



**BODY-WORN
CAMERA**
TRAINING & TECHNICAL ASSISTANCE

BWC COST AND STORAGE ESTIMATOR GUIDEBOOK

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Introduction and Overview

Many body-worn camera (BWC) sites struggle with program cost issues. It can be difficult to estimate and forecast the ongoing costs of maintaining BWC programs, including equipment, infrastructure, storage, redaction, personnel, and other costs. In addition, sites may be unsure whether the potential savings from BWCs (e.g., through reduced investigations of complaints against officers, reduced investigations of use of force incidents, reduced civil litigation) might come close to or exceed the costs of BWC programs, producing net savings.

The BWC Program Cost Estimator was developed primarily as a tool to guide BWC sites through these various cost issues to help them think more concretely about cost issues related to BWC programs and plan for long-term costs and benefits of a BWC program. This Cost Estimator is a spreadsheet-based algorithm (set of mathematical calculations) that allows a BWC site to enter real or estimated cost and cost-related data for a series of variables and quickly estimate the current and future costs of its BWC programs, as well as estimate whether the anticipated benefits of its BWC program will offset program costs in part or in whole. This Estimator will provide estimates for planning purposes, helping sites understand different BWC program cost drivers and potential savings.

The Estimator is not meant to produce a precise forecast of costs and savings for the purposes of official budgeting. Rather, the Estimator is intended to guide thinking about the costs and benefits of a BWC program and provides for making low, medium, and high cost and benefit assumptions to help jurisdictions gauge potential future costs and savings.

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Quick-Start Guide

The BWC Cost Estimator Worksheet can be found at <https://www.bwctta.com/resources/bwc-resources/bwc-cost-and-storage-Estimator>. This Guide is available for download and will help BWC Policy and Implementation Program (PIP) site managers think about the costs and benefits associated with a BWC program. Once the document is downloaded, users will be able to input specific information about their agency's BWC program, and the worksheet will display costs, benefits, and net cost over 5 years.

The time it will take to fill out the worksheet will vary depending on the availability of certain cost and benefit figures. Collecting all the information required to use the worksheet may take an hour or so, or could be time consuming and labor intensive. Users should complete the worksheet with best estimates to get some initial calculations, and then refine estimates with more precise data, as it becomes available.

Before beginning the worksheet, it will help to know the following information:

- Vendor choices and camera costs
- Number of cameras desired and how they will be implemented over the next several years
- Types and costs of additional equipment and software desired
- Types and cost of storage solutions
- Cost of any IT infrastructure updates
- Additional personnel costs
- Prosecution video transmission costs
- Public Information request costs
- Information on the amount and costs of complaints, use-of-force incidents, and officer involved shooting incidents.

For more information and guidance on finding this information, go to www.BWCTTA.com. You can provide estimates for inputs or leave them blank, but outputs improve with the accuracy and fullness of the input information. If costs are bundled, they can be input into a single field, leaving other associated fields blank. Appendix A contains guidance on dealing with bundled costs.

The worksheet includes a list of costs and benefits, with a section for the user to input information about each cost and benefit and an explanation of the costs and benefit categories. There is also a separate worksheet in the Cost Estimator file to help estimate BWC storage requirements. Guidance for this sheet is included in Appendix B. Please be sure to read all explanations carefully. On the worksheet, there are boxes highlighted in

-  Light blue with grey dots: users should input information into the blue boxes.
-  Light grey with diagonal white stripes: information will automatically populate the light grey boxes. Please do not type in those boxes.

-  Grey with dark shading: these boxes should be left blank.

If you have any questions about a particular cost or benefit, please refer to the sections below that provide more detail about the costs and benefits included in the worksheet or contact us at <http://www.bwctta.com/Ask%20a%20BWC%20Expert>.

Estimating Costs

This section estimates the cost of a BWC program to a site based on the specific cost of:

- Cameras
- Storage
- Additional equipment
- Software and licenses
- Maintenance
- IT infrastructure upgrades
- Additional personnel
- Prosecution video transmission
- Public Information Requests.

The Estimator will compute costs for up to a 5-year period of ownership, with costs allocated to the year in which the costs are incurred.

Number of sworn officers

Please enter the number of sworn officers in the department.

Number of BWCs to be fielded

Please enter the number of BWCs the department plans to deploy. Do not include spare cameras in this number. The Estimator will account for spare cameras in the “Peripheral Equipment” section.

Purchase cost distribution

Sites can choose to make all camera purchases up front (e.g., in the first year) or spread the purchases out in different ways across a number of years. The user should fill out the number of BWCs to be fielded; the Cost Estimator will offer three options for the timing of the rollout and associated purchase costs:

- If the first option is selected, all camera purchases occur in the first year.
- If the second option is selected, camera purchases will be spread evenly over 5 years.
- If the third option is selected, users will be permitted to manually enter the number of cameras they intend to purchase in each year.

In each case, the sheet will automatically calculate purchase cost for each year based on the background information filled out on the number of cameras purchased that year and cost per camera.

Basic camera and docking costs

Vendor name

Please enter the name(s) of vendors being considered as Vendor 1, Vendor 2, or Vendor 3 in the appropriate column. It is acceptable to enter a single vendor if that is all you are

considering. If you are contemplating more than three vendors, you can save additional copies of the spreadsheet and enter additional vendor information.

Cost per camera

Please enter the cost per camera under the appropriate column for each vendor. If you have a bundled upfront one-time cost per camera, enter it here and leave all associated costs included in that bundle blank. See Appendix A for more details.

Docking stations

Cost per docking station

Please enter the cost per docking station in the appropriate column for each vendor.

Number of cameras per docking station

Please enter the number of cameras per docking station in the appropriate column for each vendor.

Number of BWCs Purchased per Year

This section will automatically populate based on your response to the "Purchase Cost Distribution" question. If you select "I want to manually input purchase costs across 5 years" under the "Purchase Cost Distribution" question, you will need to input the number of BWCs planned for purchase each year for each vendor.

Storage

Sites can choose from a variety of storage solution options. Each option has pros and cons, depending on the specifics of the site. Please work with your Information Technology (IT) personnel and vendors of interest to identify storage requirements and costs, and make appropriate storage solution decisions.

A key factor in storage costs will be the resolution settings available, and chosen, for the cameras you are considering. Higher resolution usually means better quality video, but it also means increased storage and bandwidth requirements to transmit and store the video captured, and thus increased costs.

Cloud fees per camera per month

If you are considering cloud storage, please enter monthly fees charged per officer for any cloud storage vendors of interest. If you are not considering cloud storage, leave this section blank. If you have a bundled monthly cost per camera, enter it here and leave all associated costs included in that bundle blank. See Appendix A for more details.

Other fixed monthly cloud fees <Describe Here>

If you are considering cloud storage, please enter monthly fees for any other costs not included in the above. If you are not considering cloud storage, leave this section blank.

Please feel free to put a brief explanation of what is included within this field between the brackets where it says <Describe Here>. *Additional explanation can be entered in column*

“F”, which is labeled “Comments and Explanations.” We recommend that you only add to, rather than delete, the existing text, so that the instructions are available for future users.

In-house video storage

If you are considering in-house storage, please work with your IT personnel and vendors of interest to identify storage requirements and costs. Enter the upfront costs of in-house video storage into this section. If you are not considering in-house video storage, leave this section blank.

As stated above, there is a separate worksheet in the Cost Estimator file to help estimate BWC storage requirements. Guidance for this sheet is included in Appendix B.

Peripheral equipment (one-time, upfront costs)

A BWC program typically requires some equipment, such as camera mounts, in addition to cameras. Contact similar departments with BWCs and vendors of interest for availability and pricing of such items. This section briefly surveys the cost requirements of these items.

Spare cameras

Please enter the number of spare cameras desired. Contact vendors of interest for recommendations and pricing of these items.

Camera mounts

Contact vendors of interest for recommendations and pricing of these items. You may also want to seek recommendations from other agencies using the specific vendor’s equipment to identify their recommendations on the need for additional mounts.

Many factors go into the number of mounts an agency may want to purchase, including the vendor, the quality of the mount, and the officers’ uniform(s).

The first factor is whether the camera mount is included in the price of the camera or is a separate expense. If the mount is included in the cost of the camera, only additional mounts should be included in this section. If the mounts are not included in the cost of the camera, all mounts should be included in this section.

In addition, some vendors recommend purchasing multiple mounting options per officer, and/or spare mounts issued to officers, while others offer limited mounting options and/or do not recommend spare mounts be purchased.

If the vendor offers multiple mounting options, your agency also may want to consider purchasing a selection of the different mounting options to test which options may work best with your uniforms.

If your officers may use different uniform options throughout the year (e.g., button down shirt vs golf shirt, winter coats, part-time use of external vests), different mounts may be required for the different uniforms.

Some vendors may require or recommend uniform modifications in addition to, or in place of, external mounts. Please feel free to include any costs associated with such uniform modifications in this section.

Camera mounts not included with camera

Please enter the number of camera mounts and/or uniform modifications to be purchased (Please do not include any mounts that come included in the cost of the cameras).

Cost per camera mount

Please enter the cost per camera mount.

Annual cost of other spare parts

Please enter the combined annual cost of any other desired additional spare parts. Contact vendors of interest for recommendations and pricing of such items.

Auto-initiation triggers

These include equipment/software that turn on the camera based on officers' actions (e.g., pulling weapon, turning on siren, etc.). Contact vendors of interest for availability and pricing of such items.

Auto-initiation triggers

Please enter the number of desired auto-initiation triggers.

Cost per auto-initiation trigger

Please enter the equipment cost per auto-initiation trigger.

Other peripheral equipment

Please enter the combined annual cost of any other desired peripheral equipment. Contact vendors of interest for recommendations and pricing of such items.

Please feel free to enter a brief explanation of what is included within this field between the brackets where it says *<Describe Here>*. *Additional explanation can be entered in column "F", which is labeled "Comments and Explanations."* We recommend that you only add to, rather than delete, the existing text, so that the instructions are available for future users.

Licenses (annual fees)

BWC Programs can require licenses for various types of software and other technology. Contact vendors of interest for availability and pricing of such items.

Software

Contact vendors of interest for availability and pricing of such items.

Video management software

Video management software allows the agency to manage the BWC videos, and potentially other videos, added to the system. With this software, appropriate people within the

agency, and potential partner agencies, can search the uploaded videos, view videos, categorize the videos, annotate the videos, and perform other tasks to use or maintain the videos that have been uploaded. Often this software comes bundled with the cameras or as part of a vendor services contract.

Please enter the annual costs of video management software. Contact vendors of interest for availability and pricing of such items.

If this software is bundled with other items already entered, there is no need to enter it again here. If the primary component of a vendor bundle has not already been entered, please feel free to enter that bundle here.

Video editing and redaction software

Some vendors bundle video editing and redaction software with their other software licenses; others require the customers to purchase their own software. Some agencies will use the bundled software, while others may still purchase additional software. In estimating these costs, you may want to: (1) talk to the vendors to identify what software may be included with their licensing; (2) talk to other users to identify whether additional software may be required; (3) consult with your agency's IT personnel and perhaps video editing experts within your agency and/or government entity. Additional information regarding public information requests and redaction is included in the "Public Information Requests" section below. Please enter the annual costs of redaction software. Contact vendors of interest for availability and pricing of such items.

CAD integration

Some vendors offer tools to link BWC videos to the Computer Aided Dispatch (CAD) records for the event associated with the video. This is commonly referred to as CAD integration.

If you are considering the use of CAD integration, please enter the annual costs of that CAD integration. Contact vendors of interest for availability and pricing of this feature.

Other

In this section, include any other software and licensing costs such as auto-initiation trigger licensing costs and storage of non-BWC digital evidence. Contact vendors of interest for availability and pricing of such items. Please enter the combined annual cost of any other licensing fees not captured already.

Please feel free to enter a brief explanation of what is included within this field between the brackets where it says *<Describe Here>*. *Additional explanation can be entered in column "F", which is labeled "Comments and Explanations."* We recommend that you only add to, rather than delete, the existing text, so that the instructions are available for future users.

Maintenance

Please enter the annual cost of body-worn camera maintenance. Contact vendors of interest for availability and pricing of maintenance for equipment identified above.

Cost to upgrade IT infrastructure

BWC programs can require upgrades to existing IT infrastructure. BWC infrastructure for uploads/downloads and charging often requires upgrades for bandwidth and electrical capacity.

For example: An agency may need to upgrade the electrical and/or network wiring to the room(s) where cameras will be docked in the docking stations. Additional network upgrades may be required to handle the network capacity for uploading and/or accessing BWC videos. That bandwidth will be different, depending on vendor(s) and video resolution(s) considered or chosen.

Please work with your IT personnel to identify whether upgrades are required and, if so, what the costs may be. If you have a bundled upfront one-time total cost, enter it here and leave all associated costs included in that bundle blank. See Appendix A for more details.

Personnel

BWC programs can require additional personnel and training. The following section accounts for the costs of additional personnel and training. All costs will be input as annual costs, figuring the personnel time required for each position against the fully weighted annual cost (e.g., including all benefits and other costs) for such a position in your agency.

BWC project manager/coordinator

Some agencies will need to dedicate a full-time person, or more, to manage the program. Others may need only a part-time person. Please determine what your agency might need and enter the annual cost for that position(s).

IT personnel

Some agencies will need to dedicate one or more full-time personnel to manage the IT aspects of the program. Others may need only a part-time person. In general, data self-storage will require more—and more highly trained—personnel to manage data self-storage than cloud storage, as the cloud vendor will typically manage specific IT functions. Consult with your IT personnel to identify personnel requirements and costs. Please determine what your agency might need and enter the annual cost of all additional IT personnel.

Training

Some agencies will need to dedicate one or more full-time personnel to train officers in the use of BWC. Others may need only a part-time person. Please determine what your agency might need and enter the annual cost for all training personnel.

Public information personnel

Some agencies will need to dedicate one or more full-time personnel to manage the public information aspects of the program. Others may need only a part-time person or will hire outside contractors. Much of the need will be based on local/state open records laws and the policies implemented by your agency regarding methods and requirements for public

access. Additional information regarding public information requests and redaction is included in the “Public Information Requests” section below. Please determine what your agency might need and enter the annual fully weighted cost for all personnel processing Public Information Requests.

Other program personnel

Some agencies will dedicate one or more full-time personnel to assist in the management of the BWC program. This can include liaisons to stations or units, time allocations for supervisor or other internal review of video for personnel management and/or policy compliance, and other program supervisory efforts. Please determine what your agency might need and enter the combined annual cost for all other additional personnel.

Please feel free to enter a brief explanation of what is included within this field between the brackets where it says *<Describe Here>*. *Additional explanation can be entered in column “F”, which is labeled “Comments and Explanations.” We recommend that you only add to, rather than delete, the existing text, so that the instructions are available for future users.*

Prosecution Video Transmission

Agencies can incur significant costs transmitting BWC video evidence to prosecutors’ offices, including personnel costs and the means of transmission, such as discs, flash-drives, and software licensing. This section covers potential costs that agencies incur transmitting BWC video footage to prosecutors’ offices. Some of the section overlaps with the “Public Information Request” section. Please do not enter duplicate costs in both sections. Rather, chose one section to account for the cost or split the cost between sections.

Note: If your agency is not responsible for preparing and transmitting video for prosecutors, please feel free to skip this section

Can the vendor transmit electronically to prosecutors?

Some vendors provide a method or platform to transmit BWC video footage electronically to prosecutors through the Internet, especially when cloud storage is used. Please check with your vendor about the availability of this feature and whether there are any additional charges associated with it. If this service is available and your agency plans to use it, please select “Yes.” If this service is unavailable or your agency does not plan to use this service, please select “No.” To fill out this cell, use the pull-down menu provided by clicking into the cell and clicking on the grey arrow to the right of the cell.

If the prosecutor requires videos, will the prosecutor accept electronic transmission?

Some prosecutors’ offices are equipped to handle electronic transmission for most or all cases. Others may be equipped to handle electronic transmission for internal review, but still need external media (e.g., DVDs or flash drives) for court and transmission of evidence to defense. Factors may include their internal technical requirements, the number of agencies they serve, and the number of disparate systems they might need to access to manage video. Please check with your prosecutor’s office to determine whether it will accept electronic transmission of BWC video footage (and to what extent). The calculations, below,

may be useful in understanding the economic impacts of the prosecutor's approach to handling video transmission. The answer options provided for this question are "Yes," "No," "Sometimes," and "Don't Know." If the prosecutor accepts digital feeds under certain circumstances, but not all the time, select "Sometimes." If the answer to this question and the above question are both "Yes," then the rest of the answers in this section will auto-populate to zero. If you believe your agency will still incur prosecution video transmission costs despite using electronic transmission, you can change the auto-populated answers below. To fill out this cell, use the pull-down menu provided by clicking into the cell and clicking on the grey arrow to the right of the cell.

Video media: Annual number of videos requested

If your prosecutor requires transmission of video by external media for all cases, please enter the total number of annual videos requested by your prosecutor's office. This will be the number of videos the prosecutor's office will request by external media after all cameras have been rolled out. This can be estimated by multiplying the number of cases per year for which you expect to have video requests by the average number of videos requested per case. Your agency's past history, your agency's current crime trends, and prosecutor's office conventions regarding case review should inform the above stated estimate. Please consult with your prosecutor's office to determine this amount. If your prosecutor's office requires media for only some cases, please work with the prosecutor's office to estimate the annual number of cases for which video media must be prepared.

Prosecution video transmission personnel cost per video

Agencies may need to create a new position or add hours to an existing position to account for additional video transmission tasks. This will vary by agency, policy, and chain of custody requirements. Some agencies assign this role to a detective assigned to the case; others might assign it to records, evidence, or IT personnel, among others. If your agency currently prepares digital media for prosecutors, the task may remain with the personnel currently preparing such media. If your agency does not currently prepare digital media for prosecutors, you may want to consult your prosecutor's office, IT personnel, or other agencies preparing media for the prosecutor's office to estimate the average time expected to prepare each video media item.

If your agency currently prepares digital media for prosecutors, such as In Car Video recordings, audio recordings, or digital photos, the current time to prepare each video media item will be at least as long as preparing the existing media and will grow slightly with each file added to the media item. If your agency does not currently prepare digital media for prosecutors, you may want to consult with your IT personnel and other agencies preparing media for the prosecutors' office to estimate the average time it will take to prepare each video media item. Any time expected for video editing, redaction, or other manipulation should be included here, as well as time to label, package, and send the video media to prosecutors.

Please enter the cost for one video for all personnel processing video requests from the prosecutor's office. This cost can be estimated by multiplying the relevant personnel's hourly rate by the time required to fulfill an average video request.

Video editing and redaction equipment (upfront cost)

Depending on the extent of your video editing and redaction needs, you might need dedicated equipment, such as a high-end computer workstation. If your agency is going to transmit video via DVDs, you may require a high-end rapid DVD burner if there will be sufficient throughput to justify its use. Please enter the upfront cost of any new equipment—such as DVD burners or computer upgrades—that you may specifically require to handle prosecution video media preparation. Please consult with IT personnel and prosecutors. The information entered in this section may overlap with the “video editing and redaction equipment” question under “Public Information Request.” Please enter this information in one of the two places or split the cost between the two questions.

Video editing and redaction supplies cost per video

If your agency is going to transmit video via external media, such as DVDs or USB thumb drives, the costs of the media should be accounted for. Please enter the cost of editing and redaction supplies per video. Please consult with your prosecutor's office about the type of media (e.g., CD, DVD, USB thumb drive) generally used to transmit BWC video footage, and the cost of that media. The information entered in this section may overlap with the “video editing and redaction equipment” question under “Public Information Request.” Please enter this information in one of the two places or split the cost between the two questions.

Video editing and redaction services cost per video

Some agencies may choose to outsource video editing and redaction to external vendors for some or all of their editing and redaction needs. In some cases, the outside vendor may be another law enforcement agency with extra capacity. When estimating these costs, consider talking to local vendors to identify pricing and availability and to other users to identify the potential volume of videos. In addition, please consult with your agency's IT personnel and consider consulting with video editing experts within your agency or government entity. Please enter the expected cost of these services per video. The information entered in this section may overlap with the “video editing and redaction services” question under “Public Information Request.” Please enter this information in one of the two places or split the cost between the two questions.

Public Information Requests

Law enforcement agencies using BWC will likely need some method of handling Public Information Requests, including:

- Taking in the requests
- Evaluating the requests against laws and policies to determine if/how to fulfill them
- Editing the relevant segment(s) of video

- Redacting any protected information
- Providing the video to the requestor.

The number of requests and video to be processed will be determined by a number of factors, including

- State and local laws
- Agency policies
- Size of agency
- Numerous factors specific to the jurisdiction, including the nature of the media market and the nature of the relationship and trust between the agency and its community.

When estimating the factors for these costs, an agency may want to consult with surrounding agencies of similar size, with similar legal and policy frameworks. You may also want to: (1) talk to vendors to identify what software may be included with their licensing; (2) talk to other users to identify whether additional hardware or software may be required; (3) consult with your agency's IT personnel and perhaps video editing experts within your agency and/or government entity. Some of the section below overlaps with sections in the "Prosecution Video Transmission" section. Please do not account for duplicate costs in both sections. Rather, choose one section to account for the cost or split the cost between sections.

Video editing and redaction equipment

Depending on the extent of your video editing and redaction needs, dedicated equipment, such as a high-end workstation, may be required. If your agency is going to transmit video via DVDs, a high-end rapid DVD burner may be required if there will be sufficient throughput to justify its use. Please enter the upfront cost of this equipment. The information entered in this section may overlap with the "video editing and redaction equipment" question under "Prosecution Video Transmission." Please enter this information in one of the two places or split the cost between the two questions.

Video editing and redaction supplies

If your agency is going to transmit video via external media, such as DVDs or USB thumb drives, the costs of the media should be accounted for. If your agency chooses to use secure web interfaces to transmit the video, such costs can be avoided. In estimating these costs, you may want to: (1) talk to the vendors to identify whether they support secure video file transfer via the web; talk to other users to identify the potential volume of videos; (3) consult with your agency's IT personnel. Please enter the upfront cost of this equipment. If you have a bundled monthly total cost, enter it here and leave all associated costs included in that bundle blank. See Appendix A for more details.

Video editing and redaction services

Some agencies may choose to outsource video editing and redaction to external vendors for some or all of their editing and redaction needs. In some cases, the outside vendor may

be another law enforcement agency with extra capacity. In estimating these costs, consider talking to potential local vendors to identify pricing and availability and to other users to identify potential volume of videos. In addition, please consult with your agency's IT personnel and consider consulting with video editing experts within your agency and/or government entity. Please enter the expected average monthly cost of these services. The information entered in this section may overlap with the "video editing and redaction services cost per video" question under "Prosecution Video Transmission." Please enter this information in one of the two places or split the cost between the two questions.

Public Information Request user fees

It may be that some or all of the costs for complying with public information requests may be recovered through user fees. The ability to collect such user fees may be impacted by state and local law. Please consult with your agency's legal counsel and consider consulting with surrounding agencies of similar size, with similar legal and policy frameworks to identify if/how such costs may be recouped. Please enter the annual amount your agency expects to receive in reimbursements.

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Estimating Benefits

This section estimates the benefits of a BWC program to a site based on the specific benefits of:

- Reductions in the number and costs of complaints against officers
- Reductions in cost of use of force incidents
- Reductions in cost of officer-involved shootings.

For this section, the user will enter information into the cells highlighted in green only. Research shows that there may be benefits in these areas. Some research studies have shown significant benefits, by law enforcement agencies, in these areas, while other studies showed very limited impacts at other agencies. This section provides an opportunity to estimate the cost impact/savings of those benefits. Given the variances in the research, we provide a broad range for estimating benefits.

Complaints

Number of complaints filed last year

Under the “Actual” column in the cell highlighted in green, please enter the actual number of complaints filed in the last full year of records. Please consult with your records and complaint resolution personnel to determine this number.

Average cost per complaint

Under the “Actual” column in the cell highlighted in green, please enter the average cost to investigate and resolve a complaint filed in the last full year of records. Please consult with your records and complaint resolution personnel to determine this amount.

Expected reductions in complaints

Please consult with your records and complaint resolution personnel to determine high, medium, and low estimates of the reduction in percentage of complaints that may be attributed to the BWC program. Studies put such ranges between 0-percent and 90-percent reductions in complaints.

Please note: The entries in these fields are not predictions of what will happen. They are assumptions of possible impacts, to analyze the benefits of those possible impacts.

High estimate

Please enter a value for the high estimate of expected reductions in complaints. This value should be entered as a decimal between 0 and 1. The value will appear as a percent.

Medium estimate

Please enter a percent for the medium estimate of expected reductions in complaints. This value should be entered as a decimal between 0 and 1. The value will appear as a percent.

Low estimate

Please enter a percent for the low estimate of expected reductions in complaints. This value should be entered as a decimal between 0 and 1. The value will appear as a percent. Note also that an entry of a negative percent (e.g., -10%) indicates an estimate that complaints will increase by 10 percent.

Expected percentage of complaints that can be resolved primarily by video review

Please consult with your records and complaint resolution personnel to determine high, medium, and low estimates for the percentage of complaints that can be resolved primarily by video review, thereby avoiding the cost of an investigation.

Please note: The entries in these fields are not predictions of what will happen. They are assumptions of possible impacts, to analyze the benefits of those possible impacts.

High estimate

Please enter a percent for the high estimate of expected reductions in complaints resolved primarily by video review. This value should be entered as a decimal between 0 and 1. The value will appear as a percent.

Medium estimate

Please enter a percent for the medium estimate of expected reductions in complaints resolved primarily by video review. This value should be entered as a decimal between 0 and 1. The value will appear as a percent.

Low estimate

Please enter a percent for the low estimate of expected reductions in complaints resolved primarily by video review. This value should be entered as a decimal between 0 and 1. The value will appear as a percent.

Expected percentage reduction in average cost if complaint is resolved solely by video

Please consult with your records and complaint resolution personnel to determine high, medium, and low estimates for the percentage reduction in average cost per complaint (entered earlier) if the complaint is resolved primarily by BWC video.

High estimate

Please enter a percent for the high estimate of expected reductions in average cost if complaints are resolved primarily by video. This value should be entered as a decimal between 0 and 1. The value will appear as a percent.

Medium estimate

Please enter a percent for the medium estimate of expected reductions in average cost if complaints are resolved primarily by video. This value should be entered as a decimal between 0 and 1. The value will appear as a percent.

Low estimate

Please enter a percent for the low estimate of expected reductions in average cost if complaints are resolved primarily by video. This value should be entered as a decimal between 0 and 1. The value will appear as a percent.

Use of Force

Number of use of force incidents last year

Under the “Actual” column in the cell highlighted in green, please enter the actual number of use of force incidents filed in the last full year of records. Please consult with your records personnel to determine this amount.

Average cost per use of force incident

Under the “Actual” column in the cell highlighted in green, please enter the average cost to investigate and resolve use of force incidents filed in the last full year of records. Please consult with your records and internal investigation personnel to determine this amount.

Expected reductions in use of force incidents

Please consult with your records and internal investigation personnel to determine high, medium, and low estimates for the percentage of use of force incidents that BWCs might reduce. Studies put such ranges between 0 percent and 59 percent.

Please note: The entries in these fields are not predictions of what will happen. They are assumptions of possible impacts, to analyze the benefits of those possible impacts

High estimate

Please enter a percent for the high estimate of expected reductions in use of force incidents. This value should be entered as a decimal between 0 and 1. The value will appear as a percent.

Medium estimate

Please enter a percent for the medium estimate of expected reductions in use of force incidents. This value should be entered as a decimal between 0 and 1. The value will appear as a percent.

Low estimate

Please enter a percent for the low estimate of expected reductions in use of force incidents. This value should be entered as a decimal between 0 and 1. The value will appear as a percent.

Officer-involved shootings

Number of officer-involved shooting incidents last year

Under the “Actual” column in the cell highlighted in green, please enter the actual number of officer-involved shooting incidents filed in the last full year of records. Please consult with your records personnel to determine this amount.

Cost per officer-involved shooting incident

Under the “Actual” column in the cell highlighted in green, please enter the average cost to investigate and resolve officer-involved shooting incidents filed in the last full year of records. Please consult with your records and internal investigation personnel to determine this amount.

Expected reductions in officer-involved shooting incidents

Please consult with your records and internal investigation personnel to determine high, medium, and low estimates for the percentage of officer-involved shooting incidents that BWCs might reduce.

Please note: The entries in these fields are not predictions of what will happen. They are assumptions of possible impacts, to analyze the benefits of those possible impacts.

High estimate

Please enter a percent for the high estimate of expected reductions in officer-involved shooting incidents. This value should be entered as a decimal between 0 and 1. The value will appear as a percent.

Medium estimate

Please enter a percent for the medium estimate of expected reductions in officer-involved shooting incidents. This value should be entered as a decimal between 0 and 1. The value will appear as a percent.

Low estimate

Please enter a percent for the low estimate of expected reductions in officer-involved shooting incidents. This value should be entered as a decimal between 0 and 1. The value will appear as a percent.

Other Inputs

Annual inflation rate

The annual inflation rate captures the assumed future increase in the average price of personnel and materials. Please consult with your financial department to determine whether there is a specific inflation rate your agency uses. The current annual inflation rate as of August 2019 is 0.019, as reported by the Office of Management and Budget. This value is currently listed in the worksheet. An updated annual inflation rate can be found on the Office of Management and Budget website: <https://www.whitehouse.gov/wp-content/uploads/2018/12/M-19-05.pdf>.¹

The Office of Management and Budget periodically updates this data; however, the URL changes with each update. To check for a newer version, please perform a web search for “OMB Circular A-94 Appendix C”.

Annual cost of borrowing

The annual cost of borrowing is the annual discount rate (or real interest rate). This reflects how much less a benefit received one year from now is worth relative to a benefit received today. This can be positive, even if there is no price inflation. Please consult with your financial department to determine whether there is a specific discount rate your agency uses. The current annual discount rate as of August 2018 is -0.006, as reported by the Office of Management and Budget. This value is currently listed in the worksheet. An updated annual discount rate can be found on the Office of Management and Budget website: <https://www.whitehouse.gov/wp-content/uploads/2018/12/M-19-05.pdf>

The Office of Management and Budget periodically updates this data; however, the URL changes with each update. To check for a newer version, please perform a web search for “OMB Circular A-94 Appendix C”.

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Potential Funding Options

Numerous options are available for funding BWC programs. This section of the Estimator can help your agency identify potential sources of funding and scenarios to meet your agency's funding requirements from the cost section of the Estimator.

Federal grants

Federal grants, such as the U.S. Department of Justice (DOJ) Bureau of Justice Assistance (BJA) BWC Policy Implementation Program (PIP) grant and the U.S. Department of Transportation (DOT) Driving While Intoxicated (DWI) Check Point grants, can be used to fund BWC programs.

Information about the DOJ BJA BWC PIP grant program and other relevant DOJ BJA grants can be found at <https://www.bja.gov/bwc/topics-funding.html>.

State grants

Many states offer BWC grants. Please check with your state government for more information.

Nonprofit grants

Some nonprofit agencies, including local police foundations and police nonprofit organizations, have funded BWC programs.

State/local government direct appropriations

How much, if any, has your state or local government budgeted directly for your agency's BWC program?

Other operating funds

Any funds not covered by other sources will likely need to be covered by general operating budget funds.

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Calculations

This section displays the estimated costs, benefits, net present value, and return on investment. Costs, benefits, and net present value appear as monetary values; negative values will appear in red text (with parentheses).

Costs

This section displays the cost of a BWC program by year based on the values entered into the Estimator. “Then-Year” is the cost at the time it is incurred, and the “Present value” is the current value of the cost incurred based on the annual inflation and discount rates. There is also a total cost over 5 years.

Benefits

This section displays the monetary value of benefits of a BWC program by year based on the values entered into the Estimator. A high, medium, and low estimate value is presented for each year. There is also a total monetary benefit over 5 years.

Net present value

The section displays the monetary value of a BWC program by year based on the costs and benefit values displayed in the previous two calculation sections. A high, medium, and low estimate value is presented for each year. There is also a total monetary value over 5 years.

Return on investment

This section displays the 5-year return on investment based on the high, medium, and low estimate of a BWC camera program over 5 years.

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Additional Potential Benefit Areas

A number of additional potential benefits to BWC programs are difficult to quantify. These benefits include, but are not limited to:

In Car Video (ICV) Integration

- When BWC programs are incorporated with in-car video (ICV) systems, there are mutual benefits that can often be realized, including:
 - Bundled cost savings, if the ICV vendor and the BWC vendor are the same
 - The systems may also be able to share certain components and supporting personnel
 - Ability to synchronize and view ICV and BWC videos together to provide a more complete view of an incident
 - The BWC and ICV may be able to share some or all of their policy development.
 - If ICV predates BWC, the existing ICV policy can rapidly jumpstart the BWC policy development

Investigations

- BWC video may help accelerate some investigations, or at least provide evidence that leads to a successful investigative outcome.
- However, some investigators believe that these benefits may be mitigated by the extra personnel time required to review the relevant videos.

Anticipated reductions in litigation

If a law enforcement agency experiences a reduction in complaints and/or use of force incidents, it is expected that such reductions will likely also reduce the amount of civil litigation against that law enforcement agency.

Civil litigation and settlement costs

- As with complaints, it is expected that some percentage of the remaining lawsuits may result in reduced civil litigation costs, where there is video of the incident at the center of the suit.
- As with complaints, it is expected that some percentage of settlement costs will be reduced, especially where the video supports the agency's defense position.
- However, anecdotal evidence shows that settlement costs of some cases may be higher, where the video might support the plaintiff's position.

Anticipated reductions or increases in arrests and citations

- Some studies indicate that use of BWC may lead to an increase in arrests and citations, in part due to the evidentiary value of the videos.

- Other studies indicate the opposite, as people are believed to behave better when being recorded. Accordingly, fewer crimes will occur in the presence of an officer with BWC, resulting in fewer arrests and citations.

Trust and Perception

- Improving trust and perception between law enforcement and their constituency is one of the primary reasons behind the strong national support for BWC use.
- Unfortunately, there is not currently a way to quantify this benefit, especially as a monetary value.

Training Development

- Many agencies find BWC video to be invaluable training tools on an individual and agency basis. Officers can view their own videos, potentially with a supervisor or trainer, to learn from their actions, and learn ways to improve their handling of situations.
- BWC video of exceptional and poor law enforcement behavior can be used by agencies to train others. It can be less expensive and more effective than the “professional” videos that are currently used in many agencies

Anticipated reductions in officer assaults and injuries

- Given that some studies show that BWC reduces use of force by officers and assaults on officers, it is expected that BWC use may reduce officer assaults and officer injuries.
- BWC video can also be used as part of training to enhance officer safety, including methods to reduce officer assaults and injuries.

Officer wellness

- It is expected that any reductions in officer assaults and injuries will show benefits in enhanced officer wellness.
- BWC video can also be used as part of training to enhance officer safety and wellness.

Impact on Insurance Costs

- If BWC results in reduced complaints, use of force incidents, litigation, and settlement costs, then reduced insurance (or self-insurance) costs should follow.

Additional Resources

A wealth of additional resources, including the latest news on body-worn cameras, resources on emerging research on BWC and lessons learned and best practices derived from the BWC PIP site experiences on BWC policy, technology, training, and stakeholder engagement, can be found on the following websites:

- BWC Training and Technical Assistance Website : www.bwctta.com
- Bureau of Justice Assistance BWC Toolkit: www.bja.gov/bwc

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Appendix A: Bundled Costs

This section provides guidance on how to enter bundled costs into the BWC Costs sheet of the workbook.

Bundled Upfront Cost per Camera

If you have a bundled upfront one-time cost per camera, enter it in the “Cost per camera” row under the “Basic Camera and docking costs” section. If the bundle does not include camera cost, then enter the combined cost of cameras and the bundle. Leave all associated costs included in that bundle blank.

Bundled Monthly Cost per Camera

If you have a bundled monthly cost per camera, enter it in the “Cloud fees per camera per month” row under the “Storage” section. If the bundle does not include cloud fees per camera, then enter the combined cost of cloud fees per camera and the bundle. Leave all associated costs included in that bundle blank.

Bundles Upfront Total Cost

If you have a bundled upfront one-time total cost, enter it in the “IT infrastructure” row under the “Cost to upgrade IT infrastructure” section. If the bundle does not include costs to upgrade IT infrastructure, then enter the combined cost of that and the bundle. Leave all associated costs included in that bundle blank.

Bundled Monthly Total Cost

If you have a bundled monthly total cost, enter it in the “Video editing and redaction supplies” row under the “Public Information Requests” section. If the bundle does not include the cost of video editing and redaction supplied, then enter the combined cost of video editing and redaction supplied and the bundle. Leave all associated costs included in that bundle blank.

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Appendix B: Estimating Storage

This section provides a guide to the BWC Storage sheet of the BWC Cost Estimator tool. It is intended to aid agencies in determining how much storage they will need for BWCs. The storage tool estimates the storage accumulated by BWCs over a 5-year period on specific storage criteria, including:

- Sworn officers
- Cameras
- BWC footage resolution
- BWC footage bandwidth
- Number of shifts per officer per week
- Hours of video per officer per shift
- Retention.

Storage will be computed each year and cumulatively. Storage per year post full deployment will also be calculated. This Estimator is designed for a department with a minimum retention period of less than 5 years. If your department has a minimum retention period of 5 years or more, please contact CNA before using this Estimator.

Number of Sworn Officers

Please enter the number of sworn officers in the department that will be equipped with BWCs. This will be pulled automatically from the main sheet, but can be changed manually if desired.

Number of BWCs to be Purchased and Deployed

Please enter the number of BWCs that the department plans to purchase and deploy. Do not include spare cameras in this number. This will be pulled automatically from the main sheet, but can be changed manually if desired.

Purchase and Deployment Distribution

Sites can choose to make all camera purchases upfront and deploy all cameras right away or spread purchasing and deployment out in different ways across a number of years. The user should fill out the number of BWCs to be fielded; the Cost Estimator will offer three options for the timing of the rollout:

- If the first option is selected, all camera purchases and deployment occur in the first year.
- If the second option is selected, camera purchases and deployment will be spread out evenly over 5 years.
- If the third option is selected, users will be permitted to manually enter the number of cameras they intend to purchase and deploy in each year.

This number will be used to determine how many cameras are capturing footage that needs to be stored in a year.

Vendor Name

Please enter name(s) of vendors being considered as Vendor 1, Vendor 2, or Vendor 3 under the appropriate column. It is acceptable to enter a single vendor, if that is all you are considering. If you are contemplating more than three vendors, you can save additional copies of the spreadsheet. If you are contemplating multiple resolutions for each vendor, enter the name of that vendor in multiple columns to account for the different resolutions you are considering. This will be pulled automatically from the main sheet, but can be changed manually if desired.

Number of BWCs Purchased and Deployed per Year

This section will populate automatically based on your response to the “Purchase Cost Distribution” question. If you select “I want to manually input number of cameras purchased and deployed across 5 years” under the “Purchase and Deployment Distribution” question, you will need to input the number of BWCs planned to be purchased and deployed each year for each vendor. The number you input should reflect all cameras deployed in a year that weren’t already deployed in the previous year.

Resolution

A key factor in storage costs will be the resolution settings available, and chosen, for the cameras you are considering. Higher resolution usually means better-quality video, but it also means increased storage and bandwidth requirements to transmit and store the video captured. Many agencies choose a medium resolution as a compromise between storage needs and video quality. Please select the resolution you will be using for each vendor (or comparing across one vendor) here. The options provided are Standard Definition (480p), Medium Definition (720p), and High Definition (1080p). To fill out this cell, use the pull-down menu provided by clicking into the cell and clicking on the grey arrow to the right of the cell.

Hourly Bandwidth

Please consult your vendor for an estimate of hourly bandwidth and enter the bandwidth for one hour in gigabytes.

Number of Shifts per Officer per Week

Please enter the estimated average number of shifts per officer per week. Because this number is not dependent on vendors or resolution, it will auto-populate for all columns using a value input in the first column.

Number of Hours of Video per Officer per Shift

Please enter the estimated average number of hours of video per officer per shift. This number will depend on a number of agency- and city-specific factors, but is likely to be between 2 to 3 hours for an 8-hour shift and 3 to 4 hours for a 10-hour shift. Because this number is

not dependent on vendors or resolution, it will auto-populate for all columns using a value input in the first column.

Minimum Retention Requirement

Please enter the minimum retention requirements in days. This value will be how many days a video must be kept, at minimum, before being deleted. There is a wide range of time periods that agencies use for this, but it is between 30 and 90 days for many agencies. Because this number is not dependent on vendors or resolution, it will auto-populate for all columns using a value input in the first column.

Percent of Videos that can be deleted at Minimum Retention

Please enter the percent of videos that can be deleted at the minimum retention provided above. Please enter this value as a decimal between zero and one. Because this number is not dependent on vendors or resolution, it will auto-populate for all columns using a value input in the first column.

Cumulative Storage

This section displays the estimated amount of storage needed cumulatively for each year over a 5-year period and the additional storage needs generated each year post full deployment. These values appear in gigabytes. The storage per each remaining year depends on minimum retention. We have provided formulas to compute that amount for a retention schedule of less than 1 year, exactly 1 year, exactly 2 years, and exactly 3 years. If your agency has a different retention schedule, this section will populate entirely with “N/A.”

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Appendix C: Formulas

Costs

	Then Year (Inflation-adjusted future dollars)	Present Value
Year 1	Year 1 BWCs * (Cost per Camera + Cost per docking station / # of Cameras per docking station) + Year 1 BWCs * Cloud fees per camera per month * 12 + Other fixed monthly cloud fees * 12 + (spare cameras / Number of BWC to be fielded) * Year 1 BWCs * Cost per Camera + (camera mounts not included with camera / Number of BWC to be fielded) * Year 1 BWCs * cost per camera mount + annual cost of other spare parts + (# of auto-initiation triggers / Number of BWC to be fielded) * Year 1 BWCs * cost per auto-initiation trigger + in-house video storage overall cost + other peripheral equipment cost + video management software + video editing and redaction software + CAD integration + other software costs + other maintenance + cost to upgrade IT infrastructure + BWC project manager + IT personnel + Trainers + public information personnel + other program personnel + video editing and redaction equipment + annual number of videos requested * (prosecution video transmission personnel cost per video + video editing and redaction supplies cost per video + video editing and redaction supplied cost per video) + video editing and redaction equipment + video editing and redaction supplies + (video editing and redaction services * 12)-public information request user fees	Then Year value for Year 1
Year 2	(1 + annual inflation rate) * (YEAR 2 BWCS * (Cost per Camera + Cost per docking station / # of Cameras per docking station) + SUM(YEAR 1 BWCs : YEAR 2 BWCS) * Cloud fees per camera per month * 12 + Other fixed monthly cloud fees * 12 + (spare cameras / Number of BWC to be fielded) * 2 BWCS * Cost per Camera + (camera mounts not included with camera / Number of BWC to be fielded) * YEAR 2 BWCS * cost per camera mount + annual cost of other spare parts + (# of auto-initiation triggers / Number of BWC to be fielded) * YEAR 2 BWCS * other peripheral equipment cost + video management software + video editing and redaction software + CAD integration + other software costs + other maintenance + BWC project manager + IT personnel + Trainers + public information personnel + other program personnel + annual number of videos requested * (prosecution video transmission personnel cost per video + video editing and redaction supplies cost per video + video editing and redaction supplied cost per video) + (video editing and redaction services * 12)-public information request user fees)	Year 2 Then Year value / ((1 + annual inflation rate) * (1 + annual cost of borrowing))
Year 3	((1 + annual inflation rate) ²) * (YEAR 3 BWCS * (Cost per Camera + Cost per docking station / # of Cameras per docking station) + SUM(YEAR 1 BWCs : YEAR 3 BWCS) * Cloud fees per camera per month	Year 3 Then Year value / ((1

	$* 12 + \text{Other fixed monthly cloud fees} * 12 + (\text{spare cameras} / \text{Number of BWC to be fielded}) * \text{YEAR}_3 \text{ BWCS} * \text{Cost per Camera} + (\text{camera mounts not included with camera} / \text{Number of BWC to be fielded}) * \text{YEAR}_3 \text{ BWCS} * \text{cost per camera mount} + \text{annual cost of other spare parts} + (\text{\# of auto-initiation triggers} / \text{Number of BWC to be fielded}) * \text{YEAR}_3 \text{ BWCS} * \text{other peripheral equipment cost} + \text{video management software} + \text{video editing and redaction software} + \text{CAD integration} + \text{other software costs} + \text{other maintenance} + \text{BWC project manager} + \text{IT personnel} + \text{Trainers} + \text{public information personnel} + \text{other program personnel} + \text{annual number of videos requested} * (\text{prosecution video transmission personnel cost per video} + \text{video editing and redaction supplies cost per video} + \text{video editing and redaction supplied cost per video}) + (\text{video editing and redaction services} * 12) - \text{public information request user fees}$	$+ \text{annual inflation rate}^2 * (1 + \text{annual cost of borrowing})^2$
Year 4	$((1 + \text{annual inflation rate})^3) * (\text{YEAR}_4 \text{ BWCS} * (\text{Cost per Camera} + \text{Cost per docking station} / \text{\# of Cameras per docking station}) + \text{SUM}(\text{Year}_1 \text{ BWCs} : \text{YEAR}_4 \text{ BWCs}) * \text{Cloud fees per camera per month} * 12 + \text{Other fixed monthly cloud fees} * 12 + (\text{spare cameras} / \text{Number of BWC to be fielded}) * \text{YEAR}_4 \text{ BWCS} * \text{Cost per Camera} + (\text{camera mounts not included with camera} / \text{Number of BWC to be fielded}) * \text{YEAR}_4 \text{ BWCS} * \text{cost per camera mount} + \text{annual cost of other spare parts} + (\text{\# of auto-initiation triggers} / \text{Number of BWC to be fielded}) * \text{YEAR}_4 \text{ BWCs} * \text{other peripheral equipment cost} + \text{video management software} + \text{video editing and redaction software} + \text{CAD integration} + \text{other software costs} + \text{other maintenance} + \text{BWC project manager} + \text{IT personnel} + \text{Trainers} + \text{public information personnel} + \text{other program personnel} + \text{annual number of videos requested} * (\text{prosecution video transmission personnel cost per video} + \text{video editing and redaction supplies cost per video} + \text{video editing and redaction supplied cost per video}) + (\text{video editing and redaction services} * 12) - \text{public information request user fees}$	$\text{Year}_4 \text{ Then Year value} / ((1 + \text{annual inflation rate})^3 * (1 + \text{annual cost of borrowing})^3)$
Year 5	$((1 + \text{annual inflation rate})^4) * (\text{YEAR}_5 \text{ BWCS} * (\text{Cost per Camera} + \text{Cost per docking station} / \text{\# of Cameras per docking station}) + \text{SUM}(\text{Year}_1 \text{ BWCs} : \text{YEAR}_5 \text{ BWCS}) * \text{Cloud fees per camera per month} * 12 + \text{Other fixed monthly cloud fees} * 12 + (\text{spare cameras} / \text{Number of BWC to be fielded}) * \text{YEAR}_5 \text{ BWCS} * \text{Cost per Camera} + (\text{camera mounts not included with camera} / \text{Number of BWC to be fielded}) * \text{YEAR}_5 \text{ BWCS} * \text{cost per camera mount} + \text{annual cost of other spare parts} + (\text{\# of auto-initiation triggers} / \text{Number of BWC to be fielded}) * \text{YEAR}_5 \text{ BWCS} * \text{other peripheral equipment cost} + \text{video management software} + \text{video editing and redaction software} + \text{CAD integration} + \text{other software costs} + \text{other maintenance} + \text{BWC project manager} + \text{IT personnel} + \text{Trainers} + \text{public information personnel} + \text{other program personnel} + \text{annual number of videos requested} * (\text{prosecution video transmission personnel cost per video} + \text{video editing and redaction supplies cost per video} + \text{video editing and redaction supplied cost per video}) + (\text{video editing and redaction services} * 12) - \text{public information request user fees}$	$\text{Year}_5 \text{ Then Year value} / ((1 + \text{annual inflation rate})^4 * (1 + \text{annual cost of borrowing})^4)$

	transmission personnel cost per video + video editing and redaction supplies cost per video + video editing and redaction supplied cost per video) + (video editing and redaction services * 12)-public information request user fees)	
Total Five-Year	Sum(Year 1 then value : Year 5 then value)	Sum(Year 1 present value : Year 5 present value)

Benefits (all present value)

	High Estimate	Middle Estimate	Low Estimate
Year 1	SUM(Year 1 BWCs) / number of BWC to be fielded * (number of complaints filed last year * average cost per complaint * (high estimate of expected percent reduction in complaints + (1-high estimate of expected percent reduction in complaints) * high estimate of expected percent of complaints resolved primarily by video * high estimate of expected percent reduction in average cost if complaint resolved primarily by video) + number of use of force incidents last year * average cost per use of force incidents * (high estimate of expected reductions in use of force incidents) + number of officer-involved shooting incidents last year * cost per officer-involved shooting incident * (high estimate of expected officer-involved shooting incidents))	SUM(Year 1 BWCs) / number of BWC to be fielded * (number of complaints filed last year * average cost per complaint * (middle estimate of expected percent reduction in complaints + (1-middle estimate of expected percent reduction in complaints) * middle estimate of expected percent of complaints resolved primarily by video * middle estimate of expected percent reduction in average cost if complaint resolved primarily by video) + number of use of force incidents last year * average cost per use of force incidents * (middle estimate of expected reductions in use of force incidents) + number of officer-involved shooting incidents last year * cost per officer-involved shooting incident * (middle estimate of expected officer-involved shooting incidents))	SUM(Year 1 BWCs) / number of BWC to be fielded * (number of complaints filed last year * average cost per complaint * (low estimate of expected percent reduction in complaints + (1-low estimate of expected percent reduction in complaints) * low estimate of expected percent of complaints resolved primarily by video * low estimate of expected percent reduction in average cost if complaint resolved primarily by video) + number of use of force incidents last year * average cost per use of force incidents * (low estimate of expected reductions in use of force incidents) + number of officer-involved shooting incidents last year * cost per officer-involved shooting incident * (low estimate of expected officer-involved shooting incidents))
Year 2	SUM(Year 1 BWCs : Year 2 BWCs) / number of BWC to be fielded * (number of complaints filed last year *	SUM(Year 1 BWCs : Year 2 BWCs) / number of BWC to be fielded * (number of complaints filed last year *	SUM(Year 1 BWCs : Year 2 BWCs) / number of BWC to be fielded * (number of complaints filed last year *

	<p>average cost per complaint * (high estimate of expected percent reduction in complaints + (1-high estimate of expected percent reduction in complaints) * high estimate of expected percent of complaints resolved primarily by video * high estimate of expected percent reduction in average cost if complaint resolved primarily by video) + number of use of force incidents last year * average cost per use of force incidents * (high estimate of expected reductions in use of force incidents) + number of officer-involved shooting incidents last year * cost per officer-involved shooting incident * (high estimate of expected officer-involved shooting incidents)) / (1 + annual inflation rate)</p>	<p>average cost per complaint * (middle estimate of expected percent reduction in complaints + (1-middle estimate of expected percent reduction in complaints) * middle estimate of expected percent of complaints resolved primarily by video * middle estimate of expected percent reduction in average cost if complaint resolved primarily by video) + number of use of force incidents last year * average cost per use of force incidents * (middle estimate of expected reductions in use of force incidents) + number of officer-involved shooting incidents last year * cost per officer-involved shooting incident * (middle estimate of expected officer-involved shooting incidents)) / (1 + annual inflation rate)</p>	<p>average cost per complaint * (low estimate of expected percent reduction in complaints + (1-low estimate of expected percent reduction in complaints) * low estimate of expected percent of complaints resolved primarily by video * low estimate of expected percent reduction in average cost if complaint resolved primarily by video) + number of use of force incidents last year * average cost per use of force incidents * (low estimate of expected reductions in use of force incidents) + number of officer-involved shooting incidents last year * cost per officer-involved shooting incident * (low estimate of expected officer-involved shooting incidents)) / (1 + annual inflation rate)</p>
Year 3	<p>SUM(Year 1 BWCs : Year 3 BWCs) / number of BWC to be fielded * (number of complaints filed last year * average cost per complaint * (high estimate of expected percent reduction in complaints + (1-high estimate of expected percent reduction in complaints) * high estimate of expected percent of complaints resolved primarily by video * high estimate of expected percent reduction in average cost if complaint resolved primarily by video) + number of</p>	<p>SUM(Year 1 BWCs : Year 3 BWCs) / number of BWC to be fielded * (number of complaints filed last year * average cost per complaint * (middle estimate of expected percent reduction in complaints + (1-middle estimate of expected percent reduction in complaints) * middle estimate of expected percent of complaints resolved primarily by video * middle estimate of expected percent reduction in average cost if complaint resolved primarily by</p>	<p>SUM(Year 1 BWCs : Year 3 BWCs) / number of BWC to be fielded * (number of complaints filed last year * average cost per complaint * (low estimate of expected percent reduction in complaints + (1-low estimate of expected percent reduction in complaints) * low estimate of expected percent of complaints resolved primarily by video * low estimate of expected percent reduction in average cost if complaint resolved primarily by video) + number of</p>

	<p>use of force incidents last year * average cost per use of force incidents * (high estimate of expected reductions in use of force incidents) + number of officer-involved shooting incidents last year * cost per officer-involved shooting incident * (high estimate of expected officer-involved shooting incidents)) / (1 + annual inflation rate)²</p>	<p>video) + number of use of force incidents last year * average cost per use of force incidents * (middle estimate of expected reductions in use of force incidents) + number of officer-involved shooting incidents last year * cost per officer-involved shooting incident * (middle estimate of expected officer-involved shooting incidents)) / (1 + annual inflation rate)²</p>	<p>use of force incidents last year * average cost per use of force incidents * (low estimate of expected reductions in use of force incidents) + number of officer-involved shooting incidents last year * cost per officer-involved shooting incident * (low estimate of expected officer-involved shooting incidents)) / (1 + annual inflation rate)²</p>
Year 4	<p>SUM(Year 1 BWCs : Year 4 BWCs) / number of BWC to be fielded * (number of complaints filed last year * average cost per complaint * (high estimate of expected percent reduction in complaints + (1-high estimate of expected percent reduction in complaints) * high estimate of expected percent of complaints resolved primarily by video * high estimate of expected percent reduction in average cost if complaint resolved primarily by video) + number of use of force incidents last year * average cost per use of force incidents * (high estimate of expected reductions in use of force incidents) + number of officer-involved shooting incidents last year * cost per officer-involved shooting incident * (high estimate of expected officer-involved shooting incidents)) / (1 + annual inflation rate)³</p>	<p>SUM(Year 1 BWCs : Year 4 BWCs) / number of BWC to be fielded * (number of complaints filed last year * average cost per complaint * (middle estimate of expected percent reduction in complaints + (1-middle estimate of expected percent reduction in complaints) * middle estimate of expected percent of complaints resolved primarily by video * middle estimate of expected percent reduction in average cost if complaint resolved primarily by video) + number of use of force incidents last year * average cost per use of force incidents * (middle estimate of expected reductions in use of force incidents) + number of officer-involved shooting incidents last year * cost per officer-involved shooting incident * (middle estimate of expected officer-involved</p>	<p>SUM(Year 1 BWCs : Year 4 BWCs) / number of BWC to be fielded * (number of complaints filed last year * average cost per complaint * (low estimate of expected percent reduction in complaints + (1-low estimate of expected percent reduction in complaints) * low estimate of expected percent of complaints resolved primarily by video * low estimate of expected percent reduction in average cost if complaint resolved primarily by video) + number of use of force incidents last year * average cost per use of force incidents * (low estimate of expected reductions in use of force incidents) + number of officer-involved shooting incidents last year * cost per officer-involved shooting incident * (low estimate of expected officer-involved shooting incidents)) / (1 + annual inflation rate)³</p>

		shooting incidents)) / (1 + annual inflation rate) ³	
Year 5	SUM(Year 1 BWCs : Year 5 BWCs) / number of BWC to be fielded * (number of complaints filed last year * average cost per complaint * (high estimate of expected percent reduction in complaints + (1-high estimate of expected percent reduction in complaints) * high estimate of expected percent of complaints resolved primarily by video * high estimate of expected percent reduction in average cost if complaint resolved primarily by video) + number of use of force incidents last year * average cost per use of force incidents * (high estimate of expected reductions in use of force incidents) + number of officer-involved shooting incidents last year * cost per officer-involved shooting incident * (high estimate of expected officer-involved shooting incidents)) / (1 + annual inflation rate) ⁴	SUM(Year 1 BWCs : Year 5 BWCs) / number of BWC to be fielded * (number of complaints filed last year * average cost per complaint * (middle estimate of expected percent reduction in complaints + (1-middle estimate of expected percent reduction in complaints) * middle estimate of expected percent of complaints resolved primarily by video * middle estimate of expected percent reduction in average cost if complaint resolved primarily by video) + number of use of force incidents last year * average cost per use of force incidents * (middle estimate of expected reductions in use of force incidents) + number of officer-involved shooting incidents last year * cost per officer-involved shooting incident * (middle estimate of expected officer-involved shooting incidents)) / (1 + annual inflation rate) ⁴	SUM(Year 1 BWCs : Year 5 BWCs) / number of BWC to be fielded * (number of complaints filed last year * average cost per complaint * (low estimate of expected percent reduction in complaints + (1-low estimate of expected percent reduction in complaints) * low estimate of expected percent of complaints resolved primarily by video * low estimate of expected percent reduction in average cost if complaint resolved primarily by video) + number of use of force incidents last year * average cost per use of force incidents * (low estimate of expected reductions in use of force incidents) + number of officer-involved shooting incidents last year * cost per officer-involved shooting incident * (low estimate of expected officer-involved shooting incidents)) / (1 + annual inflation rate) ⁴
Total	Sum(Year 1 high estimate of benefits : Year 5 high estimate of benefits)	Sum(Year 1 middle estimate of benefits : Year 5 middle estimate of benefits)	Sum(Year 1 low estimate of benefits : Year 5 low estimate of benefits)

Net Present Value

	High Estimate	Middle Estimate	Low Estimate
Year 1	Year 1 present value high estimate of benefits - Year 1 present value cost	Year 1 present value middle estimate of benefits - Year 1 present value cost	Year 1 present value low estimate of benefits - Year 1 present value cost

Year 2	Year 2 present value high estimate of benefits - Year 2 present value cost	Year 2 present value middle estimate of benefits - Year 2 present value cost	Year 2 present value low estimate of benefits - Year 2 present value cost
Year 3	Year 3 present value high estimate of benefits - Year 3 present value cost	Year 3 present value middle estimate of benefits - Year 3 present value cost	Year 3 present value low estimate of benefits - Year 3 present value cost
Year 4	Year 4 present value high estimate of benefits - Year 4 present value cost	Year 4 present value middle estimate of benefits - Year 4 present value cost	Year 4 present value low estimate of benefits - Year 4 present value cost
Year 5	Year 5 present value high estimate of benefits - Year 5 present value cost	Year 5 present value middle estimate of benefits - Year 5 present value cost	Year 5 present value low estimate of benefits - Year 5 present value cost
Total	Total five-year present value high estimate of benefits - Total five-year present value costs	Total five-year present value middle estimate of benefits - Total five-year present value costs	Total five-year present value low estimate of benefits - Total five-year present value costs

5-Year Return on Investment

	High Estimate	Middle Estimate	Low Estimate
Year 1	$(\text{Total five-year present value high estimate of benefits} - \text{Total five-year present value costs}) / \text{Total five-year present value costs}$	$(\text{Total five-year present value middle estimate of benefits} - \text{Total five-year present value costs}) / \text{Total five-year present value costs}$	$(\text{Total five-year present value low estimate of benefits} - \text{Total five-year present value costs}) / \text{Total five-year present value costs}$

Benefit-Cost Ratio

	High Estimate	Middle Estimate	Low Estimate
Year 1	$\text{Total five-year present value high estimate of benefits} / \text{Total five-year present value costs}$	$\text{Total five-year present value middle estimate of benefits} / \text{Total five-year present value costs}$	$\text{Total five-year present value low estimate of benefits} / \text{Total five-year present value costs}$

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Appendix D: Acronyms

BJA	Bureau of Justice Assistance
BWC	Body-Worn Camera
CAD	Computer Aided Dispatch
DOJ	Department of Justice
DOT	Department of Transportation
DWI	Driving While Intoxicated
ICV	In-Car Video
IT	Information Technology
PIP	Policy and Implementation Program
TTA	Training and Technical Assistance
TOC	Table of Contents

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Appendix E: Points of Contact

Please direct any questions, comments or other feedback to BWCTTA@CNA.org.

Please include “BWC Cost Estimator” and a brief description of the question/comment/feedback within the subject line of the email.