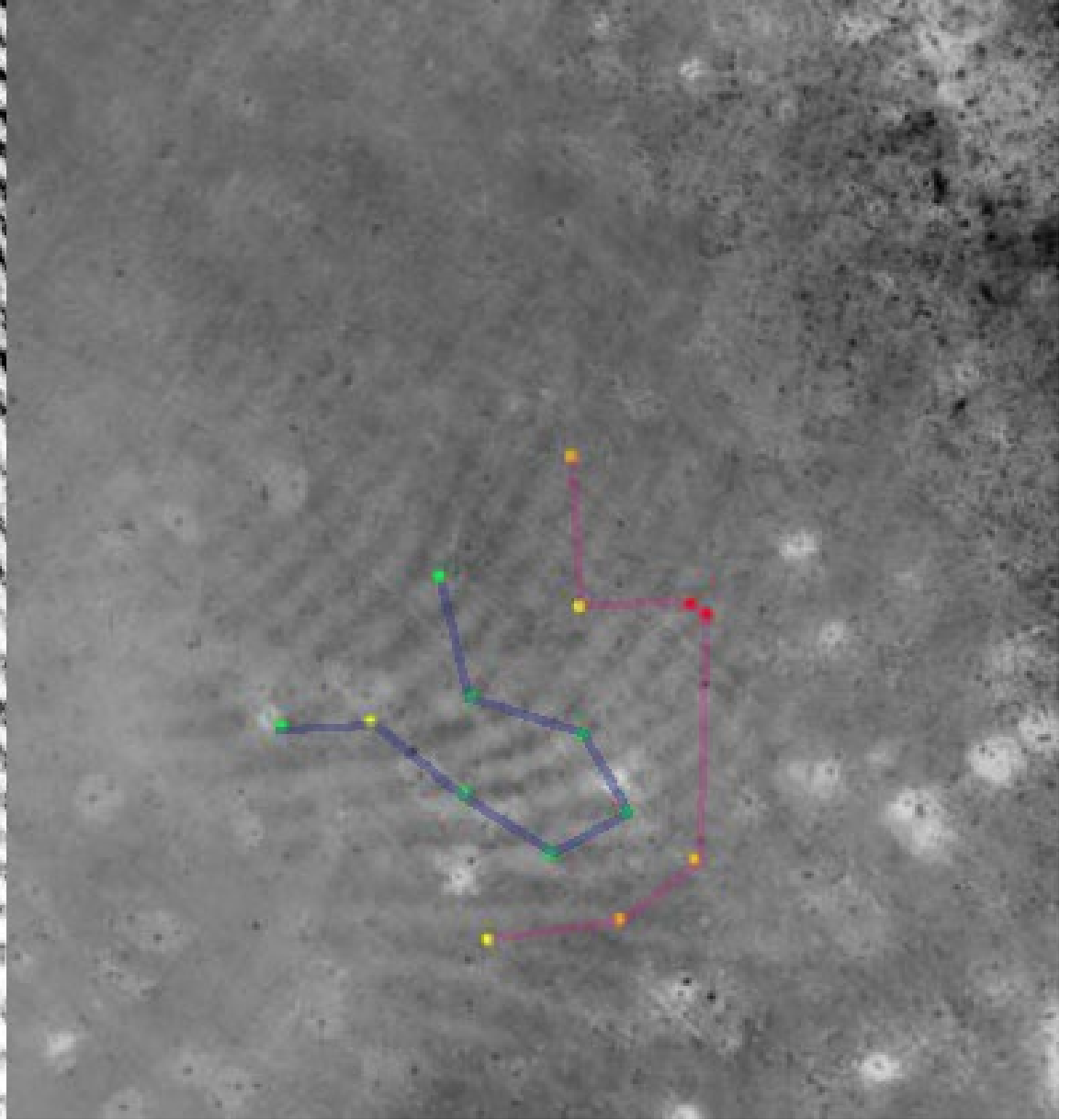
L. THUMB



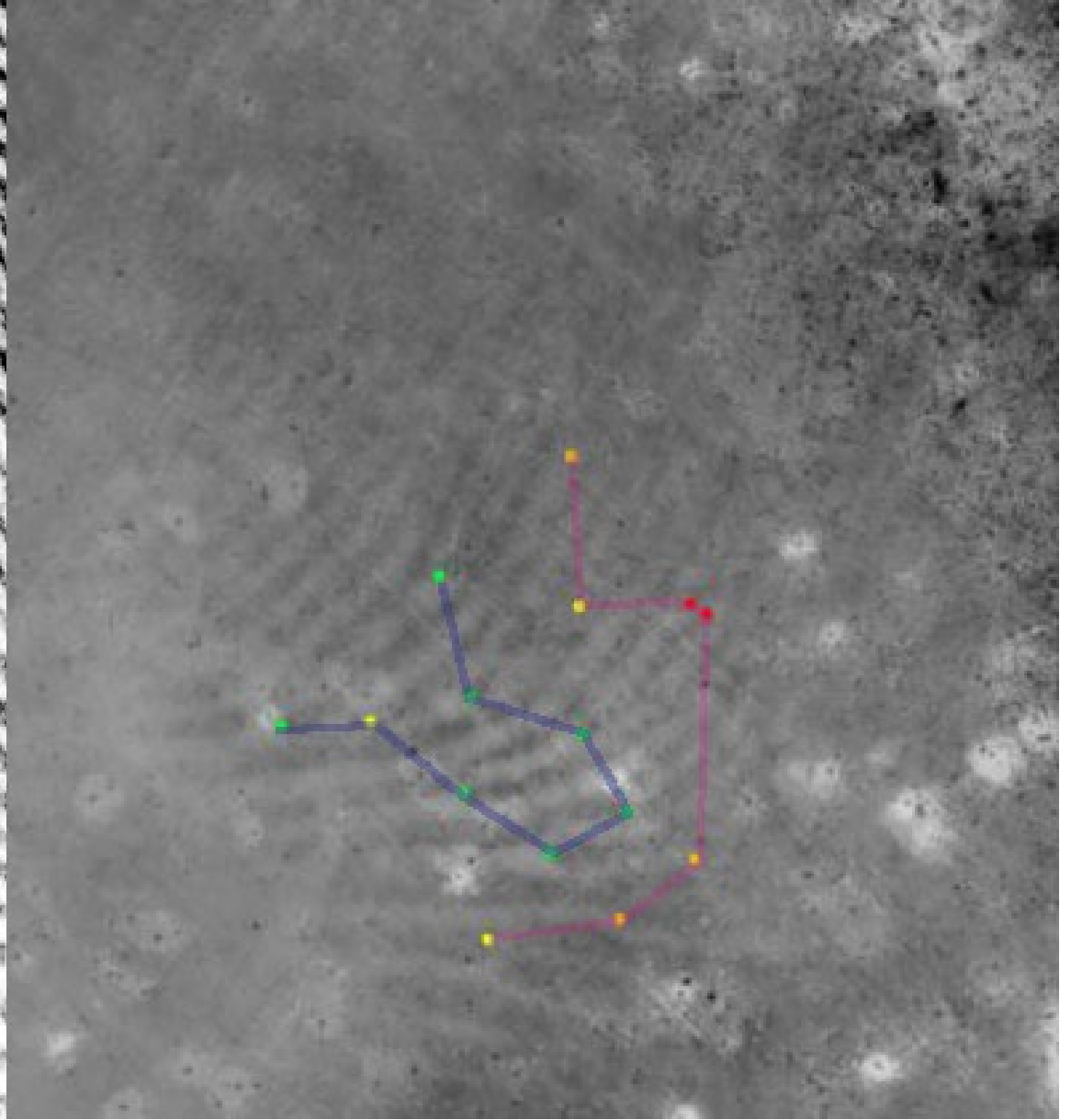
AFIS screenshot



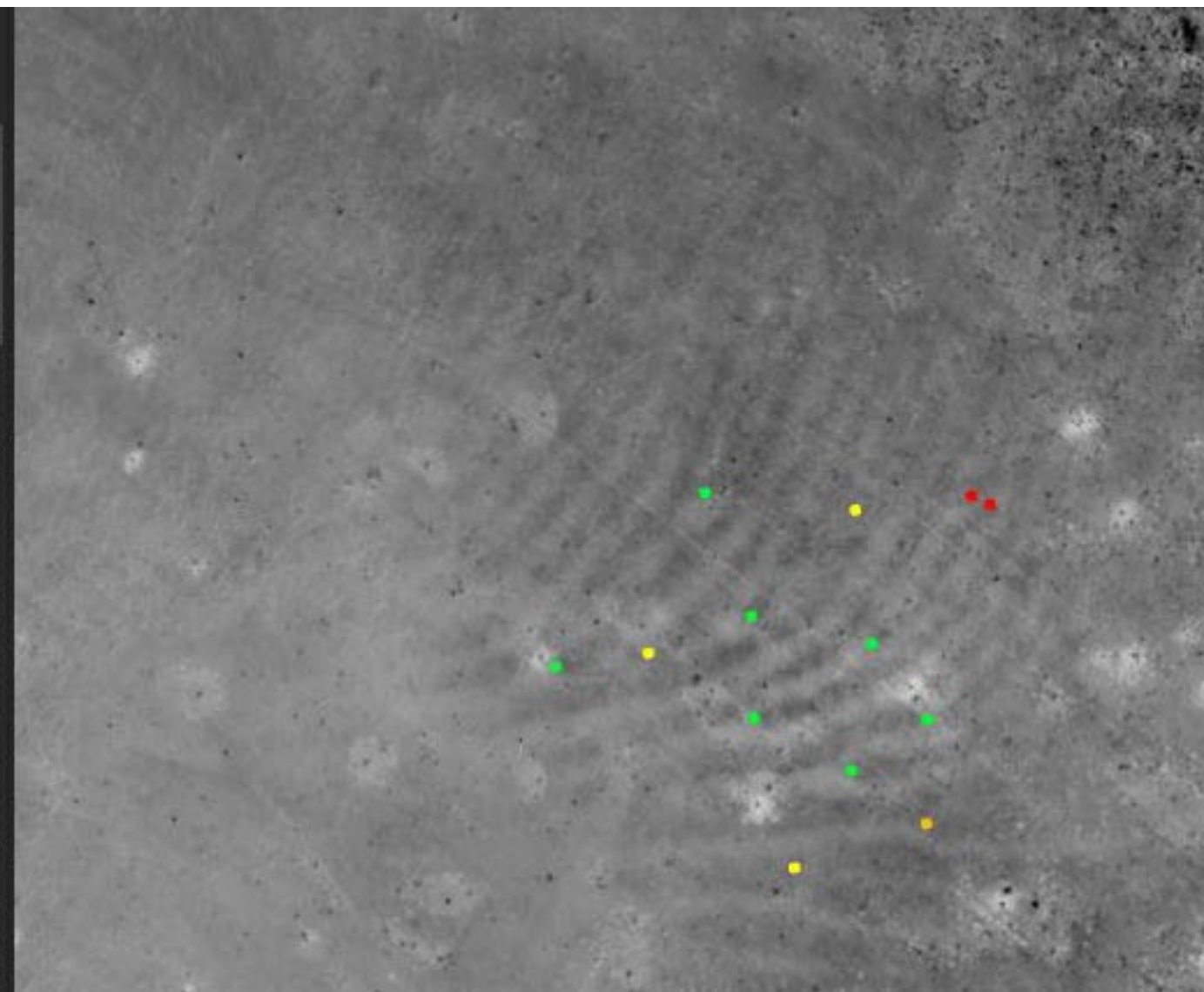
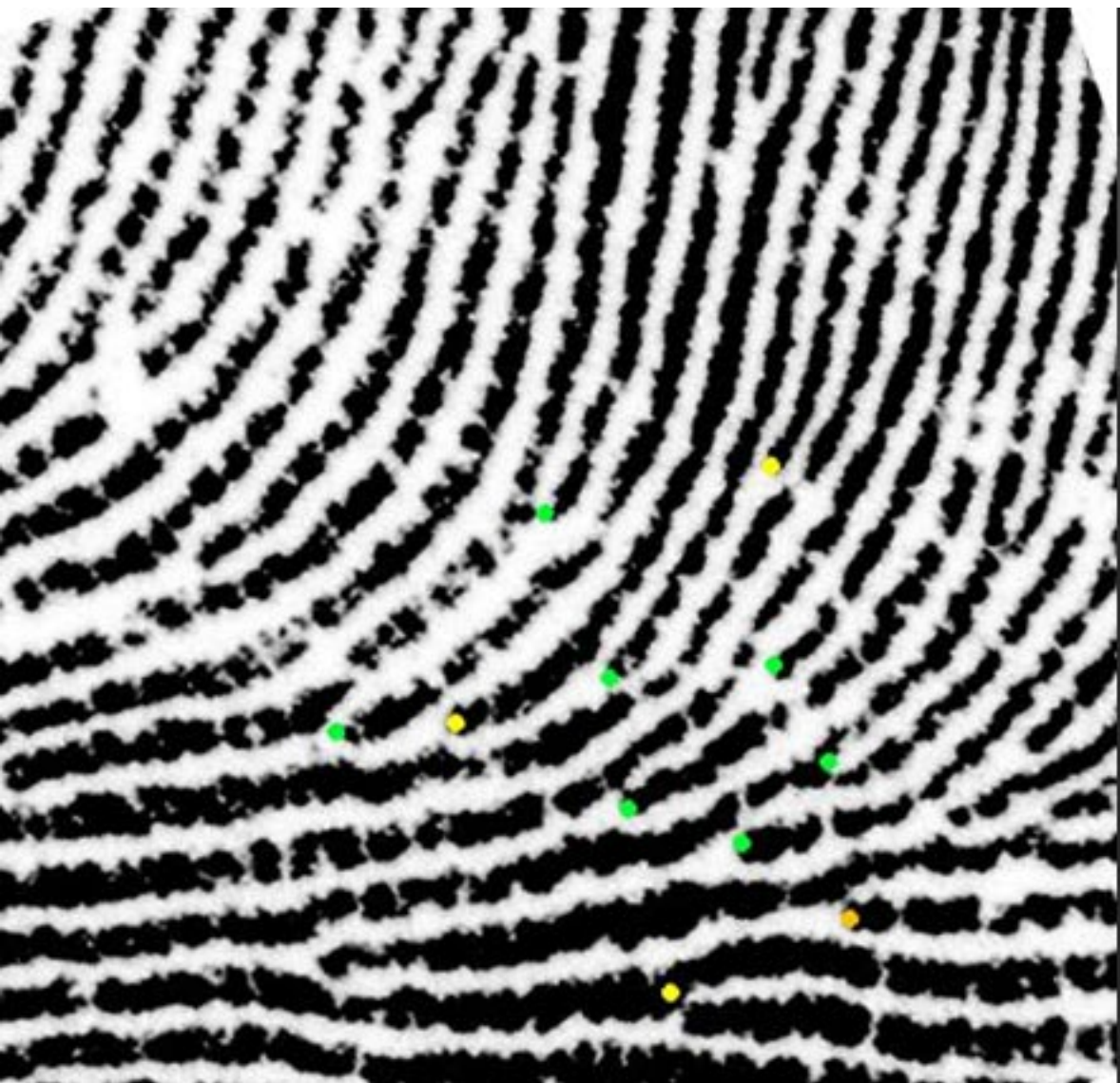
Here we have 15 features marked in the latent, and 13 of those were in the known. Much more than the 8 required in the policy. Are they truly "corresponding"?



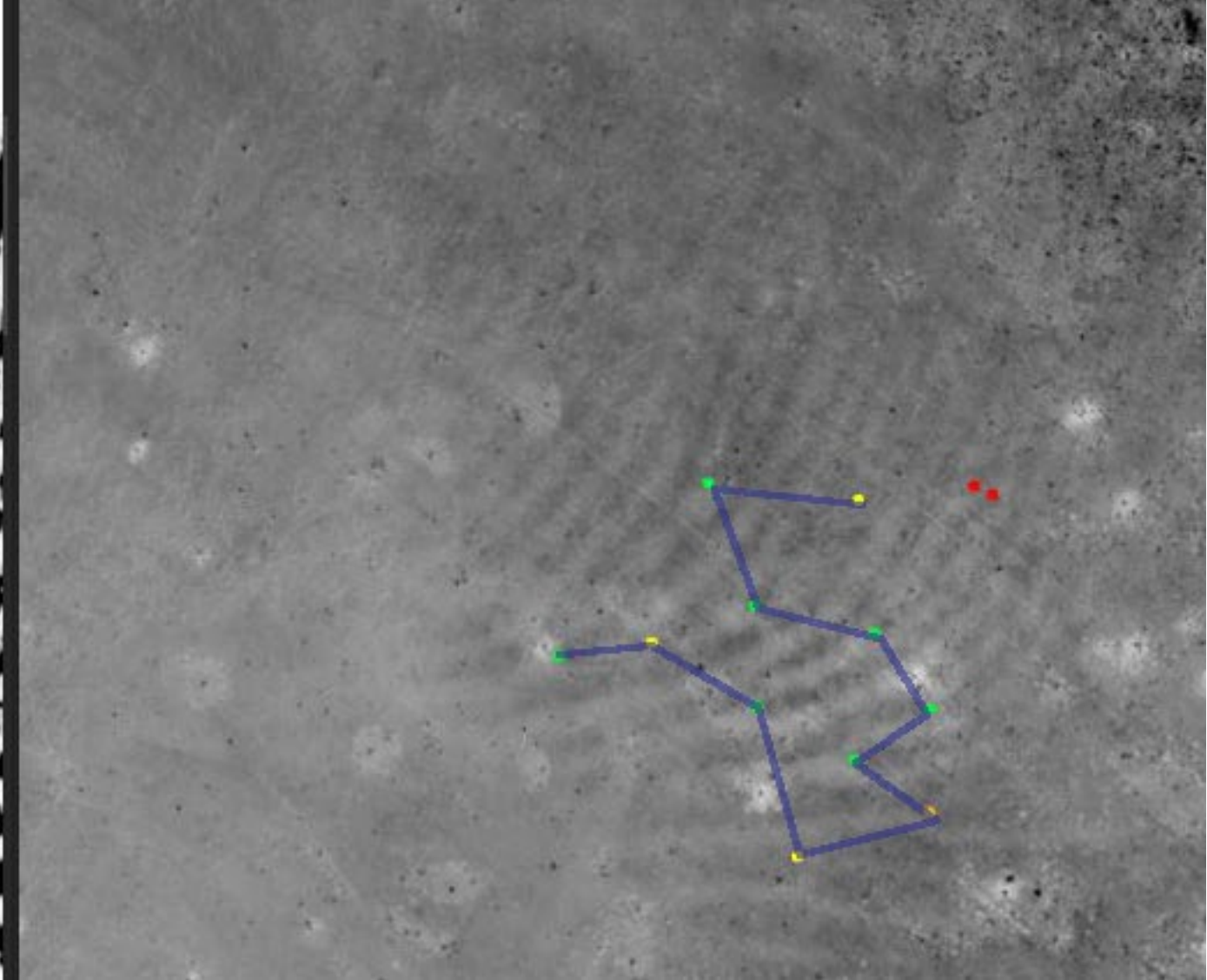
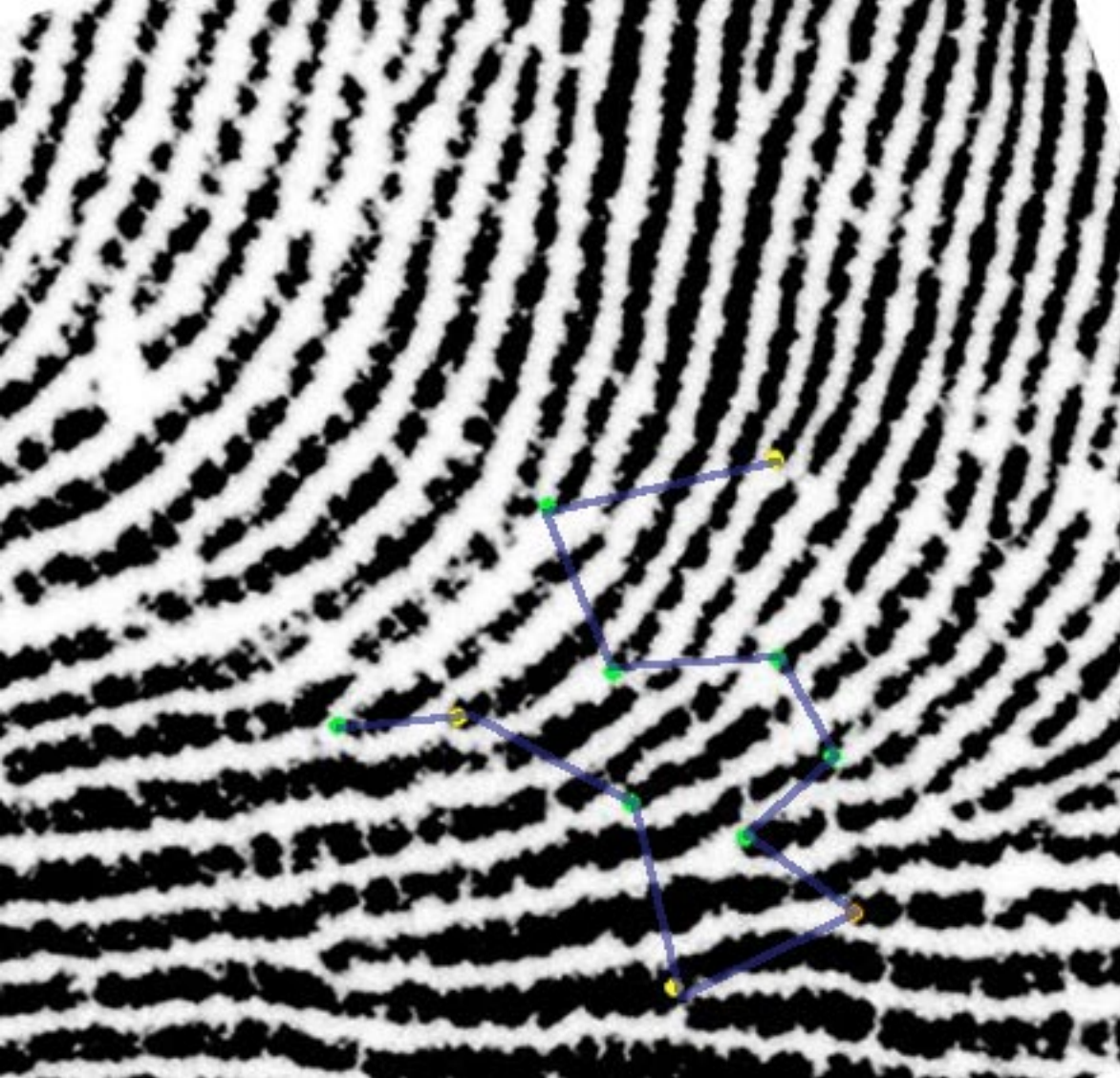
Blue line connects 8 features which are within tolerance for their angles/location to each other. Pink line connects 7 features which are outside tolerance for their angles/location to each other and the blue features.



While an examiner might feel that δ features are in agreement, there is information outside of this region that disagree. If all we had were these δ features, we might feel this is an identification according to our policy.



Let's take a look at a different known



Much more consistency with this known, 11 features connecting.
Enough to Identify?

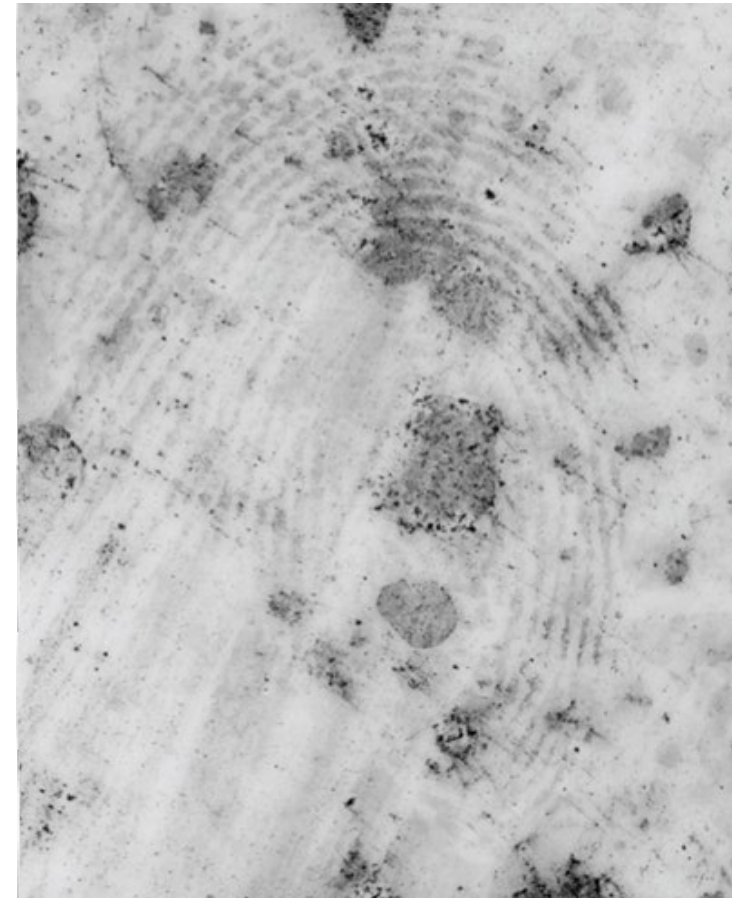
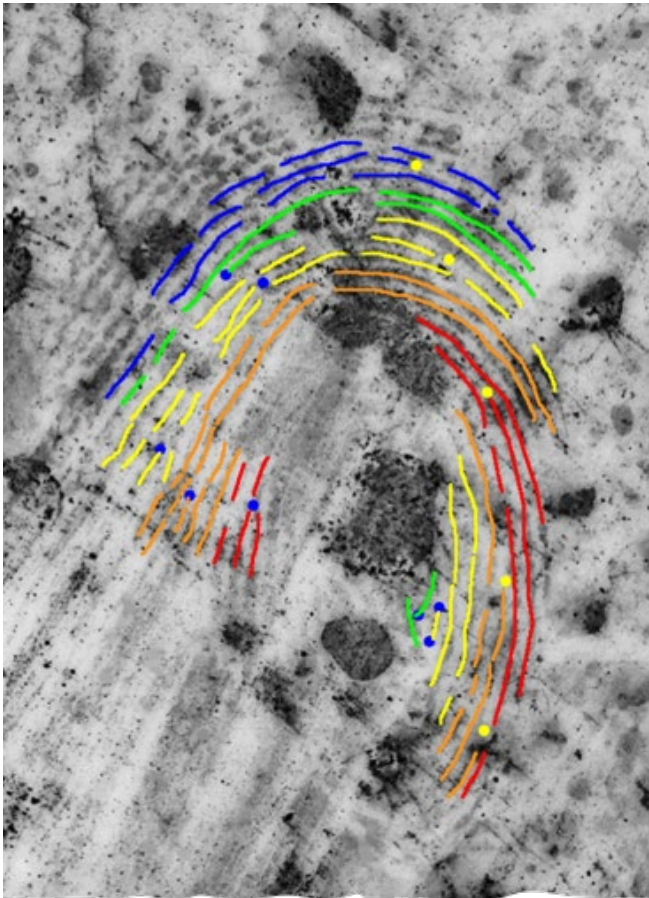
TECHNIQUES FOR COMPLEX PRINTS

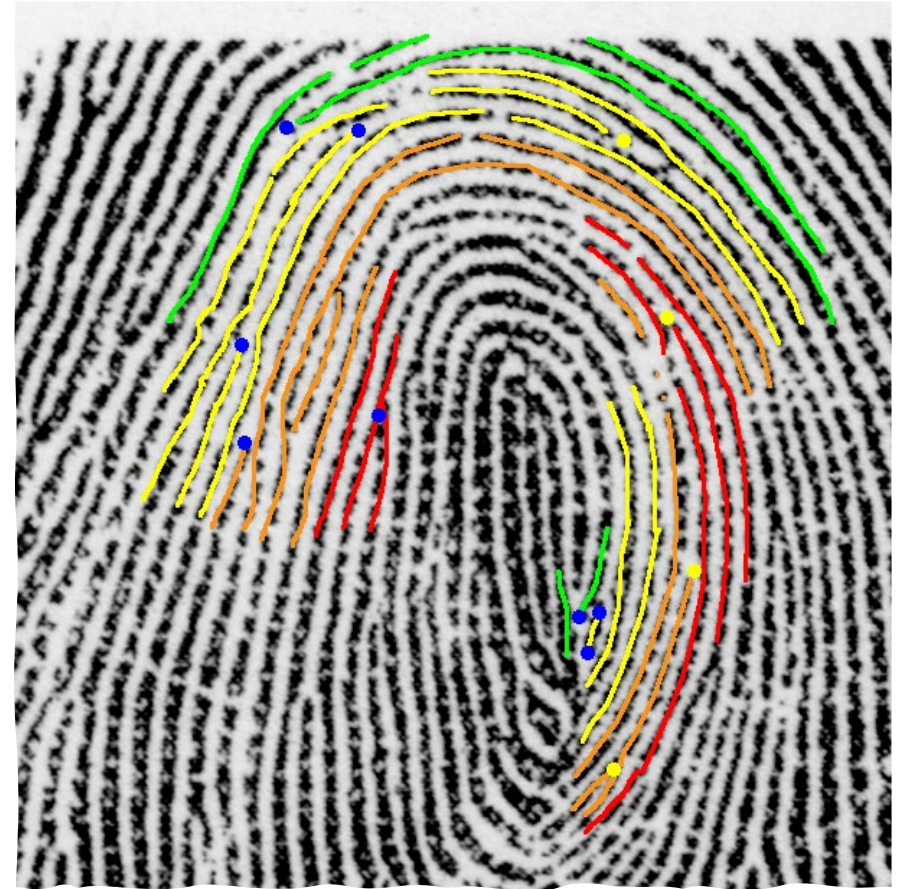
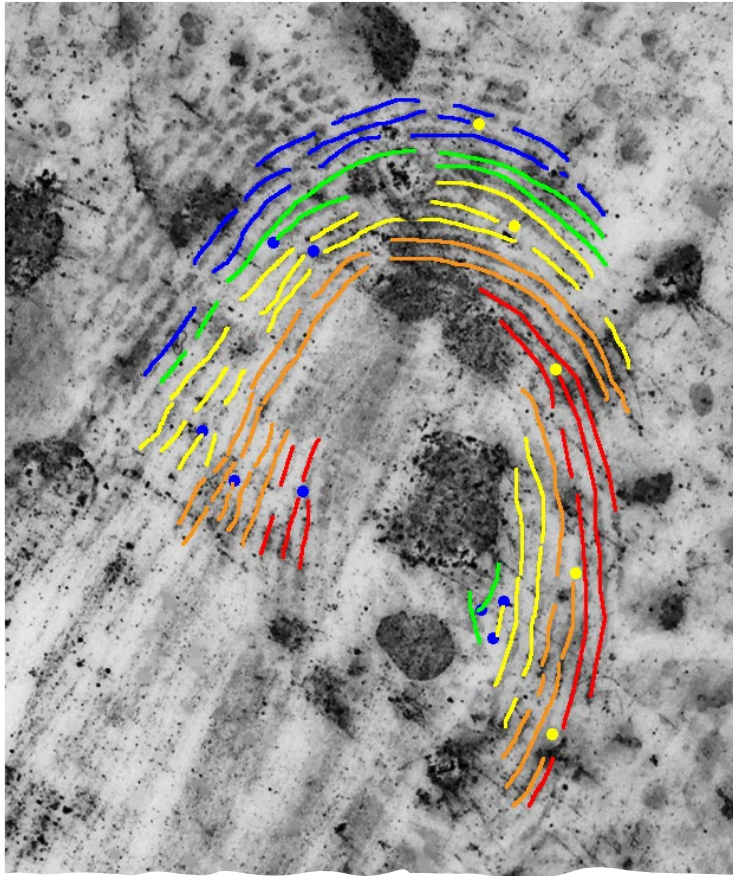
METHODS OF DOCUMENTATION

RIDGE TRACING (RAINBOW)

Passing through areas of low quality or voids can benefit from performing a ridge tracing. Pick a region to start, and make it Red. The ridges on either side move down in rainbow order. This technique is used to document **Level 1 - ridge flow**.

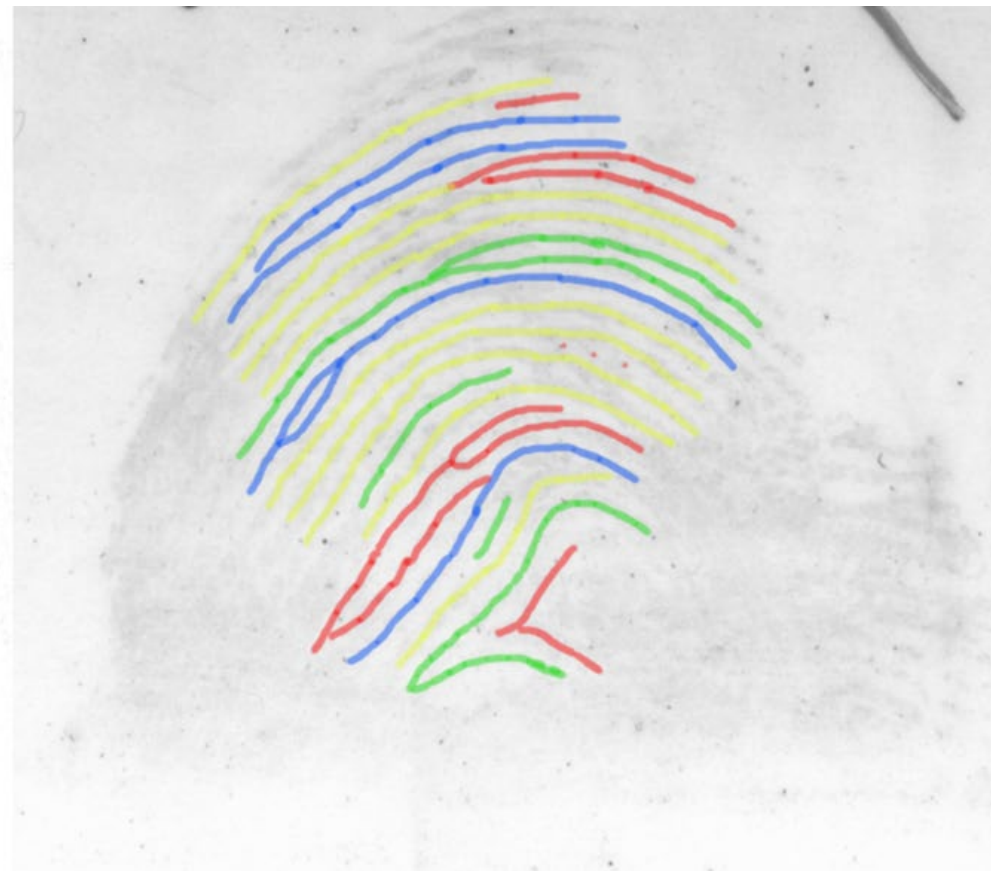
In this image the orange carries across the top of the impression, and the red allows a connection between the center and lower right areas of the print.





RIDGE TRACING (RAINBOW)

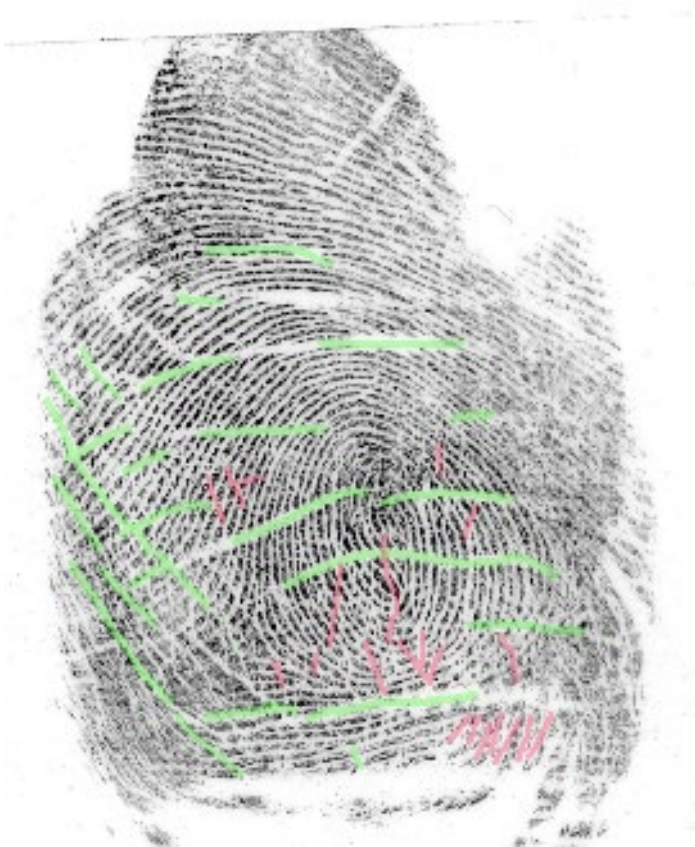
Features seen in Analysis on the latent were very limited (5 yellow features).
8 Additional features (blue) were added during comparison. Locating these features is aided by performing ridge tracing.



RIDGE TRACING (TARGETED COLOR)

Yellow ridges are intervening "open field" ridges. Those without endings or bifurcations. Level 1 and Level 2 both highlighted in this technique.

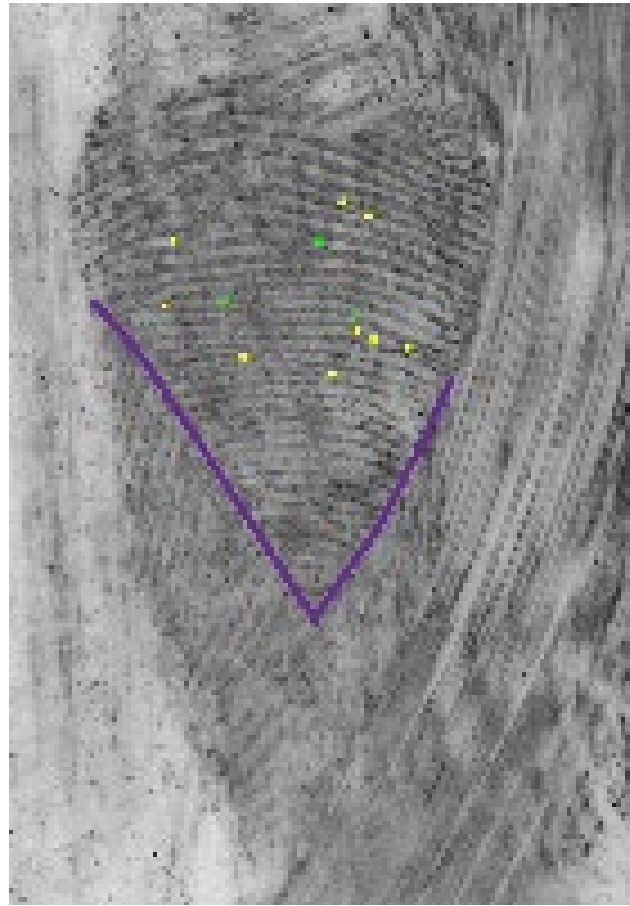
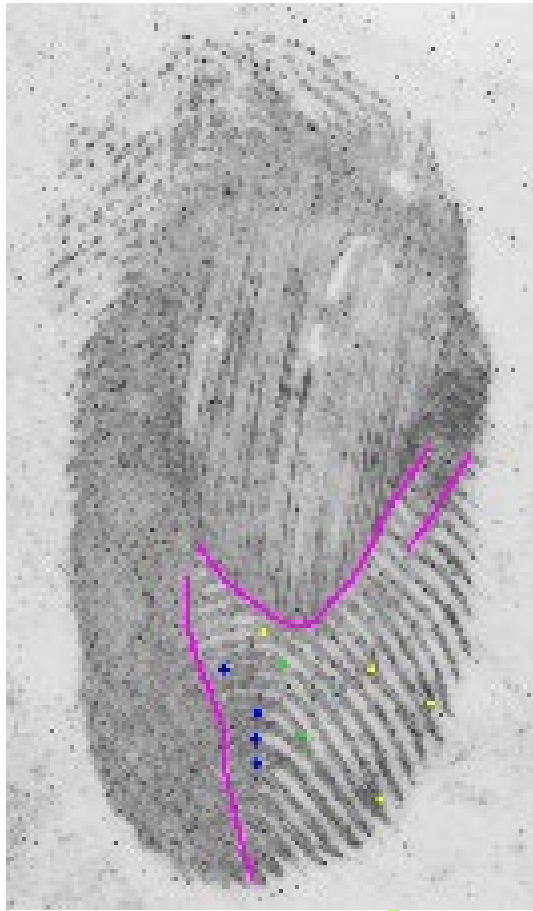
Pick a limited number of colors to work with to mark the features. Colored ridges instead of dots is another way to document the ridges, not just points.



3RD LEVEL MARKUP



Can also use Photoshop to document Level 3 structures such as creases.



DISTORTION DOCUMENTATION

Distortion can be documented using lines indicating the edges of the area of distortion. Here, magenta and purple lines were used to indicate the edges of the impression. Can illustrate why an examiner didn't document an area of the impression.

QUESTIONS?

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