



PART

2

THE BASICS OF CRIMINAL INVESTIGATION

- Chapter 4** The Crime Scene
- Chapter 5** Physical Evidence
- Chapter 6** Suspect Identification
- Chapter 7** Interviewing and Interrogation

chapter 4

The Crime Scene

“Crime is common. Logic is rare. Therefore, it is upon logic rather than upon crime that you should dwell.”

Sherlock Holmes
“The Adventures of the Copper Beeches”

KEY TERMS

ABFO scale	grid search	press pool
baseline	killer’s signature	rough sketch
circle search	lane/strip search	spiral search
close-up photographs	legend	swath
contamination	line search	trace evidence
crime scene processing plan	mapping	triangulation
crime scene sketch	midrange photographs	trophy
final sketch	overall photographs	zone search
first-responding officers	photo log	
global positioning system (GPS)	photo placard	
	preliminary scene survey	

STUDENT LEARNING OUTCOMES

Upon completion of this chapter, students will be able to:

- Recognize the responsibilities of all members of the crime scene team
- Describe how to process crime scenes, big and small
- Explain the use of templates and virtual photography in constructing crime-scene sketches
- Construct crime-scene notes
- Appreciate the importance of recording/documenting the crime scene

Introduction to Crime Scenes

No matter what the crime or where the location, no two crime scenes are ever the same. Each crime scene encompasses not only the geographic area but also persons and things. Protecting the area is pointless if what is contained within it is not also protected. The entryways and exits and travel routes to and from the scene must similarly be guarded against contamination. The geographic area and the material objects within it usually can be secured easily. More difficult is preserving the people on the crime scene. Yet, they must be preserved as meticulously as any other evidence.

All crime scenes contain physical evidence, that is, evidence that can be touched, seen, or otherwise perceived using unaided senses or forensic techniques. The difficult task is to determine what is evidence and what is not. However, it is better to process too much evidence than too little. Experience will help an investigator begin to pare down what is taken from a crime scene. Each crime has its own set of evidence parameters that help in distinguishing evidence from nonevidence.

Anything taken from the crime scene should be instrumental in discovering the facts. Keep in mind that the evidence reveals the facts; when the evidence is inconsistent with a hypothesis, the hypothesis must be changed to fit the evidence—not the other way around. Numerous court cases have reduced the significance of suspects' confessions and highlighted the key role of evidentiary corroboration. The importance of crime scene processing continues to increase. Not all evidence is recognized readily as such. Seemingly insignificant material left at a crime scene can increase in importance as the trial approaches or during the trial. The skills of the investigator may come into play anywhere or at any time.

The crime scene includes all areas through which the participants moved while entering to commit the crime, while committing the crime, and while exiting the crime scene. Generally, the crime scene is a single, well-defined area, but it may encompass several noncontiguous areas. Because most human activity takes place in sheltered places, the majority of crimes occur inside. Buildings and vehicles are the most common crime scenes, so most crime scene processing involves these locations. However, as more and more people seek outdoor recreation,

investigators will need to develop the ability to deal with outdoor crime scenes as well. For example, the roadways driven, the areas adjacent to a crime scene that facilitate parking, and the pathways leading to and away from an exterior scene may contain evidence of crime-related passage.

First Response

The investigative team's most valuable investigative tool consists of the officers who arrive first on the scene (**FIGURE 4.1**). Too often, these officers are excluded from the investigative "club," treated as underlings, and denied services and training that could increase the chance of investigative success. It is imperative that **first-responding officers** possess an understanding of the investigative process, including a familiarity with and an appreciation for forensic evidence and its location, processing, and handling. A telephone at a crime scene may be the most convenient phone to use, but getting to the phone and picking up the handset may destroy essential evidence. Ambling through the crime scene is preventable through education about the nature of the first-response function.

Protection of the crime scene will reduce crime scene **contamination**. All crime scenes and all evidence retrieved from a crime scene are contaminated; the goal is not to add to the contamination. Only materials handled in contamination-free laboratories can be said to be truly uncontaminated. The trick is to prevent any untoward or unnecessary contamination from occurring once the scene and its contents come into the possession of the police. Anyone entering a crime scene leaves something; anyone departing a crime scene

first-responding officers

First officers to arrive at the crime scene. They are responsible for protecting the crime scene from any avoidable contamination in order to preserve it for investigation purposes

contamination

Materials and other factors added to crime scenes that were not there at the time of the crime and can negatively affect the proper collection and interpretation of evidence



FIGURE 4.1: First responder.

Ryan J. Lane/Getty.

takes something along. This theory is what prompts forensic scientists to search for minute materials that may have been left at the scene of the crime.

First-responding officers must protect the scene by:

- Conceptualizing the crime scene
- Establishing the boundaries of the crime scene
- Keeping out unauthorized personnel and the curious
- Detaining and separating any eyewitnesses
- Continuing security until properly relieved

While doing this, they must also obtain medical assistance for anyone at the crime scene who is injured.

The most difficult situations to deal with are those involving other agencies and media representatives. Medical examiners, emergency medical personnel, and coroners all have duties to perform. Bodies cannot be released until officials have completed their investigative analysis. Often, there will be someone making a demand for entry who may be upset by being excluded from the scene. It is vital that the police and all persons associated with a crime scene in any capacity be aware of and comply with the written policies and procedures that apply to crime scene security. Media representatives often attempt to gain access and information by invoking the First Amendment (**EXHIBIT 4.1**) and the people's right to know. Some police officers are only vaguely aware of

EXHIBIT 4.1

The First Amendment to the U.S. Constitution

Congress shall make no law respecting an establishment of religion, or prohibiting the free exercise thereof; or abridging the freedom of speech, or of the press; or the right of the people peaceably to assemble, and to petition the government for a redress of grievances.

U.S. Constitution. Art./Amend. I.

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the amendment and have little understanding of the cases that have established First Amendment limitations. Nowhere does the First Amendment refer to the people's right to know, nor does it refer to extraordinary rights of the press. It simply refers to the abridgment of freedom of the press. The purpose of the First Amendment is to protect the press and the public from a strong central government and the temptation that it would have to censor the press. Denial of access to a crime scene does not abridge freedom of the press; journalists are free to write whatever they wish, within the confines of laws that govern the media.

In managing the press, it is important to attempt to maintain a good rapport with all representatives of the media. First responders do not have the responsibility to make any

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Dos and Don'ts for Dealing with the Media

Do

- Be firm
- Be specific
- Be courteous
- Designate a press pool area
- Escort media representatives from the crime scene
- Advise media representatives of press releases
- Encourage coverage
- Recognize First Amendment rights
- Encourage investigative reporting
- Keep lines of movement open
- Keep lines of communication open

Don't

- Be unnecessarily gruff
- Be pedantic
- Make any on-record statements
- Apologize or make exceptions
- Make press releases
- Assist in coverage
- Allow photos to be taken
- Allow access to witnesses
- Take no for an answer
- Allow media to be obstructive

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Media Checklist

- Do not contact the media unless you are trained and designated as the public information officer (PIO) or you are cleared through the PIO's office
- Be courteous at all times. An angry press does not serve the interests of law enforcement
- Bar all media from a crime scene and advise media representatives that an area will be set aside from which all information will be disseminated
- “No comment” is often the standard refrain of police. It is irritating to the press and should be replaced with a more rapport-building standard, such as “The public information officer will make a statement to all press representatives as soon as the situation allows.”
- Avoid all contact with the media off duty as well as on duty, unless specifically charged with that responsibility
- Unauthorized statements quoted by the press are often claimed by the police to be misquotations or taken out of context; in reality, they are usually accurate, although uttered thoughtlessly or in haste. Think before you speak, and realize that anything you say can be recorded and broadcast.
- If you are the subject of press coverage, do not fall victim to believing the image that the press is attempting to portray

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statements to the press. The public information officer should make all statements to the press, and all requests for access or statements should be referred to that officer. Media representatives have no greater right to enter a secured area than any other citizen, nor have they any greater right to information. Under no circumstances are media representatives to be allowed access to a crime scene. All information provided to the press regarding an investigation should be managed through **press pools** and public statements.

Once the boundaries of the scene have been determined and made secure, evidence must be discovered and collected and the crime reconstructed. Most evidence at a crime scene is vulnerable, and often the most effective evidence is the most easily damaged. **Trace evidence** is extremely fragile and susceptible to contamination. It is usually undetectable by the naked eye and must undergo extensive laboratory procedures before it can be preserved and used later at trial. Items of evidence, such as blood, fingerprints, hairs, fibers, footwear, broken glass, paint scrapings, tread marks, footprints, and toolmarks, are easily destroyed, altered, or contaminated. Only people authorized by written policy to help process the crime scene should be allowed on the scene.

As important as first responders are in securing the usual crime scene, they play an even more significant role in handling witnesses and securing the area in an underwater investigation. They may have to cordon off high-use areas and contact agencies that possess authority over the area.

Methodical Approach to Crime Scene Processing

Crime scenes can be complex and confusing. The first step in crime-scene processing is to establish a plan. All steps of crime scene response should be calculated and methodical to ensure the most positive result. It is for this reason that investigative personnel should take the information garnered from their preliminary scene survey and develop a systematic plan for proceeding with the processing efforts. A systematic **crime scene processing plan** will ensure that nothing is overlooked and no pertinent evidence is lost in the course of the subsequent investigation.

All crime scenes are different, but there are guidelines that exist in all cases that serve as a framework for the processing efforts. However, often, these tasks are not separate from one another but may overlap. This will be addressed

press pool

A group of journalists authorized to cover an event

trace evidence

Evidence left at the scene of a crime that usually cannot be seen with the naked eye and that requires the assistance of lights or reagents to visualize

crime scene processing plan

Plan created to carry out a systematic investigation of a crime scene

as the chapter unfolds. In any case, investigative and processing efforts should start in the least intrusive and destructive manners and progress to the most intrusive and destructive. Processing the scene this way will ensure evidence integrity for as long as possible. The first phase is documentation.

Documenting the Crime Scene

Documentation efforts at the crime scene begin the moment an officer gets a call and continue until the case is closed. This is often the most time-consuming but also the most important step in crime scene investigation (CSI). It is the purpose of crime scene documentation to record and preserve the location and relationship of discovered evidence as well as the condition of the crime scene as it was when the documenter was observing it. For the purposes of this text, there are four primary methods of documentation that are involved in CSI. These are:

1. Reports and note taking
2. Photographs
3. Videography
4. Crime-scene sketching and mapping (FIGURE 4.2)

The end purpose of documentation should be the successful notation of all observations made at the scene of the crime, which will ensure that the individual engaged in the documentation efforts will best be able to recall the events in the future. Importantly, this information may be presented in court.

Each of these methods is an integral part of crime scene documentation. None is a substitute



FIGURE 4.2: Documenting the crime scene.

Blitznetzov/Getty.

for another. While some of the methods might appear to be redundant, this serves to corroborate the other methods and ensures that nothing is overlooked and that all areas are accounted for. Notes and reports are not sufficient by themselves because they do not accurately portray the scene in detail in the way that photographs can. However, photographs are not sufficient by themselves, as they often need more explanation, which is the purpose of reports and notes. Sometimes, notes are dictated into a tape or digital recording device; then, at some point, they are transcribed into a written format for court purposes. For that reason, notes and reports are defined as being both audio and written. Although photographs are a good tool for documenting the visual aspects of a scene, nothing brings the scene to life as much as videotaping. However, videos cannot be used in the same manner as photographs from a forensic analysis standpoint when documenting physical evidence.

Documentation/Reports

There is an adage in police work that, “if it’s not written down, it didn’t happen.” To a large extent, this is true. It is important that each step of the process and every action taken be documented extensively using notes, photographs, sketches, and reports. The written notes begin with the first responder and continue throughout the investigative process. At each step, those individuals involved in the process are responsible for documenting all observations they made and all actions they performed. This includes documentation of efforts that resulted in negative findings. An example of a negative finding is a search for latent fingerprints that yielded nothing.

Each department typically has its own format and requirements for various levels of documentation in the investigative process. At the very basic level, written documentation consists of:

- Notification information
- Arrival information
- Scene description
- Victim description
- Crime scene team

Essentially, there are two types of written documentation. The first is notes. Notes are brief—often written in a bullet-point format—documentation of efforts, observations, and actions. Notes are taken at the time of the

incident and are informal. The second type of written documentation is a report.

Reports can be either narratives or fill-in-the-blank forms that are utilized to record pertinent information relating to a case. These are formal and are typically unique to a particular department and specific to a certain type of scene or case. Narrative reports are formally written, usually in the first person, active voice, and past tense. They document all actions taken by the report's author and all observations he or she made.

Taking Notes

Note takers should record field notes while they are still under the stimuli that made something seem noteworthy, not later (**FIGURE 4.3**). Field notes constitute the most readily available and reliable record of the crime scene. They do not form a logical flow of events but make up a hodgepodge of information gleaned from numerous perceptions, interviews, and measurements. In large investigations, the task of note taking can seem overwhelming, but the basic principles remain the same (see Investigator's Notebook).

Field notes are the building blocks that the investigator uses to develop hypotheses and, later, a theory of the crime. Field notes also can stimulate the investigator's memory if and when the case goes to court. They provide the basic information for the official report, which is the foundation for trial testimony. The official report will contain numerous entries. The investigator will produce an initial report early in the investigation; as the investigation develops and new information is discovered, the investigator will add supplemental reports to the original. The compilation of these reports, in conjunction with the field notes, allows the investigator



FIGURE 4.3: An officer makes field notes.

Yuri Arcurs/Getty.

to recollect the investigation in detail and thus form the backbone of the prosecution and the defense.

All courtroom testimony is balanced against the documentation that the investigator has accumulated, including his or her field notes. At the time of trial, the investigator may use the field notes to refresh his or her memory, but doing so allows the defense an opportunity to examine the notes and conduct a cross-examination of the witness pertaining to the notes. With that risk in mind, the investigator should put nothing in the notes that he or she would not be willing to share with the defense, the judge, or the jury. An additional caveat: All notes are available to the defense upon request, and the officer testifying is not allowed to remove anything from the notebook. Each notebook should contain notes about one investigation only, so that sensitive material from another investigation is not publicized inadvertently.

In some states, there is a rule of procedure that allows the defense to inquire of the witness whether there are any other writings or statements taken or made by the witness that are not included in the official report. An affirmative answer allows the defense to request a recess and an order directing the witness to obtain the documentation and return immediately with it to the courtroom. Even if the witness is not using the notes to refresh his or her memory, the defense may still obtain them if they exist.

Use of Notes

Notes are useful for the following reasons:

1. As the investigation progresses, suspects and witnesses make statements that may seem insignificant at the time but later may prove to be important. Field notes allow retrieval of those statements.
2. If a witness or suspect makes a statement and later adds information inconsistent with that statement, the notes will assist in impeaching the new statement and may lead to a confession.
3. It is through gathering, correlating, organizing, and comparing information that the crime scene is reconstructed and derivative evidence is developed.
4. Notes are important in preparing for interviews of witnesses, interrogation of suspects, and testifying before the court.
5. Attorneys for the state and the defendant will be interested in the time, date, and

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Elements of Field Notes

The Five Ws and an H

Who

- committed the crime?
- had a motive to commit the crime?
- was the victim?
- saw what happened?
- reported the crime?
- might know something?
- were the first people on the scene?

What

- was the relationship between victim and perpetrator?
- crime was committed?
- was said and by whom?
- evidence might there be?
- evidence has been discovered?
- is missing?
- was left?
- was moved?
- was touched?

Where

- did the crime occur?
- was evidence located?
- are all the witnesses?
- were all the witnesses?
- do witnesses live?
- is the suspect?
- was entry made?
- was exit made?

When

- was the crime committed?
- was the crime reported?
- was evidence discovered?
- did the first responder arrive?

- was the scene secured?
- was the scene released?

Why

- was the crime committed?
- was the victim chosen?
- was the location chosen?
- were the criminal implements chosen?

How

- did the perpetrator gain entry?
- was the crime committed?
- did the perpetrator depart?

Important Information

Field notes should also contain the following:

- *Identification of date and time* (the date and time of assignment to the case; the date and time of arrival on the scene).
- *Description of the location* (description of the scene on arrival, including weather, lighting, approaches, and geographic location). Information regarding the location can be useful in establishing lines of sight and the distance of visibility.
- *Description of the crime scene* (broad overview that narrows to specific noticeable details, such as forced entry, disarranged furniture, bloodstains, blood spatter, and the condition of doors and windows).
- *Listing of absent items*. What should be at the crime scene but is missing often reveals something about the perpetrator and the nature of the crime. A serial killer might take a souvenir or **trophy** that features prominently in fantasies associated with the killings. Such a souvenir or trophy may be helpful in establishing a profile of the killer and figuring out the **killer's signature** (the pattern associated with his or her killings).
- *Description of wounds on the victim*. The types and locations of wounds should be recorded. If discoloration is present, its location and color should be included.
- *Photograph log*. The photographer should keep a separate photo log; if the investigator takes the photos, he or she should place an entry in the field notes for each entry. The entry should include a description of the content of the photo; the speed of the film; the shutter speed; the distance from the object photographed; the location and direction from which the photo was taken; and the date, time, and case number or name.
- *Video log*. If the investigator is taking the video, the following information should be recorded: The type of recording device, the type of film (if not using digital), the type of lens or lenses, and whether artificial light was used.
- *Identification of the evidence recovered and its location*. All evidence must be geographically and temporally located. It is the investigator's job to record sufficient information to adequately place each piece of evidence. All measurements should be recorded, as well as the identity of the person who discovered the evidence. To identify evidence, the investigator should provide a description of the evidence and note its location, the time discovered, who discovered it, the type of container used to store it, the method of sealing the container, the markings used on tags and evidence, and where the evidence is being kept (maintenance log).

trophy

Remembrance or souvenir of a conquest, such as a body part

killer's signature

The pattern associated with a person's killings

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Field Notes Best Practices

- Write legibly
- Write complete thoughts
- Indicate date and time for all entries.
- For each case, create one set of notes in one or more notebooks
- Share information with other investigators
- Corroborate all information
- Not everything is important, but err on the side of recording too much rather than too little
- Periodically transcribe your notes in type (they make more sense and patterns emerge more clearly)
- Organize transcriptions into categories, such as persons, places, and things; physical evidence; forensic evidence; and so on
- Use a matrix to assist in identifying information. Variations in witness statements regarding height, weight, hair color, stature, eye color, and car color or make can be recorded in a matrix to arrive at a range for each of the identifying characteristics, to compute an average, or to discover the most common response.

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manner in which evidence and information were gathered and will have a vested interest in the quality and thoroughness of all reports, notes, and entries.

6. Memory is always suspect and subject to extrapolation and interpolation, the grist of cross-examination. Memory corroborated by reports and notes takes on a believability not possessed by unaided memory.

Conducting a Preliminary Scene Survey

A **preliminary scene survey** (sometimes called a walk-through) of the crime scene is conducted to develop a perspective on the nature of the crime, its commission, and the type of evidence that will be expected and searched for. Once the scene is secure, investigative personnel should conduct a preliminary scene survey. The preliminary scene survey will have the greatest informational possibilities if the first responder is available to accompany the investigative personnel. This is because it is the first responder who has

the most direct knowledge of what the scene originally looked like when law enforcement responded to the event. He or she should also know of any changes made to the scene since that initial response. It is very important that investigators are well briefed by first responders regarding the case before conducting their examination of the scene. This ensures that the preliminary scene survey will result in maximum information gathering, while minimizing scene contamination and evidence destruction. The primary purpose of the preliminary scene survey is to assess the scene for logistic and safety considerations. During the preliminary site survey, the investigator visually locates evidence or prospective sites for trace evidence. The site survey will assist the investigator in determining the boundaries of the search, identifying focal points for the search, and discovering important evidentiary items that may need special photographic or forensic attention. Evidence that deteriorates over time or with exposure should be given processing priority. Experts may need to be invited to the scene to interpret bloodstain patterns or to process trace evidence.

preliminary scene survey

A careful walk through a crime scene, conducted to develop a perspective on the nature of the crime, its commission, the type of evidence that will be expected, and the types of resources necessary to properly process the scene

The following list contains ten suggested matters to consider while conducting a preliminary site survey:

1. As with first responder efforts, make note of transient evidence present within the scene and efforts needed to properly document, collect, and preserve such evidence. If steps have not already been taken to do so, it may be necessary at this point to document, collect, package, and preserve such evidence.
2. Make note of weather and climate conditions (both indoors and outdoors).
3. Note whether lights are turned on or off.
4. Document whether doors and windows are locked, unlocked, open, closed, or if there appears to be evidence of forced entry.
5. Note the presence of any particular odors that may be connected to an individual (perfume, cologne) or an event (gas, smoke, chemicals, etc.).
6. Look for signs of activity (meal preparation, house tidy or disheveled, etc.) or struggle.
7. If timing is of great concern, look for date and time indicators such as on food, newspapers, mail, etc.
8. Attempt to locate the most probable point of entry, point of exit, paths between them, and any other areas of apparent action within the scene. These areas should be noted to ensure that processing personnel will reduce their movements in such areas to allow for the optimum opportunity to discover and collect physical evidence within the scene.
9. Attempt to answer the questions of: Who? What? When? Where? How? and Why? as they pertain to the scene and the crime in question.
10. Assess the scene for personnel (How many? Specialized?), equipment (How much? What kind?), and logistical concerns (How long? Food needs for personnel? Bathroom needs? Media considerations? Budgetary issues?). [National Forensic Science Technology Center. (2013).]

The preliminary site survey should be conducted in a cautious and aware manner. This is a minimally invasive information-gathering

event and not an evidence search or collection effort.

There are two schools of thought about whether investigative personnel should wear gloves while conducting this scene survey. One view is that if personnel wear protective gloves, they will be more inclined to touch items and, therefore, they should not wear gloves and should adhere to the “hands in pockets” approach. The other view is that personnel should always wear gloves whenever they are inside a crime scene. The author agrees with the latter line of thinking for several reasons. First, the purpose of gloves is to both protect the wearer from contamination and to protect any item touched from contamination by the wearer. While it is true that in the walk-through there should be no touching of items, this is not to say that transient evidence will not be discovered that necessitates movement or collection. Having gloves on will ensure that such evidence is minimally damaged if such contact is necessary. Also, a “hands in the pocket approach” is not realistic because the point of a preliminary scene survey is to document conditions present throughout the scene. The investigator most certainly will have his or her hands outside of any pockets and will be writing and pointing throughout the process. It is best to have personnel wear gloves with the thought in the forefront of his or her mind that nothing is to be touched unless it is absolutely imperative.

After the preliminary scene survey has been conducted, investigative personnel should have the information they need to apprise supervisors of the situation and to lay out the crime scene processing strategy. At this stage, there may be a call for more specialized personnel. Some of these personnel may be from within the ranks of law enforcement. Other specialists, such as entomologists or engineers, may be necessary to provide technical assistance that is outside of the training and education of those in law enforcement. Agencies are encouraged to think broadly and utilize sources such as local universities and other private, local, state, and federal agencies to maximize the investigatory potential. If an individual has not been trained to collect or document certain evidence, they should not; instead, they should rely upon experts to do so.

A brief, and by no means all-inclusive, list of personnel who may be called upon to assist with the investigative effort is given in this section (**TABLE 4.1**).

TABLE 4.1 Personnel Associates with Investigations

Personnel	Function
Crime Scene Investigator/Crime Scene Technician	Police or civilian personnel who are specially trained to process a crime scene. Their purpose is twofold: to collect and preserve physical evidence.
Identification (ID) Officers	Responsible for photographing the scene and searching for latent fingerprints but not responsible for other types of physical evidence. Often, these individuals are fingerprint experts who later will perform comparative analyses.
Evidence Technician	Police or civilian personnel responsible for maintaining the custodial integrity of evidence. Duties and responsibilities typically include responding to and processing crime scenes, ensuring proper packaging of collected and submitted evidence, proper storage, maintaining the evidence management system to ensure proper chain of custody, and also eventual disposal and purging of evidence.
Forensic Surveyors	Often used to provide an accurate architectural rendition of the crime scene. They typically utilize Computer-Aided Drafting (CAD) to assist them with their documentation efforts.
Forensic Photographers	Specialized photography (low light, aerial, infrared, underwater, etc.) demands specific skills. These photographers have advanced training in photographic concepts and specialized situations.
Forensic Scientist/Criminalist	Has gained specialized training and education in chemistry and biology as applied to the recognition, ID, collection, and preservation of physical evidence.
Medical Examiner/Coroner	Forensic pathologist responsible for performing autopsies in criminal cases. This may include providing an ID of the deceased; determining cause, manner, and time of death; and taking custody of the remains.
Forensic Nurse	Licensed nurse with specialized training in proper evidence collection, and most often, is utilized in sexual assault investigations. Such nurses are usually certified sexual assault nurse examiners (SANE).
District Attorney	When called upon, provides a search warrant or a court order to obtain known specimens from a defendant. A district attorney may operate in an advisory capacity when a case involves a police officer (e.g., a police-related shooting, in-custody death of suspect, etc).
Hazardous Materials Specialists	Experts assist with recognition, collection, destruction, clean up, disposal, and preservation of hazardous materials at the crime scene.
Forensic Engineers	Engineer who analyzes the structural integrity of a building or other structures in accident investigations.
Firearms Examiners	Expert who assists in crime scene ballistic recovery and can assess the trajectory of fired weapons. He or she may also assist in determining whether a shooting was accidental or intentional.
K-9 Officers	Sworn officer and trained dog may be called upon to assist with searches and tracking of individuals; if the individual is believed to be dead or buried, cadaver dogs may be utilized. Cadaver dogs are specially trained to recognize the scent of decaying remains.
Federal Authorities	Numerous federal agencies can be called in to assist or take over a crime scene involving mass disasters, terrorist acts, bombings, major fires, and bank robberies. Some examples of these agencies include: the Federal Bureau of Investigation (FBI), the Drug Enforcement Administration (DEA), the Bureau of Alcohol Tobacco Firearms and Explosives (ATF), and the United States Secret Service (USSS).

— Ripped from the Headlines —

Civilianizing Crime Scene Duties

There is movement afoot pertaining to crime scene processing duties and who is responsible for them. A growing number of departments are finding that civilianizing crime scene duties, (having nonsworn, nonbadge, nongun carrying individuals) responsible for crime scene efforts is fiscally and strategically beneficial. The

ability to hire and train civilians for specific crime scene processing efforts is more easily accomplished than the required training and education necessary to certify, hire, and train an officer. It also allows the officers to be freed up to conduct the other duties that the job calls for, which a civilian would not be able to handle.

The civilian positions are typically tasked with any situations where evidence is being collected. However, it has been increasingly recognized that a per-

son neither needs a badge nor a gun to identify, document, collect, and preserve physical evidence. In cases where there is specific knowledge or certifications required (processing fingerprints, taking photographs, documenting blood spatter evidence, the additional training and education previously given to sworn investigative personnel can instead be given to civilians.

Keep your eyes open for these changes coming soon to a department near you!

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Recording the Crime Scene

The crime scene is first recorded through photography or videography or both. The video camera is a popular tool for recording crime scenes. If used, this should be conducted either during or immediately after the preliminary scene survey and before anything is touched, examined, or moved. The result is a permanent historical record of how the scene appeared at the time of the documentation. Moving anything prior to recording the crime scene is a gross error, for a trial court will usually exclude any photograph or videotape that does not reflect the scene as it was found.

Crime Scene Photography

Entire texts have been written solely on this topic. This introduction comprises a succinct but thorough overview of the purpose and skills involved in crime scene photography. Photographers are urged to seek out books and courses that will help them to continually refine their skills.

The purpose of crime scene photography is to capture adequate images for the best possible documentation and reproduction of the reality present at the moment in time when the scene was photographed. When attempting to shoot precisely, one must remember that photography is a mechanical means of retaining vision. When properly taken, a photograph is one of the only ways to capture an instant of time. However, the camera was never intended to replace vision, because it certainly cannot (Weiss, 2009).

Crime scene photography is visual storytelling, and as such, the photographs should be a fair and accurate representation of the scene about which the story is being told.

Photographs are almost universally accepted by the courts and allowed into evidence irrespective of their image quality as long as the images contained in them are not inflammatory or prejudicial in nature (Weiss, 2009). Although it used to be necessary for a person to also be able to testify as to how a photo was developed or processed, this is rarely the case nowadays, as the images themselves are not the evidence but, rather, represent the evidence.

Photographers often may attempt to create photographs of objects or scenes “as seen” by someone else. Undoubtedly, this is an impossible undertaking, as no one can accurately document an item or moment as someone else saw it. Instead, it is an appropriate step to document the image or scene from the perspective of the viewer in approximately the same position, although not at the same moment in time (Weiss, 2009). Attention to a few simple rules can make photos acceptable to most judges.

Photographic Ranges and Perspectives

In keeping with the storytelling theme, the first photos taken at a scene should not be of gore or an item of physical evidence. Instead, they should be of the overall crime scene. They should set the stage for the beginning of the story. As such, there are three important ranges of photographs that are taken at the scene

Cityville Police Department	
Case #:	_____
Date:	_____
Location:	_____
Photographer Name:	_____
Photographer ID:	_____
Roll # (if applicable):	_____

FIGURE 4.4: Example of a photo placard.

of a crime: overall photographs, midrange/evidence-establishing photographs, and close-up/comparison/examination photographs.

Also, it is important to remember to take a photograph of a **photo placard** as the first photo taken at the crime scene. A photo placard is a handwritten or agency-developed sheet (**FIGURE 4.4**) that lists pertinent case information for the photographs to follow. Taking a photo of this as the first photo on a roll of film or as the first digital photo of a case will ensure that personnel are familiar with which photographs pertain to which case, and the name of the photographer. Only one case should be photographed on a roll of film; however, with today's digital media, often, several (if not more) cases are photographed on a single digital media card prior to downloading onto a computer. Photographing a photo placard will serve as a separator between the cases, so that case photos will not become commingled.

■ Overall Photographs

Overall photographs (**FIGURE 4.5**) are exposed with a wide-angle lens or in such a fashion that allows the viewer to see a large area

in the scene at eye level. Their function is to document the condition and layout of the scene as it was found. They help eliminate issues of subsequent contamination (e.g., tracked blood, movement of items). Typically, these are shot from the four corners of the crime scene. If indoors, usually, they are taken from the corners of the room, shooting toward the center. If outdoors, they are often shot from the direction of a cardinal heading (north, south, east, and west). These four photographs most likely will capture the entire scene. If not, additional photographs from an appropriate vantage point can be taken. These overall photographs set the scene and should include street signs and addresses, if possible. Also, it may be necessary to not only take overall photos facing the building or scene in question but also overall photos facing away from the scene to show the surrounding area.

■ Midrange/Evidence-Establishing Photographs

The function of **midrange photographs** (**FIGURE 4.6**) is to frame the item of evidence with an easily recognized landmark. This visually

photo placard

A handwritten or agency-developed sheet that lists pertinent case information for the photographs that follow

overall photographs

Photos that show a large area of the crime scene at eye level, typically shot from the four corners of the scene; used to document the condition and layout of the scene as found

midrange photographs

Photos that frame the item of evidence with an easily recognized landmark to visually establish its position in the crime scene but not intended to show details; also called *evidence-establishing* photographs



FIGURE 4.5: Example of an overall photograph.

South Agency/Getty.



FIGURE 4.6: Example of a mid-range photograph.

Couperfield/Shutterstock.

establishes the position of the evidence in the scene in relation to the item's surroundings. These types of photographs are the most overlooked in crime scene work. They are taken of the evidence prior to movement or manipulation and should never include a scale of reference in the photo. The evidence-establishing photograph is not intended to show details, but simply to frame the item with a known landmark in the scene. The close-up and the evidence-establishing photograph go hand-in-hand.

■ Close-Up/Comparison/Examination Photographs

The function of **close-up photographs** (also called comparison, examination, or macro photographs) is to allow the viewer to see all evident details on the item of evidence (**FIGURE 4.7**). This photo should be close and fill the frame with the evidence itself. They are taken with and without a scale. It is extremely important that photographs of this type are first taken without a scale of reference and then with a scale of reference. The first photo shows the scene prior to contamination or manipulation by the photographer or crime scene personnel. The second includes a scale of reference with which the viewer is able to gauge the size of the item presented within the photograph. This scale will allow for a 1:1 ratio reproduction of the photograph (i.e., 1 inch equals 1 inch). Failure to photograph the close-up without a scale prior to incorporating a scale in the photo could result in the photo being inadmissible because of the allegation of scene tampering.

The preceding photographic ranges are used any time there is an important item

of evidence that will have a bearing on the investigation. While there might be a variety of perspectives photographed, any photograph taken at a crime scene will fall under one of the preceding ranges. For instance, photographs taken from the reported position of a witness would fall into the overall range category. Those taken to show the address of a residence would fall into the mid-range category if they showed more than simply the numbers/letters and included the façade of the house or entry to the home. However, if it were only of the letters/numbers, this photograph would fall into the close-up range.

Proper Use of Forensic Scales

It is not enough for a photographer to simply make use of a scale of reference within a macro-photograph (**FIGURE 4.8**). He or she must also do so properly, or else it defeats the use of and intent behind the use of the scale of reference. In order for a scale to be of benefit, it must be possible to determine the size and/or dimension of the object(s) within the image. Forensic scales contain circles that will appear to elongate if photographed from an improper angle. Also, the lines representing termination of each centimeter can be extended to match up and intersect with the lines of the perpendicular centimeter intersection lines. If the lines do not meet and form a right angle, the photography angle was not directly overhead or parallel to the subject matter.

An **ABFO scale** is an example of a specific type of forensic scale of reference (seen within

close-up photographs

Photos that clearly show details on the item of evidence; taken both with and without a scale that allows for a 1:1 ratio reproduction

ABFO scale

(Designed by the American Board of Forensic Odontology) An L-shaped piece of plastic used in forensic photography. It is marked with circles, black and white bars, and 18% gray bars to assist in distortion compensation and to provide exposure determination reference. For measurements, the scales are marked in millimeters.

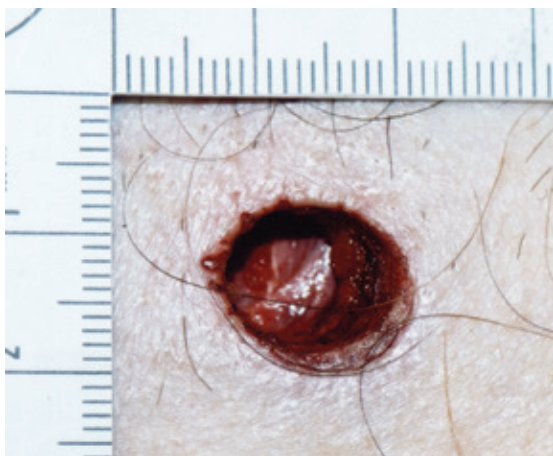


FIGURE 4.7: Example of a close-up/comparison/examination photograph.

© D. Willoughby/CMSP.

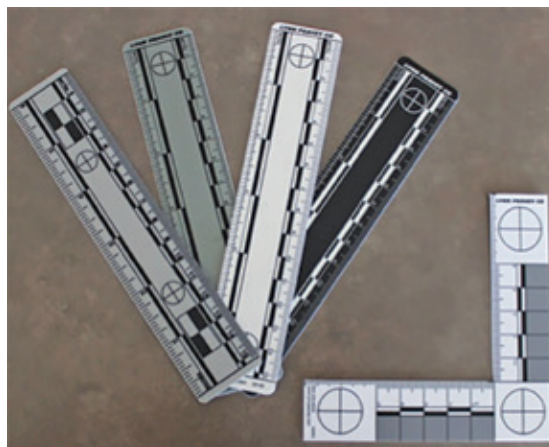


FIGURE 4.8: Examples of forensic scales of reference.

Dutelle, A.W. (2015) Basic Crime Scene Photography, 2nd Ed.

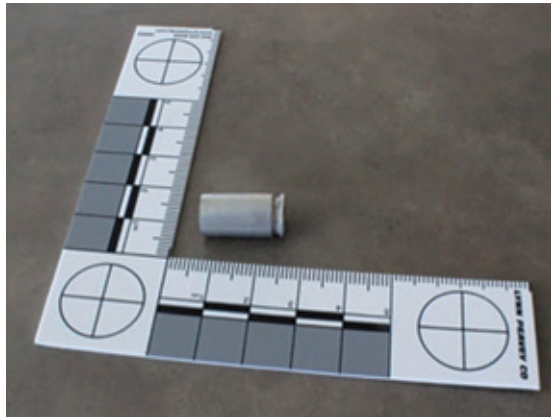


FIGURE 4.9: Improper use of ABFO scale as to evidence plane and camera angle.

Dutelle, A.W. (2015) *Basic Crime Scene Photography*, 2nd Ed.

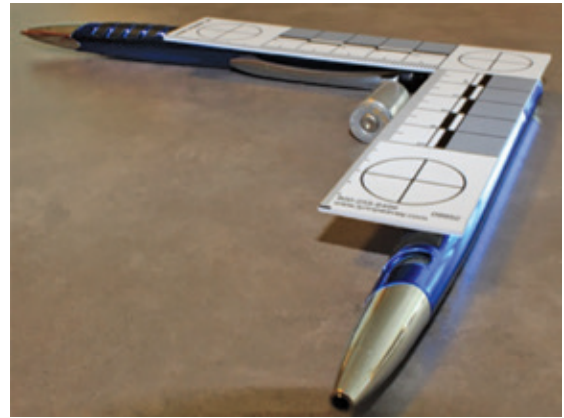


FIGURE 4.11: Use of props to raise ABFO scale to proper plane.

Dutelle, A.W. (2015) *Basic Crime Scene Photography*, 2nd Ed.

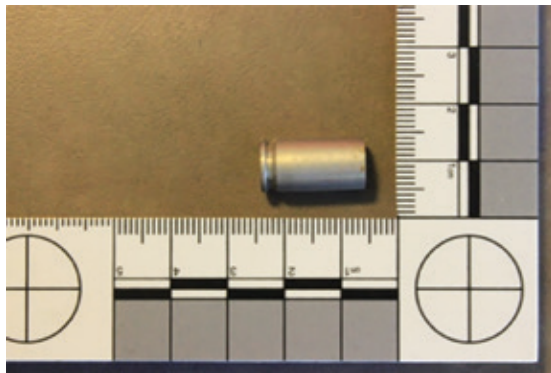


FIGURE 4.10: Proper use of ABFO scale as to plane and camera angle (props used to raise scale).

Dutelle, A.W. (2015) *Basic Crime Scene Photography*, 2nd Ed.

items of evidence exhibiting 3D characteristics (Figures 4.9–4.11).

As displayed in the previous figures, sometimes it may be necessary to raise a scale of reference in order to have it be of correct use. The opposite is also true. In the event that there is impression evidence, such as footwear or tire impressions, it will be necessary to arrange that the scale be at the same plane as the impression. Therefore, a small trench will need to be dug to the same depth as the impression, (after photographing the evidence prior to disturbing the surroundings) and the scale of reference placed within the excavated area, ensuring that the scale of reference is present on the same plane as the intended subject matter. This will result in the greatest forensic benefit of the resulting image.

FIGURES 4.9–4.11). An ABFO (American Board of Forensic Odontology) scale is an L-shaped piece of plastic used in photography that is marked with circles, black and white bars, and 18% gray bars to assist in distortion compensation and provide exposure determination (Figure 4.9). For measurement, the plastic piece is marked in millimeters. Note how the circles tend to look elongated and elliptical as well as how the imaginary centimeter termination lines do not result in right angles.

However, simply being at the correct angle is not sufficient to count as proper use of a scale of reference. The scale must also be present at the proper plane in order to be of the greatest benefit. If the scale is not presented at the proper plane, there will be distortion present. This is especially important when photographing impression evidence and

Photo Logs

Regardless of the perspective or range taken, each photograph taken at a crime scene should be documented on a photo log. A **photo log** is a permanent record of all information pertaining to documentation by photographs. Department policy often dictates what is found within a photo log; however, if no policy exists, the following suggestions are offered (**FIGURE 4.12**). Information that should be included in a photo log includes:

- Title and information block consisting of date/time/case number/agency name
- Photo equipment used
- Numerical ordering of each photo taken
- Brief description of each photo taken
- Direction facing for each photo taken

photo log
Recording of the people involved, equipment used, and conditions under which crime scene photographs were taken

Photograph List		Case #									
Code Section and Description		Month	Day	Year	Page of						
Location of Incident		City			Time						
Victim's Name		DOB		CDL							
Photographer/ID #		Scribe/ID #									
Camera, Lenses, and Flash Used											
#	Description of Photo	Polar Filter (Y or N)	Tripod (Y or N)	Lens Used (if zoom, length set on)	Flash (yes/no & normal, bounce, or off camera)	Direction Facing	F-Stop	SS	Distance from subject		
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											
15											
16											
17											
18											
19											
20											

FIGURE 4.12: Example of a photo log.

- Approximate distance from subject matter in each photo taken
- Shutter speed, aperture setting, and ISO for each photo. If photographed with conventional photography, pertinent photographic information should be included for each. If photographs are taken in a digital format, documenting such information is not as imperative because it will be digitally recorded when each photo is taken as part of the digital file for each photo.

The photo log should be a documentation of visual storytelling that flows from the general to the specific. The log itself is not always constructed at the crime scene, but rather the foregoing information will sometimes be included on a rough copy of a photo log or within the field notebook of the photographer and transferred onto a photo sheet at a later time, to include information pertaining to the digital properties of each photo, retrieved from the camera or computer at the time of download. Most agencies use pre-printed log sheets

divided into categories for ease of recording efforts.

Order of Taking Photographs

While this manner of documentation is listed near the beginning, taking overall photos is obviously much less intrusive to a crime scene than taking close-up photos (due to movement of items and the addition of scales of reference). Therefore, it is important that you realize that although these are listed together, not all ranges of photographs are taken together or at the same time during a crime scene investigation. After the initial scene survey has been conducted, but before a detailed search or examination is undertaken, the crime scene should be photographed. However, usually, this only includes the overall photographs, but if items of evidence have been located, mid-ranges can be taken from a safe position. Closeups are not typically taken until a thorough search of the scene has been conducted, unless the item is of a transient nature.

Guidelines for Crime Scene Photography

The following strategies have proven useful in crime scene investigations.

- Always use a photo placard on the first shot of each roll to demonstrate administrative data (see Figure 4.4)
- Always use a crime scene photo log (see Figure 4.12)
- Document the entire scene in situ as soon as possible using overall photographs
- Photograph all fragile evidence as soon as possible
- In the documentation stage, photograph all known evidence using closeup photos
- As items are discovered in later stages, return and document them fully, including additional overall photographs, if needed
- Create photographs that fully demonstrate the results of additional examinations (e.g., latent prints, bloodstain pattern analysis, trajectory analysis)
- Try not to include the photographer or other people in the photographs, if possible
- Shoot all close-up photographs with the use of a tripod
- Close-up photos should be taken with and without a scale of reference
- Be sure that the scale is on the same plane as the item of evidence being photographed

- The subject matter should be parallel to the film plane/camera to eliminate distortion caused by skewed angle photographs (**FIGURE 4.13**)
- If in doubt, photograph it!

Crime Scene Videography

As a result of digital media gaining widespread acceptance within U.S. courts, in the last few years, videography has become a routine method of documenting major crime scenes. While this is an obvious and useful method of providing visual documentation of the conditions and items encountered at the crime scene, it is important to remember that doing so is not a substitute for still photography. Each has its merits.

Video is taken to record the scene in as close to its original condition as possible, as this is an easy method to employ and is relatively quick in its application. Often, video is shot while conducting the preliminary scene survey as a way of recording the layout and conditions of the scene. This documentation is useful to supervisors and investigative personnel in determining logistic and equipment needs, as well as reducing official visitors by giving them the opportunity to look at the crime scene without actually entering into it themselves. It also enables investigative personnel to later “enter” the scene as often as necessary through viewing the video without the need for a search warrant. This is especially useful if the crime scene is no longer available to personnel.

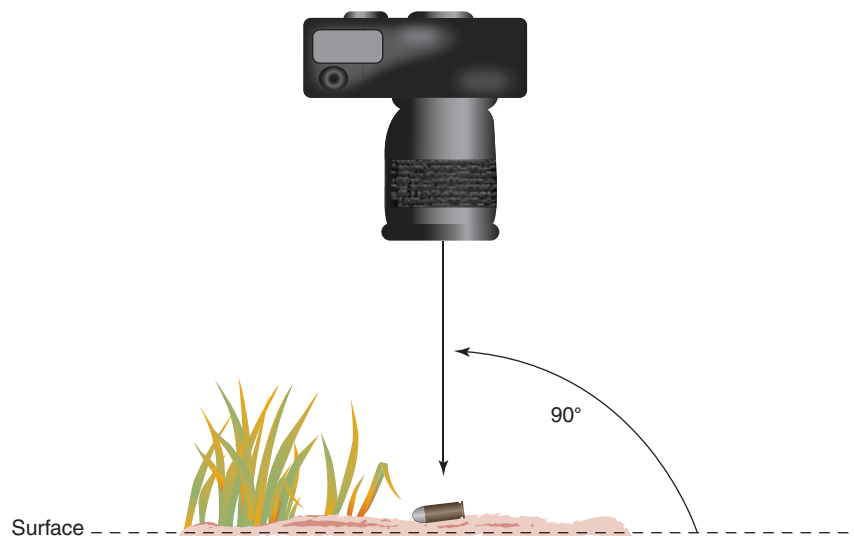


FIGURE 4.13: Example of correct camera angle for close-up photographs.

Courtesy of Dana Gevelinger.

Videography is a useful method for documenting a crime scene. It can provide a perspective that is more easily understood and perceived by the viewer than those offered by notes, sketches, or still photographs. However, it is important to remember that this is a supplemental method and not a replacement for still photography or other documentation methods.

■ Guidelines for Digital Video Recording a Crime Scene

While some of these points are similar to those for photography, a few key points are important to remember when shooting a moving data stream:

- Begin with an introductory placard that states case number, date, time, location, and other pertinent case and chain of custody information
- This video should be a storytelling event. Start with a general view of the area surrounding the crime scene. Following this should be an overview of the crime scene itself. It is a good idea to take overall photographs from the cardinal compass directions (north, south, east, west) for orientation purposes
- Turn off the audio on the digital recorder unless you intend to narrate
- Do not move the camera too quickly by panning (moving side to side), or zooming (moving in for a closeup view) as this results in abrupt motion and bad focus
- Unless in sunlight, always use a video strobe. Never use a flashlight to illuminate the scene.
- Do not use the zoom unless it is necessary because of an inability to get physically closer to the subject matter, or, if it is unsafe to do so. The human eye cannot zoom. If the video is to be a fair and accurate representation of how the videographer observed the scene, no zoom should be used.
- Video never should be edited or altered in any manner following the initial taping. The original copy should be kept as evidence, and duplicate copies should be made for viewing purposes.

Searching the Crime Scene

A variety of factors can affect a search method and these will determine the best, most accurate way to approach the scene:

- **Environment.** Environmental conditions, such as wind, rain, snow, heat, and cold will

have an impact on the method chosen due to how they affect the scene and the personnel involved

- **Object being searched for.** Obviously, a larger item will not entail the same level of searching detail as a smaller item (e.g., a handgun versus a bullet)
- **Number of available personnel.** Some search methods are designed to incorporate a greater number of searchers in order to be most effective. If such personnel are not available, a method that utilizes fewer personnel needs to be considered.
- **Terrain.** Obstructions (trees, buildings), ground cover (asphalt, grass), and grade (steep, flat) will all impact the type of method employed, as they will have a bearing on the ability of searchers to perform the task, and the ability to properly locate the necessary items of evidence.
- **Exigency.** In cases of lost children, a search for a loaded handgun (public safety issue), and other events, there is often the need for exigency that trumps the more detailed search patterns that would be preferable. Therefore, a quick and efficient method should be chosen, making use of the maximum number of resources available in the quickest manner possible.

Swath Size

A **swath** is the effective area that a searcher can cover while conducting a search. Swath is affected by all of the aforementioned matters and is itself a consideration in the determination of the proper search method to employ. If looking for a firearm, a larger swath would be more possible in a parking lot than in high grass, for instance. Also, a search conducted at night or in low light would affect the swath due to the ability of a flashlight to illuminate the area of responsibility.

Types of Crime Scene Search Patterns

Depending on the aforementioned factors, a variety of crime scene search patterns exists that can be employed at a crime scene. Regardless of the search pattern chosen, the crime scene investigator must be sure that the search is conducted in a systematic and thorough manner. This will ensure that all evidence is properly located, documented, and collected.

swath

The effective area that a searcher can cover while conducting a search

lane/strip search

A crime scene search method that begins at one corner of a search area and continues to the opposite corner, then reverses to search again in a line perpendicular to the original search line

line search

A crime scene search pattern in which searchers assemble side by side along a chosen edge of the crime scene and search the area together, maintaining a set distance between them as they walk

zone search

A search method typically used when there are previously defined zones or when a larger crime scene needs to be divided into search zones; sometimes referred to as “gridding” an area, but should not be confused with the grid method

grid search

A crime scene search pattern in which an area is searched in one direction, then the searcher(s) turn 90° and search the same area from a different angle

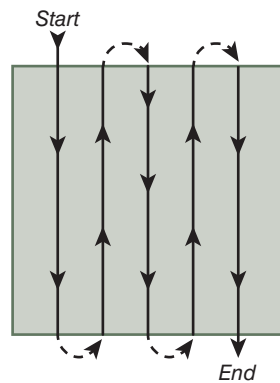


FIGURE 4.14: Example of a lane/strip search.

Courtesy of Dana Gevelinger.

■ Lane/Strip Search

A **lane/strip search** pattern divides the scene into manageable lanes in which the searcher(s) proceed back and forth, in a slightly overlapping fashion. This is similar to mowing a lawn. This method is typically conducted by only one person. (See **FIGURE 4.14.**)

■ Line Search

A **line search** is used when there are a large number of personnel available, often volunteers. In this method, searchers assemble in a line that runs along a chosen edge of the crime scene. Searchers stand side by side and spread apart, maintaining a manageable swath distance between each person. A search coordinator should place him- or herself in the middle of this line to make certain that everyone walks forward in as straight a line as possible.

If one end begins to lag, the other end is requested to slow down. At no point should anyone be encouraged to search faster! Keeping all searchers in a straight line reduces the possibility of missing an area and thus not discovering potential evidence. This method is the most commonly employed type during an exigent search for an item or person, especially when a large number of people are available. (See **FIGURE 4.15.**)

■ Grid Search

A **grid search** is sometimes referred to as a *double strip* or *double lane* method. In this method, a lane is searched in one direction, similar to the lane search method. However, at the lane's terminus, a 90° direction change is made and another lane is searched. This can either occur through the use of two searchers (one responsible for one direction and the other for the perpendicular direction), or it can utilize

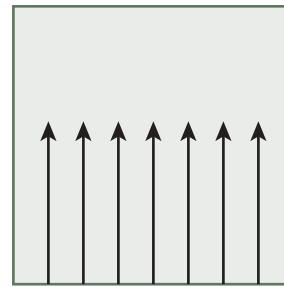


FIGURE 4.15: Example of a line search.

Courtesy of Dana Gevelinger.

a large number of searchers, incorporating the line method as described earlier and then turning 90° and performing a second line search perpendicular to the original lane. While quite time-consuming, this method allows the same area to be searched two separate times and at different angles. This redundancy will reduce searcher boredom and will change the lighting and obstruction conditions present, thus increasing the ability of the searchers to locate evidence. (See **FIGURE 4.16.**)

■ Zone Search

A **zone search** (also called a quadrant search) is typically utilized in an area that is already broken up into defined or manageable zones (e.g., a house or car). It is typically used indoors but may be used outdoors if the areas are broken down into defined zones. Zones can be searched independently and later re-searched by different search personnel to ensure that no evidence has been overlooked. This method also can be used as a way to break up a larger crime scene, so the search coordinator can then choose from any of the search methods to cover a zone area. Some choose to assemble a grid from of this method, so it is often referred to as “gridding” an area, which confuses it with the previously mentioned grid method. In this instance, an area to be searched is divided into smaller squares, each

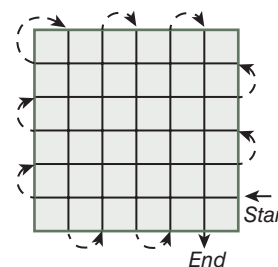


FIGURE 4.16: Example of a grid search.

Courtesy of Dana Gevelinger.

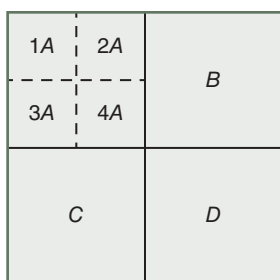


FIGURE 4.17: Example of a zone/quadrant search.

Courtesy of Ellie Blazer.

of which is further subdivided into four smaller squares. The search begins in the northernmost part of the smaller squares and progresses as one would read a book until the grid has been examined completely. (See **FIGURE 4.17**.)

■ Circle/Spiral Search

A **circle search** (also called a **spiral search**) is a specialized search pattern method that is seldom utilized; however, it does have its usefulness and merit. In this method, searchers can either start at a defined outer boundary and circle or spiral in toward the defined critical point, or they can begin at the critical point and circle or spiral outward toward the crime scene perimeter. However, physical obstructions and barriers in the scene will present problems with this method. This method is typically employed in bomb or explosive scenes with a defined seat of explosion. It may be used in underwater or open-water searches where there was a last known location for an item, vessel, or victim. If using a circling rather than a spiraling pattern, to ensure thoroughness, it is suggested that a central point and an effective swath width be determined. Once this is done, searchers should move out in concentric circles, often using a lanyard affixed to a point at the center of the scene. The searchers proceed to search in a 360° manner, around the central point, and once they reach the end of their circuit, they let out the lanyard a predetermined amount, using a manageable swath width, and then proceed to conduct another 360° circuit of the scene. It is suggested that this new circuit be in the opposite direction of the previous circuit both to reduce the possibility of entanglement and to reduce the searcher's vertigo issues from walking in a continuous circle. (See **FIGURE 4.18**.)

The physical nature of a crime scene will suggest what type of search is best to employ, but the characteristics of the scene should have no effect on the quality of the search. Obviously,

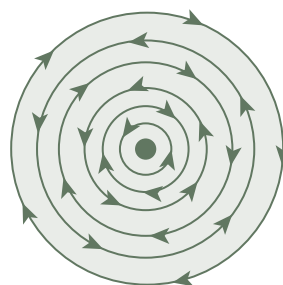


FIGURE 4.18: Example of a circle/spiral search.

Courtesy of Dana Gevelinger.

there will be exceptions. Large-area searches in mass-disaster investigations may have to sacrifice some quality for expedience, but in the average investigation, there is no excuse for haphazard searches. Proceed slowly, for evidence not only can be contaminated by being stepped on but can be destroyed easily or overlooked entirely by the unwary. An experienced investigator will have completed the walk-through before beginning the search, and the preliminary scene survey must be conducted with trace evidence foremost in the investigator's mind.

Important things to remember when conducting a search are:

- Do not touch, handle, or move evidence
- Mark or designate found items without altering them
- Found evidence must be documented before any evidence can be moved or collected

Sketching and Mapping the Scene

Sketching

A **crime scene sketch** is a permanent record of the size and distance relationship of the crime scene and the physical evidence within it. The sketch serves to clarify the special information that is present in the photographs and video documentation, because the other methods do not allow the viewer to easily gauge distances and dimensions. A sketch is the most simplistic manner in which to present crime scene layout and measurements. Often, photographer/camera positions may also be noted in a sketch.

Why is a sketch important to crime scene documentation?

- It accurately portrays the physical facts
- It relates to the sequence of events at the scene

circle search

A specialized search pattern method in which searchers can either start at a defined outer boundary and circle or spiral in toward the defined critical point or begin at the critical point and circle or spiral outward toward the crime scene perimeter; see *spiral search*

spiral search

A search method that involves moving in an ever-tightening or ever-expanding spiral; it can be used indoors or out

crime scene sketch

A measured drawing showing the location of all important items, landmarks, permanent fixtures, and physical evidence at a crime scene

rough sketch

A draft sketch prepared while on scene, typically during the preliminary evaluation, that is not done to scale, is artistically crude, and is used to record measurements and distances at the scene

final sketch

Finished rendition of a rough sketch that shows only pertinent items of evidence, usually prepared for courtroom presentation; typically includes a legend

- It establishes the precise location and relationship of objects and evidence at the scene
- It helps to create a mental picture of the scene for those not present
- It is a permanent record of the scene
- It usually is admissible in court
- It assists in interviewing and interrogating
- It assists in preparing the written investigative report
- It assists in presenting the case in court. Well-prepared sketches and drawings help judges, juries, witnesses, and others to visualize the crime scene.

- Sketch the entire scene, the objects, and the evidence

Two types of sketches are produced with regard to crime scene documentation: rough sketches and final/finished sketches. **Rough sketches** are developed while on scene, typically during the crime scene assessment/preliminary scene evaluation phase to assist with development of a strategic plan for processing. The sketch is not done to scale, can be drawn with any implement (crayon, chalk, pencil, pen, etc.), and is very rough, artistically. As work progresses at the crime scene, the sketch will include not only the crude crime scene layout but also will be used to record measurements of items and structures, and distances among items. (See **FIGURE 4.19**.)

A **final sketch** (see **FIGURES 4.20** and **4.21**) is a finished rendition of the rough sketch. It is usually prepared for courtroom presentation and often will not show all measurements

When should sketches be made?

- Sketch all serious crimes and accident scenes after photographs have been taken and before anything is moved

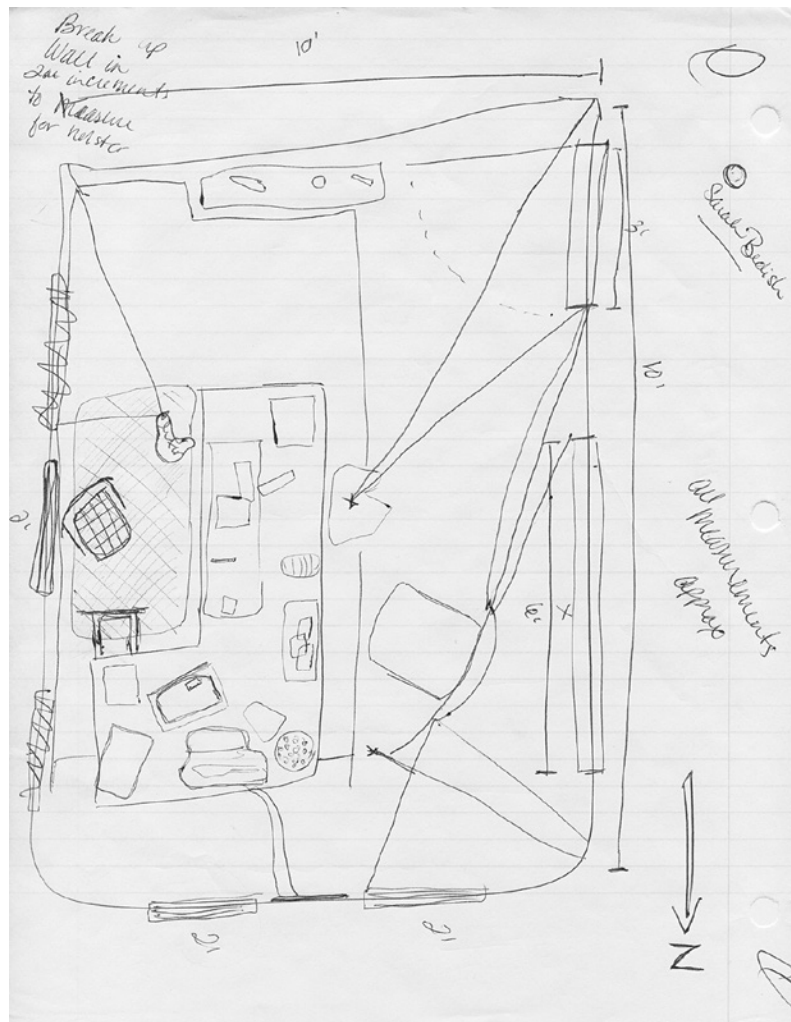


FIGURE 4.19: Example of a rough sketch.

Courtesy of Sarah Bedish.

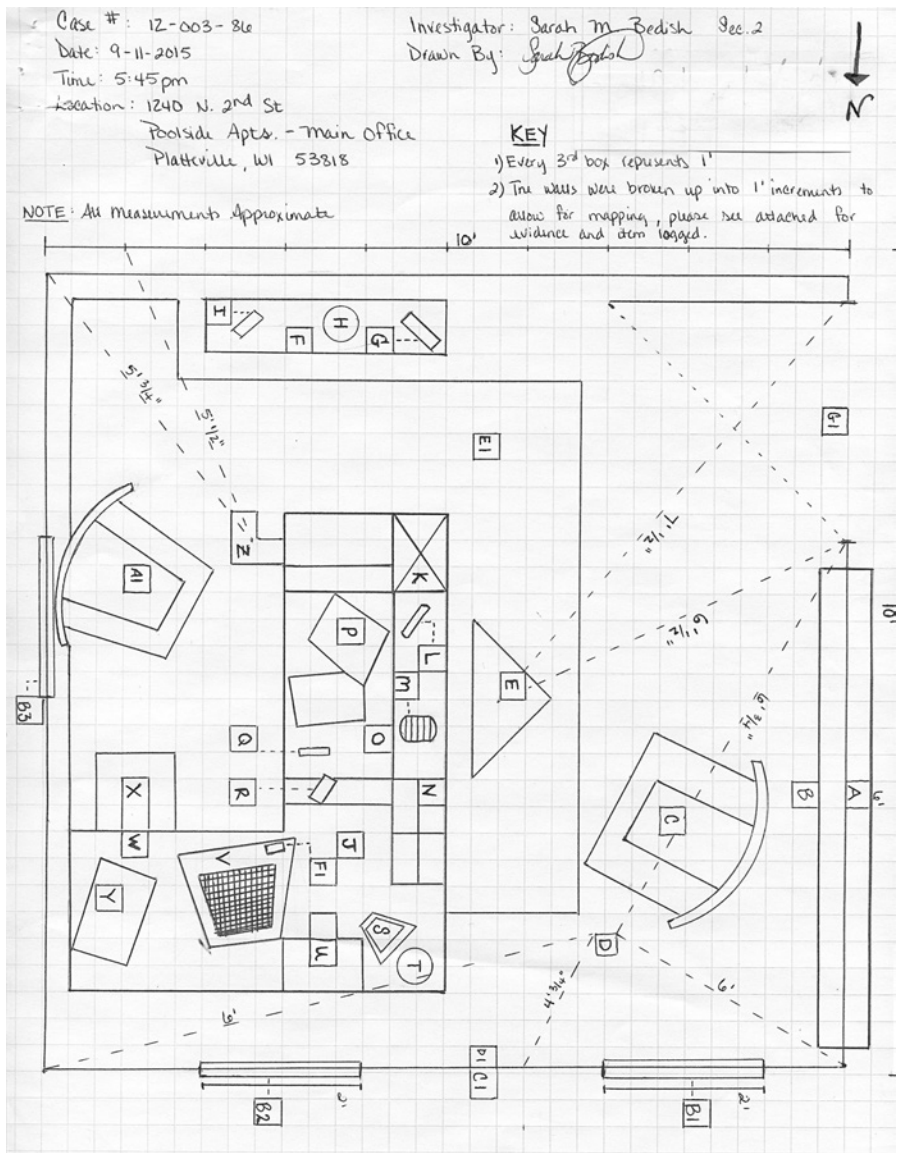


FIGURE 4.20: Example of a final hand-drawn sketch.

Courtesy of Sarah Bedish.

and distances originally recorded on the rough sketch. Only significant items and structures are typically present in a final sketch. A final sketch is either produced in ink or on a computer, in a manner that is not able to be modified (i.e., not in pencil!). The sketch should be clutter-free and should accurately depict all pertinent items of evidence, typically using an accompanying legend. A **legend** is a note of explanation, outside of the sketch area, which relates to a specific item, symbol, or information contained in the graphic representation of a sketch. A final sketch should include:

- Case information (i.e., date, time, place, case number)
- Initials/name (person who drew the sketch)
- Indication of direction (e.g., north)
- Scale (e.g., 1 inch = 1 foot)
- Measurement table (i.e., if measurements are not represented within the confines of the sketch, an accompanying measurement table should be included to explain the distances and measurements associated with it)
- A notation following the scale or measurement table stating that all measurements are approximate. This will ensure that the sketch's author does not get into a credibility argument in court that a measurement

legend
 A note of explanation that defines or labels specific information in a sketch

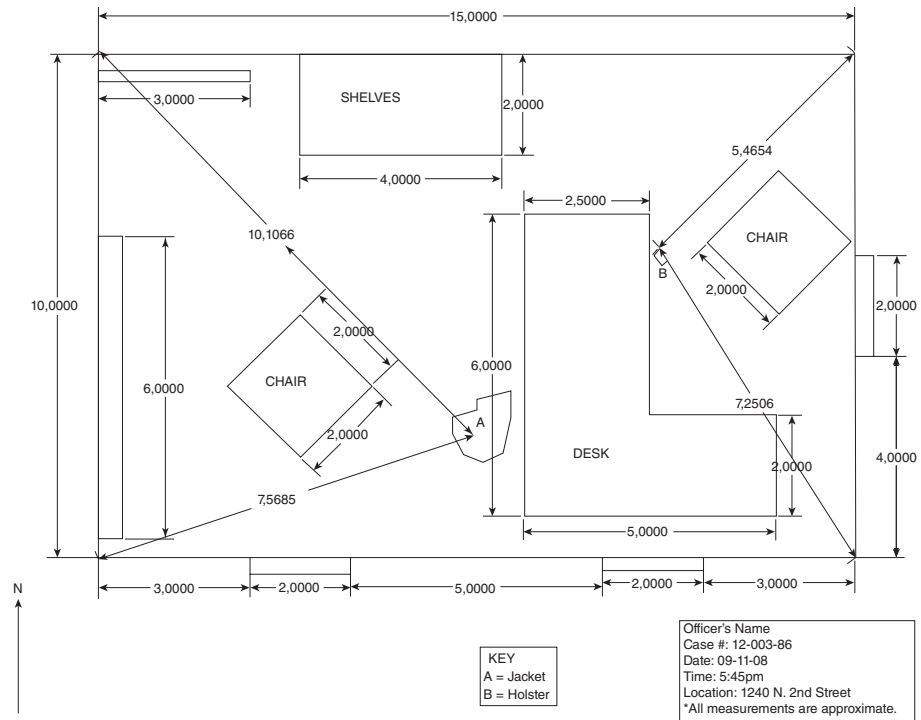


FIGURE 4.21: Example of a final computer-generated sketch.

Modified from an original illustration by Alex Albright.

is documented as the listed measurement but could, in fact, be greater or lesser due to rounding errors or other factors.

Three different crime scene perspectives can be represented in a sketch: (1) the bird's-eye or overhead view (see **FIGURE 4.22**), (2) the elevation or side view (see **FIGURE 4.23**),

and (3) the three-dimensional (3D) view (see **FIGURE 4.24**). Sometimes, people choose to incorporate several perspectives in a sketch (e.g., using both elevation and overhead sketches to draw an exploded or cross-sectional view of a scene; see **FIGURE 4.25**).

An overhead or bird's-eye view is the most common form of crime scene sketching. It is

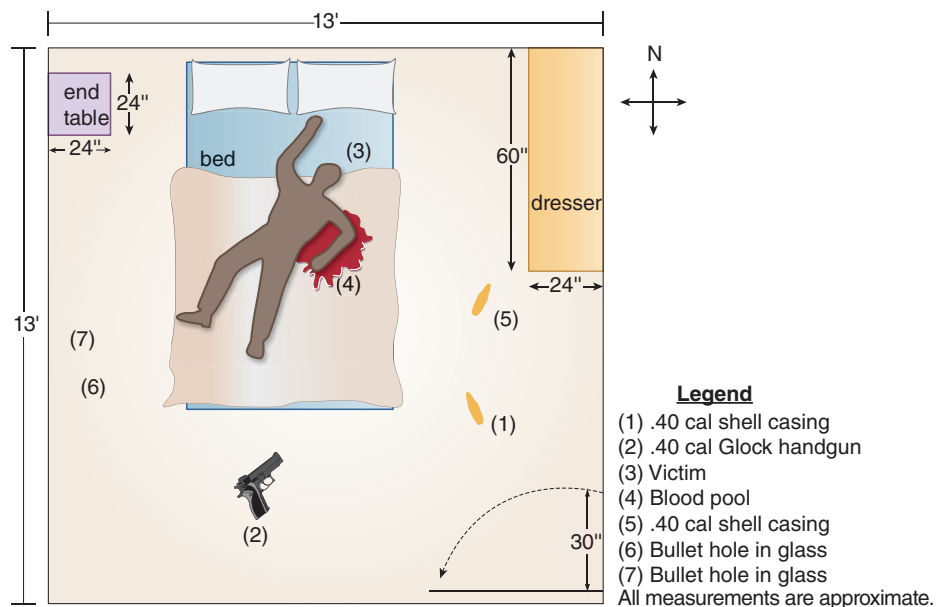


FIGURE 4.22: Example of an overhead/bird's-eye view sketch.

Courtesy of Dana Gevelinger.

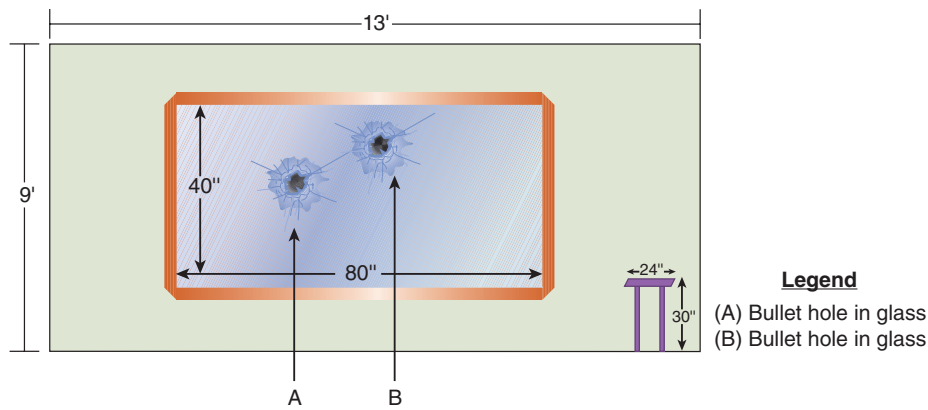


FIGURE 4.23: Example of an elevation/side-view sketch.

Courtesy of Dana Gevelinger.

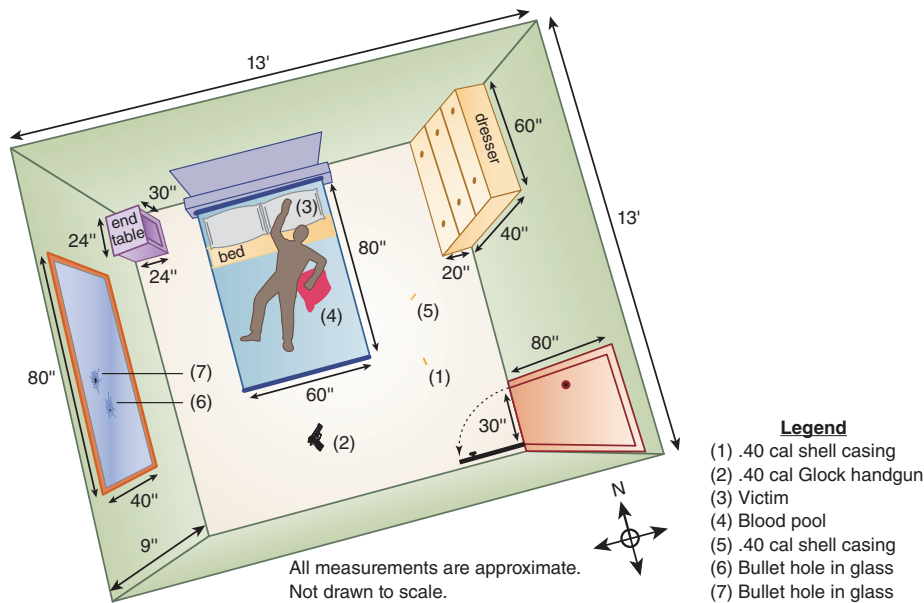


FIGURE 4.24: Example of a 3D crime scene sketch.

Modified from an original illustration by Alex Albright.

prepared as though its author were looking down on the scene from above. This type of view shows the floor layout but cannot represent heights of items or show associated evidence on walls. In order to show such information, a person must use an elevation or side-view sketch to show evidence located on a building facade or interior wall, or any item for which height is an important aspect (e.g., death involving a hanging). A 3-D crime scene perspective is created with the aid of computers. Its primary function is crime scene activity reconstruction—that is, to help explain what happened and in what order.

Everything that is included in the sketch must be located geographically (measuring distance from permanent features is one method

of doing this). Eliminate all unnecessary detail from the sketch, and include only items necessary for locating evidence and establishing scene parameters.

To be useful, a crime scene sketch must contain accurate measurements. Artistic content is not a concern. All measurements should be made from permanent objects. For indoor sketches, walls, doorframes, window frames, and corners serve well as anchors for measurements. For outdoor sketches, buildings, utility poles, roadways, and, less optimally, trees are generally reliable. Keep in mind that anything to which a measurement is anchored must withstand the vagaries of time. The trial may occur years after the offense.

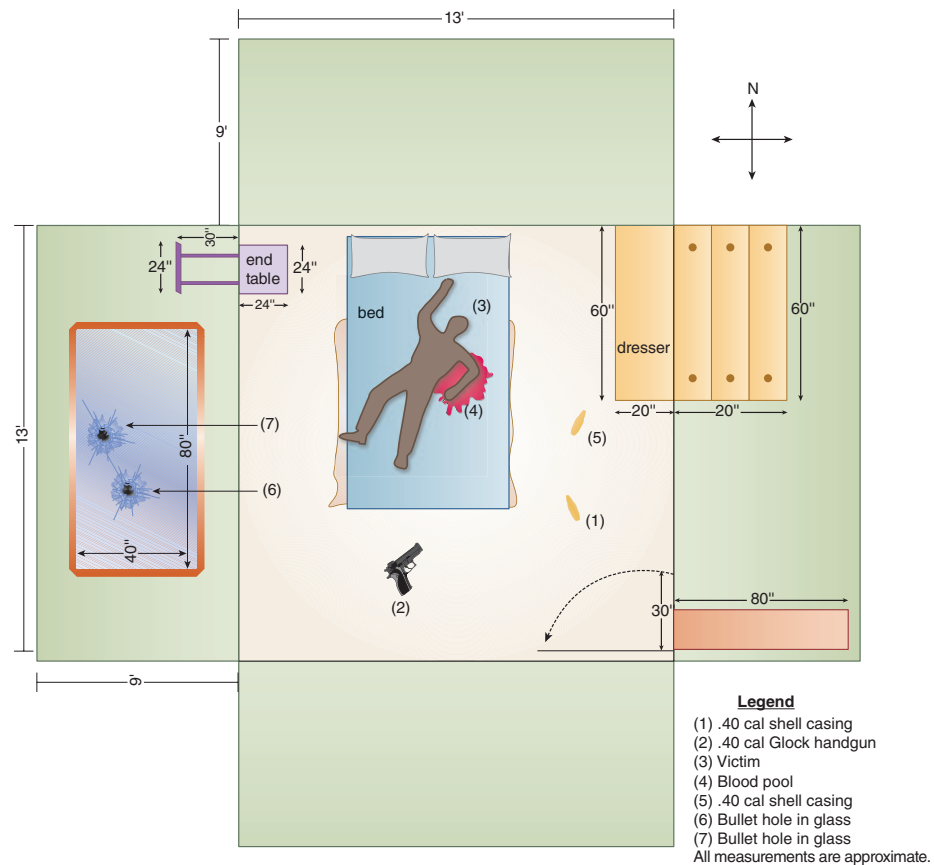


FIGURE 4.25: Example of a cross-sectional/exploded sketch.

Courtesy of Dana Gevelinger.

Crime scene templates are available for many different types of crime scenes. Once the crime scene has been measured and those measurements are transferred to a sketch, those measurements will be used in reconstructing a more elaborate and architecturally correct diagram. Very little sophistication is required to use these templates, but a professional end product is possible.

Crime Scene Mapping

Mapping is the term associated with crime scene measurements. Sometimes, a person may sketch but not map, meaning that he or she draws a sketch of an area but does not apply measurements to the sketch produced and items represented. Rarely, however, will one map without sketching (i.e., record measurements with no graphic representation for what the measurements represent). Sometimes, this step is referred to as *measuring*. There are a variety of methods for mapping a crime scene, depending on whether the crime scene is an interior or exterior scene. As this is an introductory text, only the most basic and most often used methods are covered here. The basic

types of mapping methods utilized for crime scene sketching and mapping are (a) baseline, (b) rectangular coordinate, (c) triangulation, and (d) polar/grid coordinate.

■ Baseline Mapping

This is the most basic—and least accurate—form of crime scene mapping. For this method, a **baseline** is developed or identified from which to conduct measurements. This can be an existing area, such as the edge of a roadway, a wall, or fence; or it can be developed by personnel, such as by placing a string or tape measure through the scene and conducting measurements from there. In the case of the latter, the line should be run between two known fixed points, such as trees or other identifiable items, so that the points can be found in the future and the scene can be reconstructed, if necessary. Once the baseline is established, measurements are taken from it at an approximate 90° angle from the baseline to a point on the identified item or area of the crime scene. Typically, most measurements are made either to center mass of the item or to the nearest point of the item to the baseline. Because it is impossible to

baseline

Arbitrary line of some measurable distance drawn between two fixed points; also, a construction method used to geographically locate evidence

mapping

The term associated with crime scene measurements

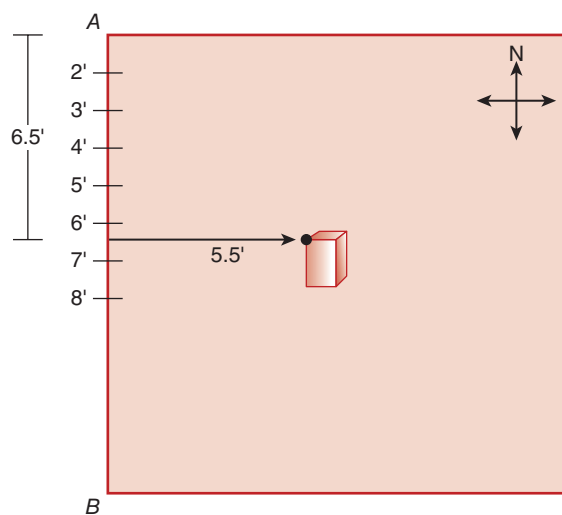


FIGURE 4.26: Example of the baseline mapping technique.

Courtesy of Dana Gevelinger.

ensure that the measurement was taken at 90° , the possibility exists that the measurement will be longer if the measurement was more than 90° from the baseline or if it was less than 90° from the baseline. For this reason, this method is not as accurate as some of the other methods; however, it is quick and extremely easy to use. (See **FIGURE 4.26**.)

■ Rectangular Coordinate Mapping

The rectangular coordinate mapping method is a slightly more accurate variation of the baseline method because it utilizes two such baselines instead of one. Two measurements are taken to a point on an item or location at the scene: one from each identified baseline. Some personnel choose to measure to two or more points on an item, using multiple rectangular measurements as a way of increasing accuracy, while others simply choose to measure to an arbitrarily identified center mass of the object in question or point to which measurements are being taken. As with the baseline method, it cannot be determined that such measurements are taken precisely at 90° angles from the baseline, so there exists a greater possibility of errors than with some of the other methods. However, because this method uses two measurements, it has much greater accuracy than the single baseline method. This method is especially useful in confined spaces and smaller interior scenes. (See **FIGURE 4.27**.)

■ Triangulation Mapping

This is the most accurate method that does not make use of advanced technology. While

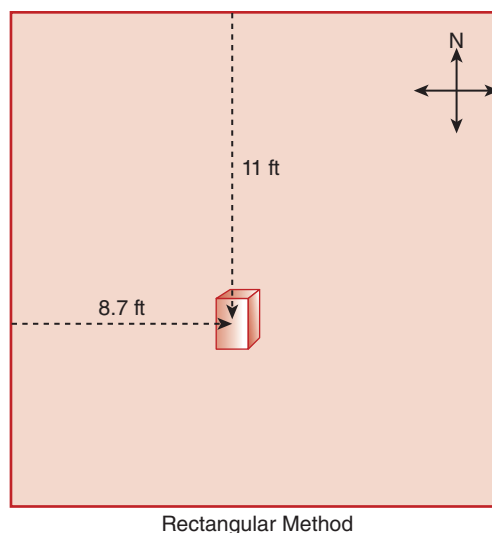


FIGURE 4.27: Example of the rectangular coordinate technique.

Courtesy of Dana Gevelinger.

triangulation is quite a bit more laborious and time-consuming than other methods, it is worth the effort because it is sufficiently more accurate than the aforementioned methods of mapping. The accuracy for this method comes from its foundation: two fixed points. From these two fixed points, measurements are taken to specified points on an item or within the crime scene. There is no need to worry about whether measurements have been made at a right angle because the points derive from a known fixed point, such as the corner of a room or the edge of a doorframe. From these fixed points, a minimum of two measurements are made to each identified point. If the object has a fixed or constant shape (e.g., a firearm or item of furniture), the object is measured to two points, from the two fixed points, for a total of four measurements. If the object has a variable shape or size (e.g., a puddle of water, pool of blood, or pile of clothes), the object is measured to an approximate center of mass. (See **FIGURE 4.28**.)

■ Polar/Grid Coordinate Mapping

Utilizing polar coordinates is the fourth method of crime scene mapping used to document evidence location at a crime scene. Like those previously mentioned, this is a two-dimensional (2D) system that indicates the location of an object by providing the angle and distance from a fixed or known point. Obviously, in order to conduct measurements by this method, a transit or compass is necessary to measure the angles and polar directions. This method is best utilized in large outdoor scenes with very few

triangulation

Basic measurement technique used for geographically locating evidence; in this technique, three angles are measured—those of a triangle formed by the item of interest and two permanent objects (fixed points)

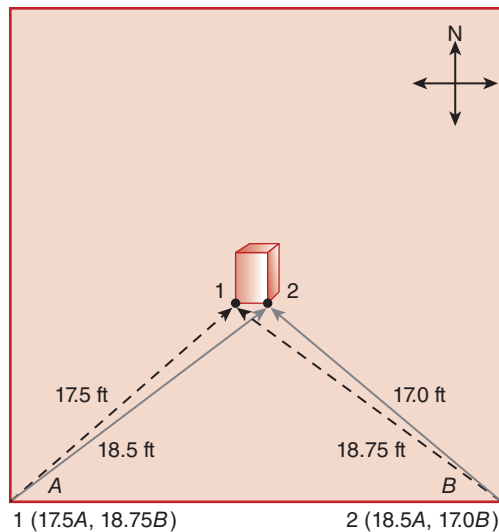


FIGURE 4.28: Example of the triangulation coordinate technique.

Courtesy of Dana Gevelinger.

landmarks (e.g., a plane crash in a forest or large field). [See **FIGURE 4.29**]

■ Advanced Mapping Techniques

Some departments may have the ability to better utilize modern technology, such as a **global positioning system (GPS)**, Total Stations, and 3-D crime scene mapping systems, which are mapping systems that can take measurements in polar coordinates and then convert the measurements into grid coordinates. The benefit of these technologies is that they are able to provide precise electronic distance measurements

global positioning system (GPS)

A device that uses satellites to compute position

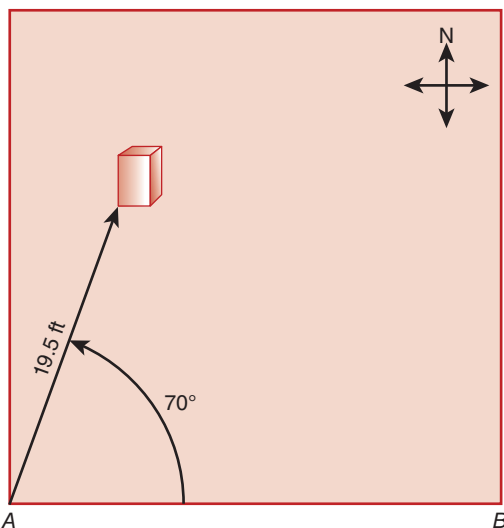


FIGURE 4.29: Example of the polar coordinate technique.

Courtesy of Dana Gevelinger.

and are extremely useful in mapping large-scale scenes and events.

GPS is a satellite-based navigation system comprising a network of 24 satellites that have been placed in Earth's orbit by the U.S. Department of Defense (Garmin, 1996–2011). GPS was originally used by and intended for the military; however, in the 1980s, the government made the technology available for civilian use. The benefit of GPS is that it works in any weather condition, anywhere in the world, 24 hours a day. There are no subscription fees or setup charges to utilize GPS. These satellites complete two very precise orbits of Earth per day, during which they transmit signal information. GPS receivers gather these signals and then use triangulation to calculate the user's location. A GPS receiver must be locked onto the position signal of at least three satellites in order to calculate a 2D position (latitude and longitude) and track movements of an object. If the GPS receiver is able to lock onto four or more satellites, the receiver can determine the user's 3D location (latitude, longitude, and altitude), along with object movement. The more satellites the GPS is locked onto, the greater the accuracy of the position. Once the user's position has been determined, calculation of movement can provide GPS users with the ability to record information, such as speed, bearing, track, trip distance, distance to destination, sunrise, sunset, time, and much more (Garmin, 1996–2011).

How accurate is GPS? In most cases, commercially available GPS receivers are accurate to approximately 12 yards, with higher-end units capable of accuracy in the 3- to 5-yards range. This is sufficiently accurate for large crime scenes that have no known or fixed landmarks. A GPS reading is typically used to "mark" a known point, and then measurements are made from that location, thereby ensuring that any measurements taken will all be "off" by the same amount because they all originate from the same location.

A Total Station is an electronic surveying instrument that has an integrated computer and can measure angles in the horizontal and vertical planes, utilizing a laser rangefinder instead of the more archaic method of a manual tape measure. This is especially useful because changes in elevation are difficult to measure and depict on a crime scene sketch. The Total Station is capable of recording evidence positions in three dimensions, thus simplifying this otherwise complicated situation.

Within the past several years, several vendors (i.e., Panoscan and Leica) have developed 3-D, panoramic crime scene photography and mapping systems. (FIGURE 4.30) “This results in a 3D representation of the scene from which any measurement can be made even after the scene has been released” (Leica, 2015). This enables such technology to be utilized for pre-event planning, crime scene documentation, and postevent analysis. Another benefit of this new technology is that it is capable of accurate crime scene documentation efforts in both bright sunshine and total darkness, often at a distance of up to 900 feet.

Crime Scene Measurements in Court

As with all other crime scene measurements, all measurements are approximate and are never documented as or testified to as being 100% accurate. Crime scene mapping is about producing the best possible documentation with the resources available, realizing that rounding and other factors inhibit the ability to be completely accurate.

A crime scene sketch is of little value if it cannot be admitted at the time of trial. As in the case of photos and audio recordings, there is a particular evidentiary foundation (predicate) that must be established in order to use sketches, maps, or diagrams:

Q: Did you participate in the preparation of the diagram that you have identified as State’s Exhibit Number 2?

A: Yes.



FIGURE 4.30: Example of 3D crime scene scanning equipment.

Courtesy of Leica Geosystems.

Q: Are you personally familiar with the objects and locations contained in the diagram?

A: Yes.

Q: Is this a fair and accurate representation of the [search site, recovery site, location of evidence found] as you recall it?

A: Yes.

Q: Is this diagram drawn to scale?

A: No.

Generally, it is easier to testify about a diagram that is not drawn to scale. Defense lawyers

— Ripped from the Headlines —

Using Drones to Map Crime Scenes

The day may soon come when investigators, and those tasked with processing crime scenes, will be making use of unmanned aerial vehicles, often termed “drones,” as a way of conducting 3D mapping of the area.

One of the most impactful benefits of the use of drone technology is the area to move around (above) the crime scene, without touching or disturbing anything within the scene. As the technology improves, the ability to hover and stabilize a drone, while taking the necessary closeup, midrange, and overall photographs, which are required to properly document

a scene, will be possible. Also, due to the current technology, the photos are able to be digitally stitched together to provide a 3D virtual map of the crime scene, from nearly every angle. This allows for investigators (and even the jury) to be able to move around the scene freely, without ever having been to the scene or having disturbed anything within the scene.

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INVESTIGATOR'S NOTEBOOK

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Elements of a Crime Scene Sketch

- A scene identifier. That identifier, placed in the title box, should be either the case number or a recognizable title associated with the offense being investigated.
- Descriptive words identifying where the scene is situated
- The date of the original sketch (rough sketch)
- The name of the investigator and the person who drew the sketch, even if they are one and the same
- A written statement indicating the drawing's scale or noting the absence of scale
- A directional rosette (an arrow showing which direction is north). In orienting the drawing, it is generally presumed that north is up.

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may focus on minuscule measurement errors to try to undermine the credibility of the entire diagram. Reasonable approximations are much easier to defend. However, if all measurements are linked to a permanent landmark that was located on the diagram with the aid of surveying instruments, having a scale drawing may not be a problem.

Collecting, Handling, and Preserving Evidence

After an intensive crime scene search and documentation, collection and preservation of evidence should begin. The objective of all criminal investigations is to discover the truth through the gathering of evidence in a forensically sound and constitutionally permissible manner—presuming that the determination has been made that a crime has, in fact, been committed. Evidence is of little value if it has been handled, tagged, or stored improperly. Once each item of evidence has been photographed and included in a crime scene sketch, it must be collected, preserved, transported, and stored. Improperly collected, preserved, transported, or stored evidence will be inadmissible at trial once the defense discovers any improprieties.

The handling and packaging of evidence is a lengthy subject. Each item of evidence at the scene should be placed in an appropriate container, which should be tagged to identify it and differentiate it from all other evidence taken at the scene as well as all other

evidence ever taken anywhere. Commercial evidence tags and labels are available and provide places for entering pertinent information. Once bagged and tagged, the evidence must be transported to the police evidence room. As mentioned in the chapter on chain of custody, every moment of the existence of a piece of evidence must be accounted for once that piece of evidence has been seized. Appropriate documentation will deflect any suggestion that the evidence in question has been misplaced, manipulated, or replaced. It is the evidence custodian's responsibility to ensure that any access to evidence placed in storage is legitimate and documented.

The following guidelines should be adhered to in order to ensure the most thorough and accurate investigation:

- Designate one person as the evidence collector/custodian (this ensures that nothing is missed)
- Document, collect, package, mark, seal, and preserve
- Collect all transient, fragile, or easily lost evidence first
- Use paper, which is the preferred packaging
- Package items separately
- Properly mark containers.
- Properly seal containers
- Mark seals with initials, date, and time

In all crashes, the specter of a human-caused explosion hovers. All clothing, personal

CASE IN POINT

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Large Crime Scenes

On April 19, 1995, at 9:03 am CST, calls were received by Emergency Medical Services (EMS) Authority Oklahoma City that a bomb had been detonated in the Alfred Murrah Federal Building. EMS ambulances, police, and firefighters had already been dispatched.

The State Emergency Operations Center was set up, including personnel from military, civil defense, and public safety along with the responding fire and police services. The governor called out the Oklahoma National Guard and members of the Department of Civil Emergency Management. Within the first hour, 50 people were rescued from the Murrah building. By the end of the day, more than 180 survivors were being treated at hospitals around the city. The last survivor, a 15-year-old girl, was found under the base of the collapsed building.

Three hundred and fifty tons of rubble were removed from the site each day until April 29. All of the debris was examined for body parts, explosive residue, and detonators. Canine units searched for survivors and located bodies among the building refuse. Rescue and recovery efforts were concluded on May 4, with the bodies of all but three victims recovered. For several days after the building's demolition, trucks hauled 800 tons of debris a day away from the site. Some of the debris was used as evidence in the trials of the conspirators.

It is important to understand that the bomb blast to the Murrah building was not devastating by itself; it just so happened that the blast was located at a critical point that undermined the whole structure of the building. Most of the damage and a vast majority of the fatalities were caused by the collapse of the building.

The FBI was on the scene immediately, because the building was under federal jurisdiction. Agents found a truck axle with a vehicle identification number (VIN). It was determined that the explosion had been contained in a 1993 Ford truck owned by Ryder Rentals of Miami, Florida. Ryder Rentals informed the FBI that the truck was assigned to a rental company known as Elliot's Body Shop in Junction City, Kansas. The FBI interviewed a rental agent at Elliot's Body Shop in Junction City on April 19, 1995. The individual who signed the rental agreement provided his name, Social Security number, South Dakota driver's license, a South Dakota home address, and a destination in Omaha; the FBI's investigation determined that all of the information was false.

On April 20, 1995, the rental agent was contacted again and assisted in the creation of a composite drawing. On the same day, agents interviewed three witnesses who were near the scene of the explosion prior to the detonation. The witnesses were shown a copy of the composite drawing and identified him as the person they had seen in front of the Murrah building. The composite drawing was shown to employees at various motels and commercial establishments in the Junction City area. Employees of the Dreamland Motel in Junction City told agents that the individual in the composite drawing had been a guest at the motel from April 14 through April 18, 1995. This individual had registered at the motel under the name of Timothy McVeigh, listed his automobile as bearing an Oklahoma license plate with an illegible plate number, and provided a home address on North Van Dyke Road in Decker, Michigan; he drove a car described as a 1970 Mercury.

A check of the Michigan Department of Motor Vehicle records showed a license in the name of Timothy J. McVeigh, date of birth April 23, 1968, with an address of 3616 North Van Dyke Road, Decker, Michigan. Further investigation showed that James Douglas Nichols and his brother Terry Lynn Nichols owned the property at that address and that the property was a working farm.

A relative of James Nichols told the FBI that Timothy McVeigh was a friend of James Nichols, who had been involved in constructing explosives and who possessed large quantities of fuel oil and fertilizer. On April 21, 1995, a former coworker of Timothy McVeigh's reported that he had seen the composite drawing on television and recognized the drawing to be Timothy McVeigh. He told the investigators that McVeigh was known to hold extreme right-wing views, was a military veteran, and was so agitated about the conduct of the federal government in Waco, Texas, in 1993, that he personally visited the site.

On April 21, 1995, investigators learned that Timothy McVeigh was arrested at 10:30 am on April 19, 1995, in Perry, Oklahoma, for not having a license plate and for possession of a weapon approximately 1.5 hours after the explosion at the Alfred P. Murrah Federal Building. (See **FIGURE A**) McVeigh, who had been

(continues)

(continued)

FIGURE A: Alfred P. Murrah Federal Building. Courtesy of FEMA.

held in custody since his arrest on April 19, 1995, listed his home address as 3616 North Van Dyke Road, Decker, Michigan; listed James Nichols of Decker as a reference; and was stopped driving a yellow 1977 Mercury Marquis.

As a result of the investigation conducted by the FBI, Timothy McVeigh was indicted, tried, found guilty, sentenced to death, and executed.

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effects, and body parts should be handled in the same fashion as for a known bombing. Any investigation should search for detonator components. Aircraft parts should be recovered and documented like any other evidence.

Even in the case of a crash with confirmation of accidental causes, those causes will be best discovered and corroborated by treating the recovery operation as a criminal investigation.

CONCLUSION

Scientific crime scene investigation is the best methodology to ensure that an investigation is properly conducted and that justice is served. Use of this methodology will prevent the abrupt end of an incomplete investigation and allow for the best use of the physical evidence found at crime scenes. The general rule relating to crime scene documentation is “if it isn’t written

down, it didn’t happen.” This is important to remember when conducting the various steps of crime scene documentation. It reminds the individual to be as thorough and precise as possible to correctly retain and be able to recall the events, items, and locations involved with a crime scene.

QUESTIONS FOR REVIEW

1. Why is it important to secure the crime scene?
2. What is physical evidence?
3. What is meant geographically by the term *crime scene*?
4. What is crime scene contamination, and what role does it play in the processing of a crime scene?
5. What is transfer, and what is its significance to a crime scene?
6. What are the eight elements of an appropriately protected crime scene?
7. What are field notes, and what role do they play in a criminal investigation?
8. What kind of information should be recorded pertaining to recovered evidence?
9. What is a preliminary scene survey and what purpose does it serve?
10. Where does photography come into play in processing a crime scene? What is photographed, and when is it photographed?
11. What information is included in a crime scene photo log?
12. What information should be included on a crime scene sketch?
13. How does processing a complex crime scene differ from processing a less complex crime scene?
14. What should the presumption be in a mass disaster?
15. List three rules of crime scene photography.
16. Discuss the types of photographs that should be taken at a crime scene.
17. Why photograph bloodstains?
18. How should a violent crime scene be photographed?
19. When should a crime scene be photographed?

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