



The Lab Report

Volume 8, Issue 2

April 2018

Nebraska State Patrol Crime Laboratory Mission Statement

The mission of the Crime Laboratory Division is to provide quality and timely forensic science services to the State of Nebraska. To fulfill the mission of the laboratory, the following objectives are supported and understood by the staff of the NSP Crime Laboratory:

To provide timely, effective and impartial forensic services to aid in the investigation of crimes; To provide relevant, professional and impartial testimony in judicial proceedings; To disseminate scientific information and educate the criminal justice community regarding forensic science matters; To provide traceable and accurate results that are pertinent to the needs of the criminal justice community.

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Current Case Assignment Turnaround Times (TAT) and Agencies Served

January 1 – April 20, 2018: 120 different agencies submitted cases, equating to 1,820 new cases and over 2,107 assignments to sections for analyses.

TAT in the following sections is an average over the past 30 days:

- ◆ Controlled Substances – 57 days
- ◆ Toxicology – 43 days

TAT in the following sections is an average over the past 90 days:

- ◆ Biology – Violent/Personal Crimes – 121 days
- ◆ Biology – Non-Violent/Property Crimes – 173 days
- ◆ Firearms/Toolmarks – 117 days***
- ◆ Latent Prints – 147 days
- ◆ Trace Evidence – 20 days

Database HIT information:

CODIS (Combined DNA Index System) (January 1 – March 30, 2018)

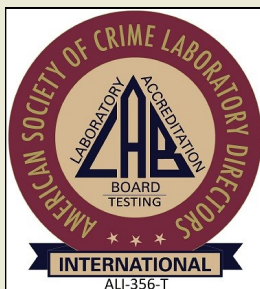
- 17 Offender Hits (associating a known offender sample with an unknown evidence sample)
- 2 Forensic Hits (associating unknown evidence samples from two separate criminal cases)

AFIS (Automated Fingerprint Identification System) (January 1 – March 30, 2018)

- 77 Latent Print Identifications, of which 48 were Cold Hits

*** **TAT in Firearms/Toolmarks** is impacted by the fact that often evidence is not available to the section's forensic scientists until after examinations have been completed by other sections in the lab.

TAT Information is current as of 4/20/18 and obtained from the Lab Information Management System (LIMS). Numbers can fluctuate somewhat due to assignments being added, deleted, and/or combined as needed, after the original evidence submission to the laboratory.



ASCLD/LAB accredited since 2004.



Evidence Section News / Submission Requirements

In the January 2018 issue of the NSPCL newsletter, we talked about the necessity of proper evidence submission (especially when mailing evidence) and our policy of returning improper evidence after three contacts with the agency (i.e. three strikes).

To review, upon receipt at the NSPCL the following must be in place:

- Evidence submission form in an envelope on the outside of the package
- Outermost package must be tape sealed **WITH INITIALS CROSSING THE TAPE ONTO THE PACKAGE** - this creates a tamper evident seal.
- Submit only one case per certified mail or other postal tracking tag.

When contacting submitting officers regarding improper evidence submissions, some of the most common responses are:

“But I sealed all the packages inside the box”

- NOTE: The NSPCL evidence technicians do NOT open the outer mailing package. This outer container must be properly sealed before the lab can accept it.




“We’ve always done it this way”

- NOTE: Please make note of new evidence submission policies/practices as they are relayed to you, our customers, through our various communication outlets. Evidence packaging policies/best practices change periodically to fit accreditation needs, evidence storage needs, analysis requirements, etc. When new policies are not followed, the NSPCL evidence technicians have to take time to fix the agency error by way of contacting the agency, sending evidence back, etc. With the record increases in submissions coming into the laboratory on a daily basis, the evidence technicians can no longer fix the errors and still provide quality, efficient service to our customers.

Evidence Section News / Submission Requirements

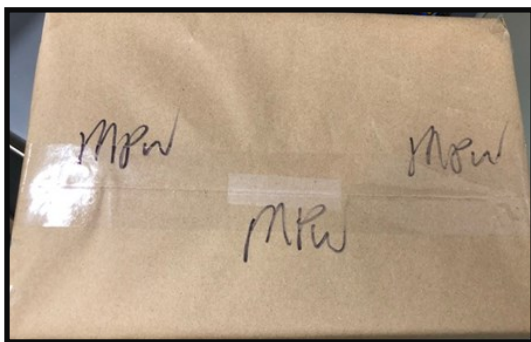


What can you do to help?

-  Train new submitting officers in proper submission of evidence.
-  Have submitting officers who are new or haven't submitted in the last year contact the lab to make sure they have the most up to date info on laboratory evidence submission requirements.
-  Go to the NSPCL website under "Forms you may need", then "Crime Lab Forms", "Crime Laboratory Manual" and then "Evidence Submission".

<http://statepatrol.nebraska.gov/pages/crimeLabForms/nspcrimelab/10740.PDF>.

Below are images showing how the external evidence packaging should look. Boxes and envelopes must be taped with the officer's initials crossing over the seal on to the package.



Your assistance is greatly appreciated! Please let us know if you have any questions. Lab staff are always happy to assist. Thank you!



Latent Print Impressions and Digital Photography

Latent print impressions are extremely fragile, and can easily be destroyed. In some instances (especially on major cases), it may be safer to photograph the impression at the scene, if there is a chance the impression will be damaged with lifting, or when the evidence is transported to the laboratory. In other situations it may be more effective to photograph the impression in the laboratory due to the specialized lighting available in conjunction with a copy stand. It is up to the investigative officer to determine which would be the best course of action for each item of evidence.

The Nebraska State Patrol - Latent Print section accepts digital photographs of the latent impressions on any of the following digital media devices: CD, DVD and/or USB Flash drive.

The following information is being offered to serve as a guide to submitting investigators using digital photography to collect latent print evidence.

Which file format should I use to capture latent impressions?

When photographing latent print impressions, it is highly recommended the images be captured in TIF (TIFF) or the camera's RAW file formats (whichever is available on your camera). RAW files are unprocessed data taken directly from the imaging sensor and saved in their true, 12 or 14 bit color depth. TIF or TIFF files (Tagged Image File) are used for storing high-quality type graphics. Both RAW and TIF files support "lossless" compression, where the quality of the image does not get compromised with further image processing.



While each digital camera manufacturer has their own proprietary RAW file format, ultimately all RAW files are converted into a TIFF for further digital processing

Latent Print Impressions and Digital Photography

But my camera only captures images in JPEG... now what?



If your camera only captures images in JPEG, please check your settings, and select **Large** in the Image Quality Settings screen. **But if RAW file format is available to you, PLEASE switch the capture mode to RAW in order to ensure that you are capturing the best quality images!**

Image-recording Quality Settings

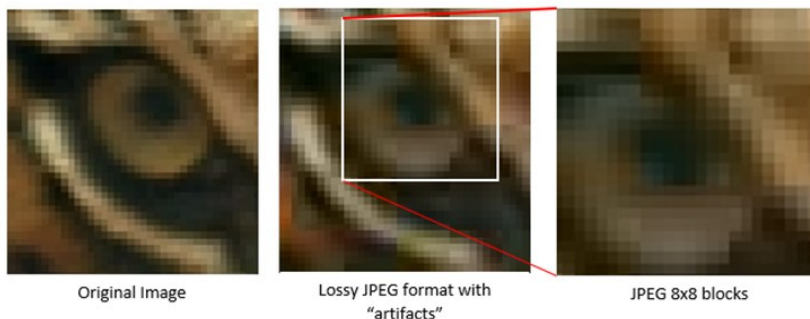
	Image Quality	Pixels Recorded	Possible Shots
JPEG	L	18M	1140
	M	2240	2150
	M	8.0M	2150
	S1	4200	4200
	S1	4.5M	3350
	S1	6360	6360
RAW	S2	2.5M	5570
	S3	0.35M	21560
	RAW + L	18M	230
	RAW		290

Why can't I capture latent impressions in JPEG file format?

JPEG is often the default file format for most of the digital cameras. **While being acceptable for capturing general crime scene photos, this file format is not considered to be suitable for capturing high quality forensic digital images!**

So, what happens...?

Every time an image is shot in JPEG, the camera captures that image, and further divides it into blocks of 8x8 pixels. It then evaluates the information, and decides which pixels are important, and which ones are not. The pixels deemed to be "not important" are then discarded, resulting in a smaller (compressed) version of the image.



Original Image

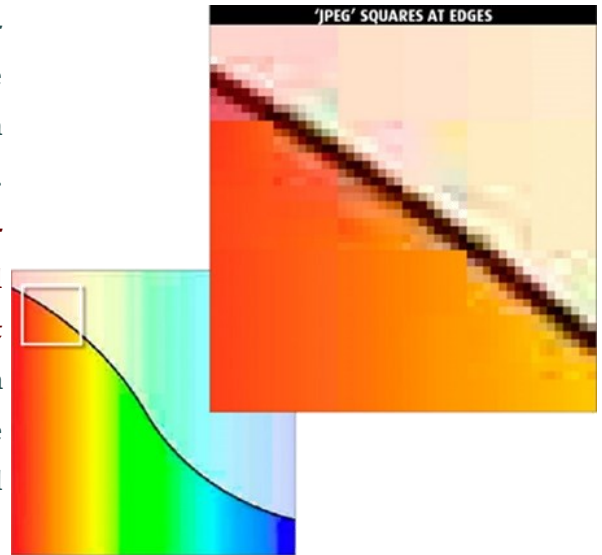
Lossy JPEG format with
"artifacts"

JPEG 8x8 blocks

Latent Print Impressions and Digital Photography

“Feathering” can also be noted in JPEG images, especially around the edges of the solid colors in the images (in our case, the solid color represents ridge detail, and the feathered areas are affecting (changing) the ridge shapes).

As a result of the compression, the JPEG file format changes image data while converting it, and can introduce “artifacts” that were not there in the original image (change in friction ridge shapes and features). Therefore, the JPEG file is considered to be “lossy” file format, and as such, it is not suitable for latent print photography where the high resolution and clarity images of the minute detail needs to be captured for further analysis.



DID YOU KNOW.....?

Every time you rotate a JPEG image in Photoshop it loses quality!

Changing one single pixel in a JPEG image and then saving it, causes a file compression and a loss of image quality.



JPEG compression is automatically performed in order to make the files smaller, and make more room on the memory card. For example, if capturing images at 18 megapixels, you can capture 1140 high quality JPEG images, compared to only 230 high quality RAW images. The quality of a digital file in JPEG is sacrificed on the account of the quantity of images being captured.

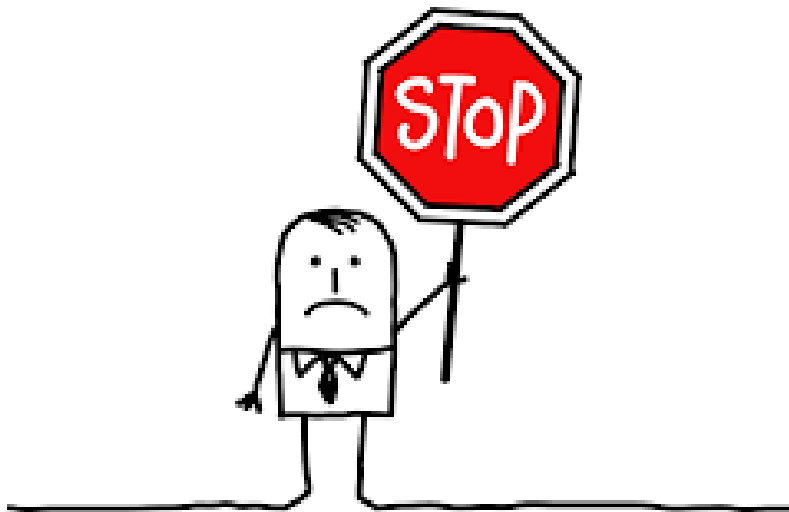
Latent Print Impressions and Digital Photography

Should I process my digital images prior to submitting them to the Crime Laboratory?



NO! There are certain tools and functions available within digital image processing programs that are not suitable or permitted in forensic digital image processing. These functions may result in permanent alteration of image quality and/or information.

Once the digital media containing images of the latent impressions is received by the NSP's Latent print section, a latent examiner trained to competency in digital image processing will conduct further image analysis using Adobe® Photoshop® CS6 program. They will ensure that only industry accepted processing tools will be applied on these images, resulting in best possible final product, as well as ensuring that metadata containing the image processing history is captured within the file.





Latent Print Impressions and Digital Photography

Which photographs should I submit for latent print analysis?

While you must establish the location of the fingerprint on an item of evidence or in the scene, taking numerous mid-range (distance) photographs and including them on the digital media being sent to the Lab becomes cumbersome for the latent print examiner. We call these images “evidentiary photographs”, and they generally have very little, if no value at all to us.


Latent impressions in the evidentiary photos are generally too small, and zooming in causes image pixilation to the point where the impression becomes unusable (“No Value” for latent examination purposes). Furthermore, every image on the media you submitted for latent analysis must be inventoried by our section, both in our case notes and on the Laboratory Report, whether or not it contains friction ridge detail. If you submit media containing 100 digital files, where 80 of them are evidentiary crime scene photos, and 20 of them contain friction ridge detail, all 100 of them shall be sub-itemized, and shall be listed on the report.

We recommend that aside from the general evidentiary photographs, you also take high quality close-up photographs of the latent impressions. Please make sure that a scale is included within the frame of these images. On the scale you can write the evidence item number, and/or any other relevant information that will assist you at a later time in identifying where the said impression came from.



Latent Print Impressions and Digital Photography

Which photographs should I submit for latent print analysis?

Case # 04-0193	Date/Time 1/20/14	Diagram of Lift Location:
Type of Offense 459 AC		
Location 217 Canyon Crest Dr.		
Victim Jones, Robert		
Prints Lifted From OUTSIDE DRIVER'S DOOR VICTIM'S VEHICLE		
Prints Lifted By S.B. Staff #501		

The diagram and notes on a latent print card identify the original location of the fingerprint.

You can also choose to create a latent lift card for your records, with a corresponding item number (listed on your scale), which can contain all of the necessary information as well as a diagram of the location and an orientation of the latent impression. However, [there is no need to send these cards to the Lab with your evidence!](#)

Only digital files that are relevant to the latent print analysis in your case, and are containing close-up photographs of the friction ridge detail (fingerprints and/or palm prints) should be copied on the digital media for submission to the Crime Lab for latent print analysis.

How should I photograph latent impressions?

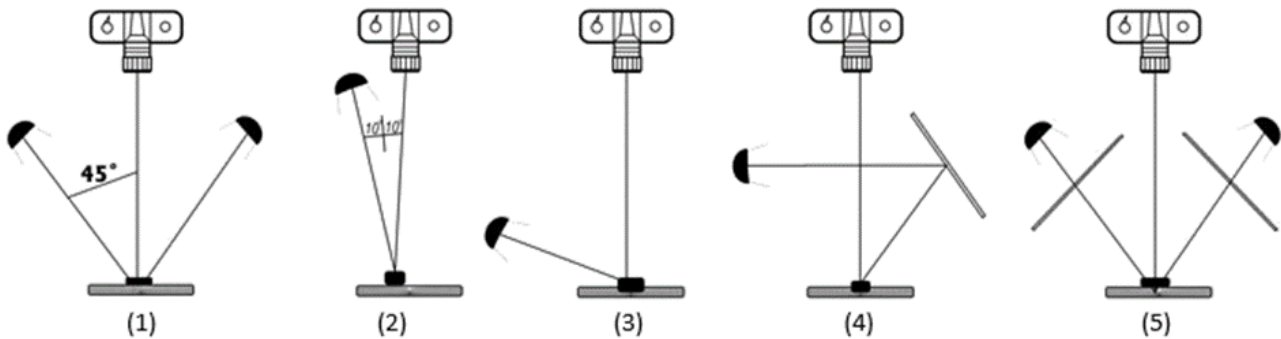
Close-up photography is a standard in capturing friction ridge detail. A good quality digital camera with a macro-lens and a tripod that steadies the camera is the ideal set-up each agency should have when performing latent photography. While this is not always feasible, an officer can take additional steps that would allow him or her to capture quality latent images even with a point and shoot camera:

- ◆ Pre-set your camera to TIF or RAW file format capture mode; alternatively, use High Quality JPEG;
- ◆ Use tripod or any makeshift device (e.g. cardboard box) that will serve the same purpose, and would allow you to steady up the camera. The depth of field in close-up photography is shallow, and being able to steady-up your camera will allow for precise focusing;

Latent Print Impressions and Digital Photography

How should I photograph latent impressions? (continued...)

- ◆ Camera's lens should always be parallel to the fingerprint surface (this will decrease the depth-of-space distortion in your images), and the appropriate lighting, depending on the item, being photographed, should be used. Some lighting examples:



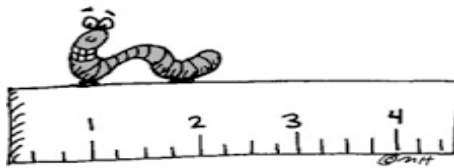
- 1) 45 degree lighting (for photographing an average item);
- 2) Direct Reflective lighting (minimizes shadows, and may create a hot spot);
- 3) Oblique lighting (shows detail by creating shadows on the surface of the evidence);
- 4) Bounce lighting (produces non-glare lighting with low contrast);
- 5) Diffused lighting (used on shiny or reflective surfaces; provides even lighting with reduced reflections and hot spots).

- ◆ Fill out the camera frame with a latent impression being captured (i.e. get as close as possible to the impression. Do not cut off the impression, or take partial photographs. Latent impressions cannot be stitched together!
- ◆ Make sure the latent impression you are photographing is in focus! While we can apply traditional dark room tools to correct the lightness and darkness of the image, and can remove most of the background noise, we are unable to sharpen an out of focus image.



Latent Print Impressions and Digital Photography

- ◆ **Always include a scale within the frame!** The scale should be positioned in close proximity, but not overlapping the impression being photographed. Please use a **METRIC SCALE** when photographing latent impressions, making sure that both long and short lines of the scale are visible within the image. The scale in digital photography is necessary for further calibration and comparison purposes.



Please remember.... If you are not able or if you are unsure how to photograph latent impressions, feel free to submit the original evidence to the NSP Crime Lab, for latent print processing!

Final touches....

- Please package the media containing latent photographs in a jewel case (CDs/DVDs), and place it into the padded manila envelope, for added protection during shipping.
- Ensure that a back-up copy of the digital images is retained by your department, in case the evidence gets lost in the mail.
- All evidence will be returned to you upon completion of the latent print analysis. Also included with the returned evidence will be a CD (or a DVD) containing copies of the value latent impressions that have been used for comparison purposes in your case. This CD/DVD is considered to be a part of your evidence, and should be maintained by your agency for future comparison purposes.

For any questions regarding the submission of latent evidence to the NSP Crime Lab, please contact us at 402/471-8950 and ask to speak with an examiner in the Latent Print section.





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Lincoln, NE 68524

(main) 402-471-8950
(fax) 402-471-8954

Evidence Receipt Hours:
Monday-Friday
9am-4pm

To contact the crime lab with
general laboratory questions,
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email Vicki Hopkins at:

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