

**TENNESSEE BUREAU OF INVESTIGATION**  
*Forensic Services Division*

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**Forensic Imaging Standard Operating Procedures**  
**Digital Enhancements**

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**3. Digital Enhancements**

**3.1. Scope**

This section provides procedures to store, archive, and enhance developed latent prints, lifts, photographs, or digital media containing latent print impressions. The Forensic Imaging Section utilizes Adobe Photoshop for the processing of all digital images of latent prints that are enhanced using digital techniques. The procedures outlined in this policy are meant to be general in nature, as no two digital images will require the same digital imaging processing.

**3.2. Instruments and Equipment**

- Camera equipment
- Adobe Photoshop
- Digital technology or silver based film
- Scale
- Storage media
- Flatbed scanner
- Computer system
- Imaging software
- Digital printer
- High quality printing paper
- Archiving media
- High quality printing paper and ink
- Storage Media (i.e. flash cards, CD/DVD, thumb drive, hard drive)

**3.3. Procedural Precautions**

Images may be processed or enhanced using a variety of techniques. It is possible to over enhance an image and achieve less than desirable results. Care should be taken to enhance an image only to the point of its best quality.

**3.4. Chemical Precautions**

No adverse affects are expected under intended use.

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#### **3.5. Preservation of the Original Digital Image**

- 3.5.1. Original digital images shall be preserved by permanently archiving them in their original file format.
- 3.5.2. No original digital images shall be altered in any manner. Only duplicate images of the original digital images will be used for image processing, analysis, enhancements or adjustments.
- 3.5.3. Original images will be placed into an “original assets” folder. Copies of the original images will then be placed into a “working assets” folder. These folders will be located within the case folder described in section 3.5.5.
- 3.5.4. Original images captured on removable reusable storage media, non removable camera media, or any other temporary media will be copied as primary images and in their original file formats. Primary digital images that are in a camera RAW file format can be converted to an uncompressed format and then saved into the examiner’s folder.
- 3.5.5. Each case will be assigned a folder that has the examiner’s initials (the initials may be either 2 or 3 letters, provided they are unique to only one examiner), the unique laboratory number, and the date the images were uploaded. The following is an example of how it is to be written: AAA-XXXXXXXX-MMDDYY. This folder will serve as the main folder of all images submitted for the case.

It is possible for a single case to consist of multiple image folders. The multiple folders will be created in the event that images in the case are processed on different days.

- 3.5.6. All images submitted from an outside source will be copied into the folder described in 3.5.5 in their original format and be considered the original images. The original media will be not be altered and will be returned to the submitter unless the unit supervisor approves an exception.

#### **3.6. Enhancement Procedure**

- 3.6.1. Images Submitted by Outside Agencies

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3.6.1.1. Images submitted by outside agencies should include a ruler for scale. A ruler is required to scale the image to 1:1. Images submitted without a ruler may be enhanced for comparison purposes but will not be properly scaled for AFIS entry. Therefore, it can not be entered into AFIS.

3.6.1.2. Images submitted by outside agencies to be used for comparison purposes should be submitted in a file format that uses lossless compression or no compression such as RAW or TIFF or a suitable high quality resolution. The images should be at the maximum resolution possible.

It may be necessary to convert some RAW images to a format that can be opened by current software versions.

3.6.1.3. The original digital image or negative of an image should be submitted. If an image other than the original (i.e. photograph) is submitted, the Forensic Imaging Specialist may be limited in enhancing that image.

#### 3.6.2. Images Captured by a Forensic Scientist During Examination

3.6.2.1. All images shall be captured in a file format that uses lossless compression or no compression, such as RAW or TIFF, and should contain a ruler for scale.

3.6.2.2. Images that are to be used for comparison purposes should be captured at a minimum of 1000ppi.

3.6.2.3. Images scanned at 1:1 or natural size do not need to include a scale or ruler.

#### **3.7. Image Processing Techniques**

3.7.1. Adobe Photoshop offers a wide variety of tools, imaging techniques, and filters to the Forensic Imaging Specialist in the processing or enhancement of an image. The Forensic Imaging Specialist shall determine which techniques will be used to process or enhance the image.

3.7.2. The Forensic Imaging Specialist shall not use the Clone/Rubber Stamp

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Tool in Adobe Photoshop during the processing or enhancement of any image due to the fact that this would alter the image.

- 3.7.3. The Forensic Imaging Specialist should consider SWIGIT guidelines while making enhancements to images for comparison.

### **3.8. Reports and Records**

- 3.8.1. Adobe Photoshop creates a record of all the enhancements made to an image and is saved to the Metadata.

### **3.9. Reference Materials**

Adobe Photoshop – See the help file as no printed manual is available for this software.

SWGIT Manual (SWGIT Version 3.3 2010.6.11 Section 4) for a set of guidelines in the enhancement of images.

SWGIT Manual (SWGIT Version 3.3 2010.6.11 Section 19) for information on image compression.