Measuring the Effects of Video Surveillance on Crime in Los Angeles

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CONTENTS

EXECUTIVE SUMMARY 4
THE RISE OF CCTV SURVEILLANCE IN CALIFORNIA 6
The Prevalence of Video Surveillance in California 7
California Crime Rates, Video Surveillance and Spending 8
Privacy, Efficacy and Public Opinion 10
Arguments against CCTV on Privacy Grounds 10
Arguments for CCTV on Efficacy Grounds 11
Privacy versus Efficacy in California 13
META-ANALYSIS OF EXISTING EMPIRICAL WORK 14
Crime Deterrence 14
Crime Detection, Mitigation and Prosecution 17
Local Characteristics of CCTV Implementation 18
CCTV, CRIME AND POLICING IN LOS ANGELES 18
Crime and Policing in Los Angeles 19
Gang-related Activity 20
The Advent of Video Surveillance 20
RESEARCH QUESTIONS, CASE STUDIES AND METHODOLOGY 21
Research Questions 22
Case Selection: Hollywood Boulevard and Jordan Downs Housing Project 22
Methodology 25
Statistical Analysis of Crime Data 25
Geographic Areas: Target, Buffer, Control 25
Time Period of Analysis 27
Measures of Crime 28
Statistical Tests 28
Qualitative Interviews 29
STATISTICAL FINDINGS 29
Hollywood Boulevard Statistical Findings 30
Pre-Post Crime Analysis 32
Crime Displacement Effects 33
Pre-Post Arrest Analysis 34
Jordan Downs Statistical Findings 35
Pre-Post Crime Analysis 36
Crime Displacement Effects 38
Pre-Post Arrest Analysis 38
Discussion of Findings 39
Data Limitations 39
Disparities between the Target and Control 40
Nature of Crimes 41
Capacity Constraints 42
Increased Detection, Mitigation and Resolution of Crime 42

IMPLEMENTATION AND EFFECTIVENESS 43
Funding & Private Public Partnerships 44

Hollywood 44
Jordan Downs 45
Types of Partnerships 45
Legacy Issues and Maintenance 45
Additional Public Resources 46
Simultaneous Crime Reduction Strategies 46
Surveillance Coverage Area and Camera Placement 47
Hollywood 47
Jordan Downs 47
Technology and Monitoring 48
Camera Technology 48
Head End Monitoring Systems 48
Future Implementation 49
Operations, Training and Turnover 49
Camera Configuration 49
Leadership, Training and Turnover 49
Privacy Considerations and Community Involvement 50
Station Practices 50
Protecting Privacy Rights 51
CONCLUSIONS FOR POLICYMAKERS 53
REFERENCES 55
APPENDICES 64
APPENDIX A. Evidence of CCTV Crime Prevention 61
APPENDIX B. Sorting the Data 73
APPENDIX C. Statistical Analysis 77
APPENDIX D. Video Camera Specifications 90

LIST OF FIGURES AND TABLES

Table 1. CA Cities with Significant Surveillance Systems 7
Table 2. CA Jurisdictions with Actively Monitored Systems 7
Figure 1. Crime in California 1996-2005 9
Table 3. Causal Mechanisms of CCTV Crime Curtailment 12
Table 4. Summary of Meta-analysis Results 16
Figure 2. Crime in Los Angeles 1997-2007 19
Figure 3. Case Study Locations 22
Table 5. Hollywood Boulevard Characteristics 23
Figure 4. Hollywood Demographic Change 23
Table 6. Jordan Downs Characteristics 24
Table 7. Methodology 25
Figure 5. Hollywood Camera Locations 26
Figure 6. Jordan Downs Camera Locations 27
Table 8. Jordan Downs and Nickerson Gardens Demographics 27
Table 9. Hollywood Average Monthly Crime Rates (pre-implementation) 30
Table 10. Hollywood Target and Control Area Arrests January 2003 to February 2005 (pre-implementation) 31
Table 11. Hollywood Monthly Crime Rates 32

Figure 7. Hollywood Monthly Crime 33
Figure 8. Percentage Change in Hollywood Monthly Crime Rates Following CCTV 34
Table 12. Hollywood Monthly Arrest Rates.....34
Table 13. Jordan Downs/Nickerson Gardens Average Monthly Crime Rates (pre-implementation) 35
Table 14. Jordan Downs Target and Control Arrests January 2003 to September 2006 (pre-implementation).....36
Table 15. Monthly Crime Rates in Jordan Downs and Nickerson Gardens 37
Figure 9. Jordan Downs Monthly Crime 38
Figure 10. Percentage Change in Crime in Jordan Downs Study Areas 38
Table 16. Jordan Downs Monthly Arrests Rates 39
Table 17. Implementation Successes and Challenges.....43

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EXECUTIVE SUMMARY

This study reviews existing literature of video surveillance and measures the effectiveness of surveillance to deter crime in select locations within Los Angeles, California. Aided by additional funding from the federal government, private donations and the dropping cost of video surveillance equipment, a growing number of local law-enforcement departments across California are employing fixed video surveillance, also called closed-circuit television (CCTV), of public space. Proponents of video surveillance argue that it may deter criminal behavior by increasing the probability of detection and apprehension, but evidence pertaining to its effectiveness is mixed and concerns about privacy infringement persist.

Building upon previous research of CCTV by the California Research Bureau, we first examine 44 video surveillance evaluations, primarily conducted in the United Kingdom, that investigate the technology's deterrent effect on crime. Following deployment of CCTV, 41 percent of these evaluations reported a statistically significant reduction in crime, 43 percent reported no statistically significant effect (increase or decrease) on crime, and 16 percent showed a significant crime increase. Importantly, none of the five evaluations of CCTV conducted in the United States found a statistically significant crime reduction. In addition, few empirical studies have investigated the utility of video surveillance in enhancing law enforcement's ability to detect crimes or mitigate harm after it occurs. Nor did our meta-analysis uncover studies that examined the relationship between the presence of CCTV and the ability of police to elicit confessions from suspects or raise the likelihood of obtaining a guilty verdict in court.

The City of Los Angeles is one municipality in the state in which law enforcement monitors video surveillance cameras in "real time." L.A. has financed many of its cameras through innovative public-private partnerships and federal grants. To further inform state and local policymakers as to the effectiveness of CCTV in deterring crime, we employ a quasi-experimental research design to analyze the effectiveness of video surveillance in two locations in Los Angeles: Hollywood Boulevard's "Walk of Fame" and Jordan Downs public housing development.

Our statistical analysis of crime and arrest data before and after implementation found:

- Neither cameras in Jordan Downs nor Hollywood Boulevard had any statistically significant effect in reducing the *overall monthly crime rates* within the target areas;
- The monthly rate of *violent crimes* fell in both the Jordan Downs and Hollywood target areas but the results were not statistically significant;
- The monthly rate of *property crime*s decreased in Hollywood and increased in Jordan Downs, but the results were not statistically significant;
- The evidence on the *displacement of crime is mixed*; in both locations, some crimes increased at a faster rate in buffer areas (between 500 and 1000 feet), while other crimes decreased at a faster rate in these same areas; however, the results were not statistically significant;
- CCTV had no statistically significant effect on *monthly arrest rates* for misdemeanor "quality of life" infractions in either Jordan Downs or Hollywood Boulevard.

Because local implementation and operations were found to be critical to CCTV effectiveness in our meta-analysis, we complement our statistical findings through interviews with the Los Angeles Police Department (LAPD), community groups and business interests as well as through related documents and media reports. In so doing, we find that the types of crimes being targeted by the Los Angeles Police Department, and the dynamism of the areas under study, may limit the generalizability of our results.

We also isolate specific aspects of deployment in Los Angeles that may present challenges or opportunities to policymakers and law enforcement considering CCTV. These include funding and public-private partnerships; the presence of simultaneous crime reduction strategies; the importance of camera placement and coverage area; the technology and monitoring capabilities of the cameras; the influence of training, turnover and leadership in CCTV operations; and privacy considerations and community involvement.

Our study led to the development of the following six overarching lessons for policymakers:

1. CCTV is a tool for law enforcement, not a panacea;
2. Public-private partnerships save costs, but raise new policy questions;
3. Effective and sustainable CCTV systems require adequate training, leadership and resources;
4. Explicit guidance on storage and use of video surveillance might help to allay privacy concerns;
5. Deterrence and enforcement are strongly intertwined;
6. Additional research is needed into local program operations, as well as the detection, apprehension and prosecution of criminal suspects.

THE RISE OF VIDEO SURVEILLANCE IN CALIFORNIA

This study examines the effectiveness of video surveillance, also called closed-circuit television (CCTV) systems, in reducing and deterring crime. While privately monitored CCTV systems have long been a feature of crime prevention in shopping malls, convenience stores, parking garages, airports and hospitals, video surveillance systems that are monitored by law enforcement are relatively new to the U.S. A nationwide survey of law enforcement agencies conducted by RAND in 2000 found that only 3 percent of local departments and 7 percent of state police reported extensive use of "fixed-site video surveillance cameras (Schwabe et al. 2001).[1]

In contrast, public CCTV systems have been employed extensively in cities throughout Europe for more than a decade. In Great Britain, for example, CCTV is so prevalent that some residents can expect to be captured by a camera at least 300 times a day (Fussey 2007). With more than 10,000 cameras operating in London alone, at a total cost of nearly $400 million, the security-camera cordon surrounding the city has earned the nickname the "Ring of Steel" (Davenport 2007).[2]

However, an amalgamation of technological improvements, cost reductions in video-monitoring equipment and federal grants to aid local law enforcement in fighting terrorism have contributed to an appreciable increase in CCTV deployment in the United States. Since the terrorist attacks of September 11, 2001, for instance, the Department of Homeland Security's Grant Program (HSGP) has awarded $23 billion to state and local governments — funds that can be used by local law enforcement for a variety of security enhancements, including video surveillance (Center for Democracy and Technology 2008). While the Department of Homeland Security will not divulge the funding allocated specifically for video surveillance, a *Boston Globe* investigation suggests that a "large number of new surveillance systems, costing at least tens and probably hundreds of millions of dollars, are being simultaneously installed around the country as part of homeland security grants" (Savage 2007). Our own analysis of news coverage suggests the following cities received federal grants to aid in their CCTV deployment: Chicago, New York, St. Paul, Madison, Pittsburgh, New Orleans, Baltimore, San Francisco and Los Angeles.[3] Chicago, which now has 560 cameras in "high-crime areas," received $34 million to help link up existing camera systems to one centralized location (Moore 2005). New York, for its part, recently unveiled the Lower Manhattan Security Initiative, a plan that includes adding more than 3,000 surveillance cameras to the 250 cameras currently in place (Viahos 2008). Other cities such as Philadelphia, Washington D.C. and New Orleans have also invested heavily in CCTV surveillance (Bulwa and Stannard 2007).[4]

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[1] The RAND survey further found that only 1 percent of state and local police nationally use "mobile video surveillance cameras, [which] might be used in a stakeout or hostage negotiation situation" (Schwabe et al. 2001).
[2] Costs reported in pound sterling by London's *Evening Standard* as £200 million. Converted into dollars April 11, 2008, at a rate of 1.969.
[3] The *Globe* reports the following grants from DHS: St. Paul, MN, received a $1.2 million grant for 60 cameras; Madison, WI, received a $388,000 grant for 32 cameras; Pittsburgh received $2.58 million for 83 cameras.
[4] In 2007, U.S. Senator Joe Lieberman (I-CT), Chairman of the Homeland Security and Government Affairs Committee, proposed an amendment requiring the Homeland Security Department to develop a "national strategy" for surveillance-camera deployment in the United States to fight terrorism (Office of U.S. Senator Joseph Lieberman 2007).

Active vs. Passive Monitoring

Two basic modes of deployment currently enable CCTV surveillance in public spaces: actively monitored systems and passively monitored, or recording-only, systems.

Actively monitored systems require personnel to monitor television screens in real time. Depending on the hardware installed, actively monitored systems can allow for recording as well, in addition to remote movement of cameras and even audible communication with subjects in the surveilled areas. Such systems enable law enforcement to respond to, and potentially halt, crime as it occurs.

Passively monitored, recording-only systems, on the other hand, provide a record of criminal activity that can be used as evidence later, but these systems cannot be viewed in real time.

The burgeoning federal involvement in CCTV funding and deployment has likely contributed to the growth of public video surveillance by law enforcement in California — a trend that is likely to continue. In this section, we discuss the prevalence of CCTV in California and give a general snapshot of crime trends in the state. We also examine some of the privacy concerns raised by opponents of public video surveillance and delineate the predominant theories as to why video surveillance may prove an effective crime fighting tool.

The Prevalence of Video Surveillance in California

The use of CCTV in California is on the rise. A 2007 American Civil Liberties Union (ACLU) report found that, of the 131 cities in northern and southern California surveyed, at least 37 have some sort of public video surveillance program in place. Of these cities, 18 have "significant" surveillance programs for public streets and plazas (Schlosberg and Ozer 2007). Cities and jurisdictions with "significant" surveillance systems are listed in Table 1; cities and jurisdictions with "actively monitored" systems in which local police departments can monitor the cameras in real time are listed in Table 2.[5]

Table 1. California Cities with Significant Surveillance Systems

Antioch	Ripon
Brentwood	Sacramento
Clovis	San Francisco
Fairfield	Stockton
Fresno	Long Beach
Lakeport	Palm Springs
Los Angeles	Riverside
Manteca	Santa Barbara
Pittsburg	South Gate

Table 2. California Cities with Actively Monitored Systems

Brentwood	Sacramento
Clovis	Santa Rosa
Fairfield	Stockton
Fresno	Fullerton
Lindsay	Long Beach
Pinole	Los Angeles
Pittsburg	Oxnard
Ripon	Riverside
	Santa Monica

Schlosberg and Ozer (2007). "Public Records Survey Summary Findings"; *available at:* www.aclunc.org/docs/Government_Surveillance/report_spreadsheet_for_website.pdf.

[5] Schlosberg and Ozer (2007) do not indicate whether these municipalities view the cameras in real time, nor do they specify what constituted a "significant" CCTV system.

Particularly notable cases of video surveillance programs in California include the following city programs:[6]

> *San Francisco.* The city has installed 68 CCTV recording cameras since 2005. The *San Francisco Chronicle* reported that, as of March 2008, the city had spent $900,000 and had budgeted an additional $200,000 for 25 more cameras to target both violent gang activity and property crime (Knight 2008).[7]
>
> *Fresno.* The city has 47 video surveillance cameras currently in place. The *Fresno Bee* reports that the city plans to deploy 130 more cameras by October 2008, followed by 250 more cameras by 2009 (Guy 2008).[8] The Fresno Police Chief has indicated that the $3 million project will be actively monitored.
>
> *El Cerrito.* This California city in Contra Costa County enacted the Surveillance Act of 2007. The law mandates police-accessible video surveillance cameras in certain types of businesses such as liquor stores, banks, check-cashing businesses, gas stations, convenience stores and pawn shops (El Cerrito City Ordinance 2007–06).
>
> *San Jose.* In June 2006, the San Jose City Council appropriated $96,727 to install surveillance cameras in the city's downtown areas (San Jose City Council 2006). The San Jose Redevelopment Agency raised $97,000 for the purchase of the video surveillance cameras (Herhold 2007).[9]
>
> *Los Angeles.* In conjunction with private businesses, federal grants and business-improvement districts, the Los Angeles Police Department has purchased and deployed 80 actively monitored cameras in various locations since 2002, including the famous Hollywood "Walk of Fame"; MacArthur Park, a municipal park in downtown; Santee Alley in downtown; and the Jordan Downs public housing projects in Watts, among others. Private parties have given the LAPD direct access to data collected by approximately 30 additional cameras (Email correspondence, Gomez April 14, 2008).

California Crime Rates, Video Surveillance and Spending

As the utilization of video surveillance by law enforcement has increased, overall crime in California has remained relatively stable, and, in some cases, declined. In 2006, the state had 518 violent crimes and 1,889 property crimes per 100,000 residents (California Department of Justice 2006). Compared with other states, California ranked 25th in the rate of crime per 100,000 residents (United States Department of Justice 2005). While the violent crime rate in California

[6] For brief descriptions of additional CCTV systems in California, including Palm Springs, San Diego and Vallejo, *see* California Research Bureau (Nieto et al. 2002) "Public and Private Applications of Video Surveillance and Biometric Technologies," p. 17-18.

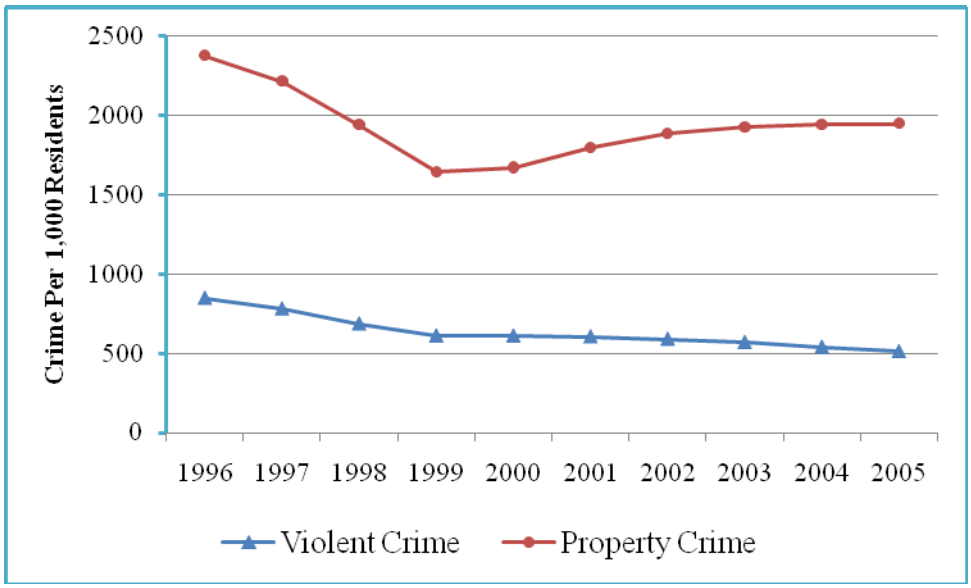
[7] Cameras are located at 24th and Harrison streets in the Mission District, at the corner of Eddy and Laguna streets, outside the Yerba Buena Plaza East housing project, Pacific Avenue and Stockton Street in Chinatown, and Market Street and Sunnyvale Avenue at the request of residents.

[8] The article notes that "cameras are already in place in Roeding Park, near the FAX bus transfer station in Manchester Center and along Parkway Drive" and will also be used to monitor activity near public schools.

[9] Note that because of the timing of the ACLU report, neither El Cerrito nor San Jose was included in its survey.

increased 1.2 percent in 2006, this was the first such increase in 13 years (California Department of Justice 2006). In contrast, the property crime rate has steadily increased since 1999 (ibid).[10] Rates for violent and property-related crime per 100,000 residents in California from 1996 to 2005 are shown in Figure 1.

Figure 1. Crime in California 1996-2005



COMPSTAT Historical Fact Sheet (2008).

Despite these general declines, crime and crime prevention loom large in both the minds of residents and the state budget. A 2006 poll conducted by the Ralph and Goldy Lewis Center for Regional Policy Studies at the University of California, Los Angeles (UCLA), indicated that crime was the second most important concern among southern Californian residents that year (SCS Fact Sheet 2006). Another poll, conducted in 2005, indicated that 56 percent of Californians were "extremely concerned" about crime and law enforcement (California Opinion Index 2005). Clearly, public safety is important to Californians, and the use of video surveillance has increasingly become a part of the crime prevention toolkit used by police departments.

In 2002, California spent about $18.1 billion to fight crime, a figure that includes the costs of police, prosecution, courts and corrections (California Department of Justice 2002).[11] Additional grants from the federal government to California cities and jurisdictions for new security measures such as video surveillance represent an important source of new revenue for law enforcement in the state.

[10] The crime rate represents the number of crimes per 100,000 people in California. It should be noted that official crime statistics imperfectly measure actual crime. Official statistics are based on reported crimes and, therefore, do not account for crimes that were not reported to police or were otherwise not detected by law enforcement officials.
[11] This figure is not adjusted for inflation and represents the last year in which the cost of crime was estimated by the California Department of Justice.

Furthermore, the sale of video surveillance equipment has exploded in recent years. While surveillance sales trends in California were not available, one market research firm estimates that global surveillance sales will have grown at a compound annual growth rate of 12.4 percent from 2005 to 2008 (RNCOS, 2007). Another market research firm anticipates revenue for video surveillance equipment worldwide will expand from $13.5 billion in 2006 to $46 billion in 2013 (ABI Research Press Release, 2008). "This is a modern version of the California gold rush except that people are bringing cameras instead of pickaxes and shovels," ABI Research Vice President and Research Director Stan Schatt stated (ibid).

The general fear of crime, the availability of federal grants and an ever-expanding video surveillance marketplace have certainly played a role in the growth of CCTV in California and elsewhere. But the expansion has been accompanied by lingering questions about the effectiveness of CCTV systems and concerns about the protection of individuals' civil liberties. We next consider these underlying concerns in the context of general support for video surveillance.

Privacy, Efficacy and Public Opinion

The ubiquity of public video surveillance cameras nationwide is experiencing widespread public support, including in California. An ABC News/Washington Post Poll (2007), for example, reveals that 71 percent of Americans approve of additional video surveillance. This has not changed since a CBS News opinion poll conducted in 2002 (CBS) found that 60 percent of respondents polled thought video surveillance would help reduce crime.

Nevertheless, these programs do face some opposition on privacy grounds, a problem that California policymakers will eventually be called on to weigh against the systems' purported value as a law enforcement tool (discussed in "Arguments for CCTV on Efficacy Grounds" on p. 11). Growing concern regarding the value of video surveillance as a crime prevention strategy is starting to make headlines in California (Knight 2008). The debate generally hinges upon two main issues: privacy and effectiveness.

Arguments Against CCTV on Privacy Grounds

Many privacy advocates and constitutional scholars have taken issue with CCTV surveillance, both nationally and in California. The Fourth Amendment, which ensures "… the right of the people to be secure in their persons…" has served as the primary legal grounds for opposition to CCTV surveillance. Privacy advocates suggest that the use of video surveillance in public places violates the Fourth Amendment wherever a person's reasonable expectation of privacy is intruded (Schlosberg and Ozer 2007). The U.S. Supreme Court has battled over whether video surveillance is constitutional and should be used as evidence in criminal proceedings. In California, local chapters of the ACLU have further decried the possible "chilling effect" (Nieto 1997) video surveillance might have on First Amendment rights, such as the freedom of assembly and the freedom of speech. Additionally, California is unique in that voters overwhelmingly approved a "Right to Privacy" amendment to the California Constitution in 1972. Privacy advocates argue that unrestricted or unregulated utilization of video surveillance may infringe upon this constitutional provision (Schlosberg and Ozer 2007).

To address the privacy issues that emerged after the deployment of CCTV in businesses, the courts established the rule that "whatever the public may see from a public place cannot be private"[12] (Paton-Simpson 2000). In 1997, the standard was tightened slightly to include only what could be seen with "the naked eye"[13] in response to the intrusive nature of some video surveillance technologies. Privacy advocates note that the confluence of sophisticated technologies — easily available personal data; GIS-mapping software; free street-mapping software with satellite and, in some cases, street views; facial-recognition software; radio-frequency identification; and high-resolution video surveillance equipment — dramatically widens the scope of information that can be obtained about an individual within the view of "the naked eye" (Nieto 2002).[14]

Of primary importance to privacy advocates is an apparent lack of guidance on the protection of civil liberties regarding the storage of video imagery and how actively monitored systems should be used, if at all. The ACLU notes that "[c]ities throughout California have approved and implemented camera systems without guidelines to guard against abuse and, in most circumstances, with little or no public debate" (Schlosberg and Ozer 2007). They argue that without such guidance, stored video footage may be obtained by random citizens through routine public records requests. Moreover, video operators may inappropriately profile certain groups or target individuals for personal amusement. In the United Kingdom, one privacy watchdog suggests that up to "90 percent of CCTV installations fail to comply with the Information Commissioner's U.K. CCTV code of practice, and many installations are operated illegally" (Davenport 2007). A review of more than 600 hours of data from three different surveilled areas in the United Kingdom found that 9 out of 10 targets by CCTV operators were men and almost half were teenagers (Norris 2007). The study also found that Britons of African descent were between 1.5 and 2.5 times more likely to be targeted by CCTV operators than one would expect when compared to their percentage in the overall population (ibid).[15]

Arguments <u>For</u> CCTV on Efficacy Grounds

Supporters of video surveillance typically adhere to "rational choice" theories or environmental criminology, both of which emphasize place-based constraints on criminal behavior. A rational-choice model assumes that criminals are rational actors that make decisions as to where, when and how they will commit a crime. For environmental criminologists, the spatial dimensions of crime are most important, and, therefore, offer "place-based" strategies for prevention (Brantingham and Brantingham 1981). Taken together, Ronald Clarke (1983) calls these "situational crime prevention" strategies, which he characterizes as comprising measures that: "(1) target specific forms of crime, and (2) involve management, design, or manipulation of the immediate environment … so as to increase its risks as perceived by a wide range of offenders."

[12] *N.O.C., Inc. v. Schaefer*, 484 A.2d 729, 730 (N.J. Super. 1984).
[13] *Vega-Rodriguez v. Puerto Rico Telephone Company*, 110 F.3d 174 (1st Cir. 1997).
[14] For additional information on these technologies, *see* California Research Bureau (Nieto, et al. 2002) "Public and Private Applications of Video Surveillance and Biometric Technologies."
[15] It is worth noting that 40% of people of the people that the police targeted in the study were picked out "for no obvious reason."

Clarke and Homel (1997) classify CCTV as a type of "formal surveillance" that grew from Oscar Newman's (1972) "defensible space" approach, which proposed designing buildings and communities to increase visibility in vulnerable public spaces. Newman's was among the first situational crime techniques and a significant catalyst for formalized surveillance.[16] It has been suggested that CCTV surveillance acts as a "force multiplier" that can prevent crime by enhancing law enforcement's ability to detect and apprehend criminals, increasing the public's awareness of criminal activity, and elevating the perceived risk of apprehension to criminals. Table 3 provides a matrix of crime-prevention mechanisms.

Table 3. Causal Mechanisms of CCTV Crime Curtailment

Caught in the act	Perpetrators will be detected and possibly removed or deterred.
You've been framed	CCTV deters potential offenders who perceive an elevated risk of apprehension.
Nosy parker	CCTV may lead more people to feel able to frequent the surveilled places. This will increase the extent of natural surveillance by newcomers, which may deter potential offenders.
Effective deployment	CCTV directs security personnel to ambiguous situations, which may head off their translation into crime.
Publicity	CCTV could symbolize efforts to take crime seriously, and the perception of those efforts may energize law-abiding citizens and/or deter crime.
Time for crime	CCTV may be perceived as reducing the time available to commit crime, preventing those crimes that require extended time and effort.
Memory jogging	The presence of CCTV may induce people to take elementary security precautions, such as locking their car, by jogging their memory.
Anticipated shaming	The presence of CCTV may induce people to take elementary security precautions for fear that they will be shamed by being shown on CCTV.
Appeal to the cautious	Cautious people migrate to the areas with CCTV to shop, leave their cars, and so on. Their caution and security mindedness reduce the risk.

Armitage, Smyth, and Pease (1999). Burnley CCTV Evaluation. In N. Tilley (ed.), *Surveillance of Public Space: CCTV, Street Lighting and Crime Prevention, pp.* 226-227

These theories function in contrast to traditional criminological theories that investigate the "root causes" of crime, that is, the psychological and social forces that lead to criminal behavior

[16] Nevertheless, Newman was much more interested in "natural surveillance" and never explicitly advocated for formal video surveillance. In addition, his own defensible space research was widely criticized because of methodological errors.

(Clarke 1983). From this perspective, because situational strategies do not address the underlying causes of crime, CCTV surveillance simply displaces criminal activity to areas that are not being watched (Brantingham and Brantingham 1981). Moreover, if the deterrent effects of CCTV surveillance rest on perpetrators being rational actors who minimize the chance of being caught, it may not be effective in preventing certain types of crimes, such as crimes of passion or those where post-operation apprehension does not apply, such as suicide bombing.

Privacy versus Efficacy in California

The tensions between liberty and security in relation to video surveillance are playing out, in particular, in two northern California cities. However, as the use of CCTV to monitor public spaces grows, cities in other parts of California are likely to face similar deliberations.

The 68 publicly funded cameras in San Francisco, spearheaded by Mayor Gavin Newsom are passively monitored, a configuration that was decided upon to address privacy concerns. San Francisco city law prohibits police officers from viewing video surveillance footage in real time, and mandates that the cameras be turned off during planned protests to protect political speech. Instead, footage may be viewed after a crime occurs, but is automatically erased every 72 hours. However, Kevin Ryan, the newly appointed director of the mayor's own Office of Criminal Justice, argued that without an actively monitored surveillance system like that in Chicago or Los Angeles, the power of video surveillance as a law enforcement tool cannot be realized (Bulwa, 2008). Ryan and others argue that actively monitored systems provide police with an opportunity to respond to crimes as they occur. San Francisco Police Commissioner Joe Alioto-Veronese, too, believes that the passively monitored configuration — along with their low resolution and slow frame rate (two to four frames per second) — limits the system's usefulness to police. Some of the police commissioners note that only one arrest has been made in connection with a murder after more than two years of video surveillance. San Francisco Police Chief Heather Fong, however, argues that, despite the difficulty in quantifying criminal deterrence, the level of comfort video surveillance brings to citizens should not be discounted.

In neighboring Oakland, then-mayor and current California State Attorney General Jerry Brown rejected the use of video surveillance in the city in 1999 (Schlosberg and Ozer 2007). Brown argued that the police department and the community working together will make the city safer; video surveillance, while becoming increasingly intrusive, will not. Mr. Brown's past opposition to video surveillance and his current position as the State Attorney General at the California Department of Justice make him a potentially significant source of opposition to further deployment of CCTV systems in California. In October 2005, however, Oakland Councilman Ignacio De La Fuente circumvented the City Council, attracted funding through a public-private partnership and had three cameras installed in his district, giving full utilization of them to the police. Interestingly, De La Fuente had eloquently stated his opposition to the installation of video surveillance cameras in the city in 1999, but apparently changed his mind (Ozer 2006) in an effort to combat drug dealing outside a liquor store in his district (De La Fuente 2005).

In many cases, these arguments play out ideologically because empirical study of the effectiveness of CCTV in California is lacking. Currently, researchers at UC Berkeley are

evaluating San Francisco's CCTV program, but according to Peter Bibring, contributing writer on the ACLU's "Watchful Eye" study, and Romi Ganschow, policy department coordinator for ACLU, Northern California, very little research is currently underway in other parts of the state to determine the true efficacy of video surveillance in crime prevention (Interviews, November 14, 2007).[17] The goal of this study is to provide a better empirical foundation for considering CCTV policy in California through both existing research and original case studies. We first summarize empirical findings from studies of video surveillance systems in other jurisdictions. We then use these studies to inform our evaluation of the effectiveness of video surveillance in select locations within the City of Los Angeles.

META-ANALYSIS OF EXISTING EMPIRICAL WORK

A number of studies from around the world have examined the effectiveness of video surveillance as a law enforcement tool. This meta-analysis builds upon these studies to detail the apparent effects of video surveillance on various types of crime both in the United States and internationally. It also reviews the effects of video surveillance by the environment in which the surveillance cameras operate. Finally, the analysis provides a framework for understanding local programmatic characteristics that may impact CCTV, describing qualitative differences between the prevention of crime, the mitigation of crime as it occurs, and the apprehension and prosecution of criminal subjects.

Crime Deterrence

In 2002, Welsh and Farrington published a meta-analysis of the research on the effectiveness of CCTV done to date for the United Kingdom's Home Office, the government department responsible for protecting the public from crime and terrorism. They found that half (11) of the 22 evaluations analyzed reported statistically significant reductions in crime, 27 percent (6) reported no statistically significant results, and 23 percent (5) reported a statistically significant increase in crime. We built upon their analysis and used their framework to include additional evaluations that have been produced since the meta-analysis was published. Our results are similar, with 41 percent of the evaluations reporting a statistically significant decrease in crime, 43 percent reporting no statistically significant or uncertain results, and 16 percent reporting a statistically significant increase in crime.

The criteria for including a CCTV evaluation, as specified in Welsh and Farrington's (2002: 3) and used in our analysis, are:

1. CCTV intervention is the focus of the study;
2. Outcome measures of crime are reported;
3. The study used a minimum research design of before-and-after measures of crime in experimental and control areas;
4. The total number of crimes in each area prior to the CCTV intervention was at least 20.

[17] University of California researchers released preliminary findings from as study on the effectiveness of video cameras in San Francisco in March of 2008.

We searched online academic databases and the bibliographies of CCTV reports to identify additional studies. We found another 22 CCTV evaluations in addition to the 22 evaluations from the initial analysis for a total of 44 assessments.[18] Of these evaluations, 79.5 percent (35) were conducted in the UK, 11 percent (5) in the U.S., and the remaining 4 percent were conducted in Canada, Japan, the Netherlands or Norway. The majority 57 percent (25) of the CCTV systems we evaluated monitored city streets, 20.5 percent (9) were in residential areas, 11 percent (5) were in public transit stations, and 11 percent (5) were in public parking lots. Summaries of the evaluations methodologies, locations, and results included in our analysis can be found in Appendix A (p. 65).

We then classified the evaluations into one of the categories defined by Welsh and Farrington (2002: 7):[19]

1. Desirable effect: Significant decrease in crime;
2. Undesirable effect: Significant increase in crime;
3. Null effect: No statistically significant effect on crime;
4. Uncertain effect: Unclear evidence of an effect on crime.

Of the 44 evaluations included in our analysis, 43 percent reported the cameras had no or an uncertain effect on reducing crime, 41 percent reported a statistically significant reduction in crime, and 15.9 percent reported some undesirable effect (i.e. a statistically significant crime increase). Within the 19 evaluations that found no statistically significant effect on crime or were uncertain as to CCTV's effect, 36.8 percent (7) reported a reduction in crime, 52.6 percent (10) reported an increase in crime, and 10.5 percent (2) reported no change or a very small change in crime.

Importantly, none of the five evaluations that were conducted on CCTV systems in the United States showed any significant decrease in crime from the presence of cameras. This raises interesting questions as to whether cultural or geographic differences may influence CCTV's deterrent effect. Another review by Welsh and Farrington (2004) suggests that video surveillance was "found to be far more effective in reducing crime in Britain than in America." These differences, they argue, may be attributable to a number of factors, including the absence of interventions such as "improved street lighting or police patrols" in the American CCTV programs they evaluated, as well as cultural differences, such as stronger public support of CCTV in the United Kingdom (ibid).

The CCTV systems in parking lots had the greatest success rate, with four of the five systems evaluated demonstrating a desirable effect. In contrast, none of the nine CCTV systems in residential areas were classified as having a desirable effect, with the majority (seven) demonstrating no or an uncertain effect on crime. The results for the systems in city streets and public transit stations were mixed; about half (12) of the systems in city streets were associated with a desirable effect, 10 exhibited no or an uncertain effect on crime, and three were associated

[18] The number of assessments is the total number of quantitative CCTV evaluations, not the number of studies. Some reports included evaluations of CCTV systems in multiple locations, so the number of evaluations exceeds the number of studies.

[19] The categories are based on the results of the statistical analyses reported in the evaluations and do not necessarily indicate that the CCTV system caused the observed change in crime.

with increased crime compared to the control. Similarly, two of the CCTV systems in public transit stations fell in the desirable effect category, two were classified as having a null effect and one experienced an undesirable effect. Refer to Table 4 for a summary of the results of our meta-analysis.

Table 4. Summary of Meta-Analysis Results

Effect	Evaluations	Location (# evaluations)	CCTV Environment (# evaluations)
Desirable Effect	18	UK (16) The Netherlands (1) Japan (1)	City Streets (12) Parking lot (4) Public Transit (2)
Undesirable Effect	7	UK (7)	City Streets (3) Residential (2) Parking lot (1) Public Transit (1)
Uncertain/Null Effect	19	UK (12) US (5) Canada (1) Norway (1)	City Streets (10) Residential (7) Public Transit (2)

Some of the studies also analyzed changes in certain types of crime. Overall, CCTV had the greatest impact on vehicle and other types of property crimes, with 10 evaluations reporting decreases in vehicle crime and 12 evaluations reporting decreases in property crime.[20] The CCTV systems had a lesser effect upon violent crimes; four assessments reported a decrease in violent crime and two evaluations reported increases in violent crime (although the authors suggest that the increase in violent crime may be due to increased detection). Similarly, in California, University of California, Berkeley researchers released preliminary findings of their evaluation of San Francisco's CCTV system. They found "that nonviolent thefts dropped by 22 percent within 100 feet of the cameras, but the devices had no effect on burglaries or car theft" (Knight, 2008). The study also found that San Francisco's cameras had "no effect" on violent crimes (ibid).

These differences between the apparent ineffectiveness of cameras to deter violent crimes, by comparison to their apparent success in deterring property crimes, may relate back to the underlying theory that some crimes, such as property-related offenses like larceny, are often opportunistic (Fabrikant 1979). In contrast, many violent crimes may be motivated by passions that make individuals less rational, more impulsive, and therefore less influenced by the risk of detection or apprehension.

[20] The evaluations were carried out in several countries, each with their own different system of categorizing and defining crime. Here, vehicle crime generally refers to vehicle theft and theft from vehicles. Other types of property crime include burglary, robbery, theft, larceny and "street crimes."

The findings from the University of California, Berkeley study regarding possible differences in deterrent effects based on the distance from the cameras also raise concerns about possible displacement of crime to other areas — an issue raised by critics of situational crime prevention strategies.

Crime Detection, Mitigation and Prosecution

Although an inherent part of deterring crime is the detection and apprehension of criminals, operational differences between CCTV systems affect law enforcement's ability to mitigate crime as it is happening and the prosecution of a crime after it has been committed.

As discussed briefly in "Privacy versus Efficacy in California" (p. 13) proponents of actively monitored video surveillance argue that while not all areas may show a statistically significant net reduction in crime, such monitoring can be used to reduce the escalation of crime as it is happening. For instance Shepherd (et al. 2005) argues that CCTV surveillance helps to explain conflicting reports in England and Wales, between an increase in the number of violent crimes recorded by police, and a decrease in the number of injuries resulting from violent crimes. Shepherd's analysis suggests that surveillance has increased detection of violent crimes while "facilitating a faster police response to arguments and assaults, which limits their duration and reduces the likelihood and seriousness of injury" (Laurence 2005).

Law enforcement and other officials further argue that video evidence provides a critical prosecutorial tool, but no studies in our review examine their effectiveness in the apprehension and prosecution of criminal suspects. Anecdotal evidence suggests that a crime captured on video may move an undecided jury to reach a guilty verdict or a judge to impose a more severe sentence on an assailant. For instance, the California Research Bureau cites the importance of video evidence in prosecuting the perpetrators of the first World Trade Center Bombing (Nieto 1997). According to Deputy Chief Charlie Beck of the Los Angeles Police Department, recorded evidence of a crime is also instrumental in gaining a confession from a suspect before court proceedings begin (Interview, Beck, February 5, 2008). A recent homicide investigation in Fresno provides further evidence for this assertion: Two individuals captured on video shooting a young man in southwest Fresno were apprehended by police. The suspects originally pleaded self-defense but confessed to the crime after being told of the video evidence (Guy 2008).

Some studies have questioned the admissibility of CCTV and other surveillance-related technologies in a courtroom setting (Murphy 1999). As evidence, CCTV footage is considered circumstantial, not conclusive (Schlosberg and Ozer 2007). Moreover, to be considered admissible as evidence, the video footage must add new factual elements to the prosecution's case; merely being persuasive does not make it pertinent to a case in court (Greenfield 1991).

Local Characteristics of CCTV Implementation

This discussion of the effectiveness of CCTV in reducing crime, and its operational use as a crime mitigation and prosecution tool, suggest that local programmatic characteristics heavily influence the success of surveillance programs. It raises issues around the specific tactical elements of deployment, for example, whether the deployment of different hardware systems in different locations causes technical problems for a police department, how the resolution and frame rate of surveillance cameras affect CCTV's usefulness, and whether sporadic monitoring of systems designed to be actively monitored contributes to public safety (Interview, Beck, February 5, 2008).

These varying results give rise to five operational elements that researchers have identified which may enhance the deterrent effect of video on criminal activity:

- Comprehensive crime-prevention programs that employ other strategies to complement CCTV programs (Gill and Spriggs 2005),
- More cameras and greater surveillance coverage of an area (Gill and Spriggs 2005),
- Continuous surveillance areas (e.g., parking lots, commercial areas, and parks) (Gill and Spriggs 2005),
- Small and well-defined surveillance areas (Ratcliffe 2006),
- Police monitoring and operation of the CCTV system (Ratcliffe 2006).

These individual operational elements may not play an equal role in CCTV program effectiveness in every case, but they do provide an initial framework for understanding potential differences. By studying a city in California, additional characteristics that may influence CCTV effectiveness may arise. The City of Los Angeles' targeted deployment of CCTV, made possible largely through public-private partnerships and donations, may also offer new insight to California policymakers and law enforcement. In the next sections, we provide some context for our examination of the effectiveness of video surveillance in two locations within Los Angeles.

CCTV, CRIME AND POLICING IN LOS ANGELES

Our meta-analysis identified that, despite the growing popularity of CCTV systems in California and the mixed results of previous studies, only San Francisco has undertaken a serious evaluation of its surveillance program — an assessment conducted only recently. Given our finding that local program characteristics likely affect the overall success of CCTV programs — which are often very different from one other — in reducing and preventing crime, it is critical that other cities' CCTV programs are evaluated and that local characteristics and context are described.

To inform policymakers and law enforcement officials who currently have or are considering employing CCTV systems as a crime-prevention and crime-reduction tool, we evaluate two actively monitored public video surveillance programs in Los Angeles. As the largest municipality in California, Los Angeles may have the greatest demand for future deployment of CCTV systems and an early assessment of its successes and failures may have broader implications than those from a smaller city. Moreover, the unique partnerships and actively monitored systems in Los Angeles provide a framework for comparing programmatic

characteristics to San Francisco's passively monitored, publicly funded video surveillance program.

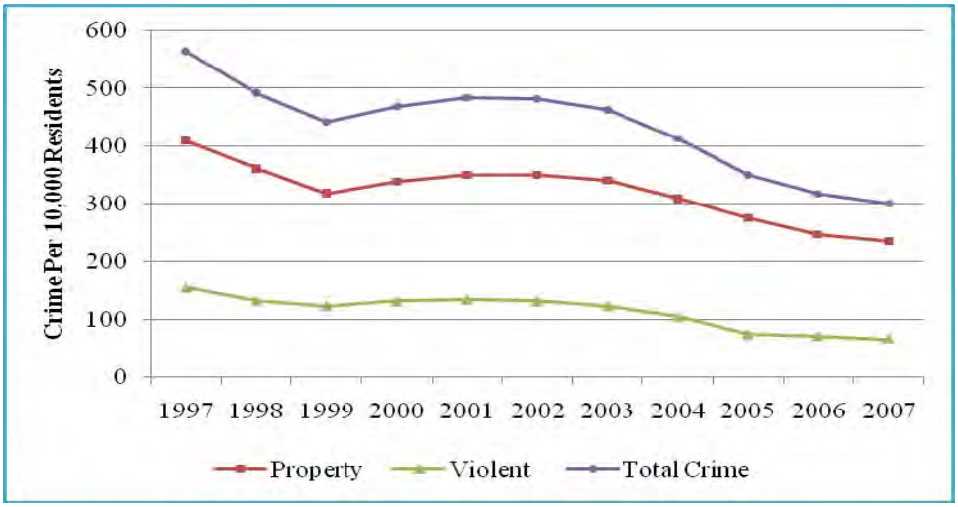
As previously mentioned, working through various public-private partnerships, the Los Angeles Police Department actively monitors about 80 cameras within its city limits.[21] Locations of these cameras include MacArthur Park, major thoroughfares in Hollywood, the Jordan Downs housing project in Watts, and a street in downtown Los Angeles' fashion district named Santee Alley.

We first discuss crime in Los Angeles, the policing situation in the City, and the successful deployment of CCTV in MacArthur Park. We then provide an overview of our two chosen case studies or target areas: Jordan Downs Housing Development in Watts and Hollywood Boulevard between La Brea and Vine in Hollywood. We also describe our control or comparison areas for our statistical analysis before describing our research questions and methodological approach.

Crime and Policing in Los Angeles

With more than 4.2 million residents, Los Angeles is the second most populous city in the United States and the largest city in California. Overall, crime rates in Los Angeles have steadily declined over the years. As illustrated in Figure 2, both property crimes and violent crimes (per 10,000 residents) are the lowest in 10 years. In 2007, the number of crimes reported was fewer than the previous year in every major (Part I) crime category, including homicide, rape, robbery, aggravated assault, larceny, auto theft and burglary. Although the crime rate in Los Angeles remains high when compared to the largest city in the country, New York City, L.A.'s crime rate (per 10,000 residents) in 2006 was lower than other major California cities, such as San Francisco and Oakland. (Both San Francisco and Oakland's crime rates per capita increased in various crime categories over the last two years.) Still, homicide rates are higher in Los Angeles than in San Jose, San Diego, Santa Ana, Fresno, Sacramento and many other California cities.

Figure 2. Crime in Los Angeles 1997-2007



Spanning 469 square miles, Los Angeles is also one of the largest cities in the United States. Despite its significant size and population, Los Angeles has far fewer police officers per resident and per square mile than other large American cities (Wagers 2007). As of

[21] It should be noted that "actively monitored" video feeds are not watched constantly. The LAPD uses knowledge of an area and daily crime statistics to determine during which hours of the day to monitor cameras and how the cameras should be oriented while merely recording (Interview, Graham, March 26, 2008.)

2006, the City of Los Angeles employed 2.4 police officers for every 100,000 residents, as compared to 4.9 in New York City and 4.8 in Chicago (ibid). Similarly, Los Angeles' 19.7 officers per square mile are dwarfed by New York's 128.8 or Chicago's 61.9 (ibid).

Gang-related Activity

Another important element of Los Angeles crime and policing, particularly in Southeast Los Angeles, is the prevalence of gang-related activity and the focus of law enforcement on the suppression of such crimes. A recent report by the Advancement Project (2006) names Los Angeles "the gang capital of the world," noting the 40,000 gang members and more than 700 gangs in the city; an astounding 75 percent of youth gang homicides in California take place in Los Angeles. (In the beginning of 2008, Los Angeles experienced a sharp upswing in gang-related homicides: As of March 19, 2008, 93 people had been killed in Los Angeles, compared with 69 during the same period last year — a nearly 35 percent increase [Rubin 2008]).

The Advent of Video Surveillance

William Bratton took over as chief of the LAPD in October 2002. Prior to his arrival, crime had increased by 54 percent over the previous three years (*The Economist* 2007). Chief Bratton brought to Los Angeles many of the same crime-reduction strategies he had previously applied in other large metropolitan areas cities, among them New York and Boston. These strategies largely focus on his belief in a "broken windows" theory of policing, wherein officers are encouraged to address minor criminal offenses in an effort to deter more serious crimes later. One such tactic to capture and deter these minor offenses was the deployment of video surveillance cameras.

The first police-coordinated deployment of video surveillance in Los Angeles took place at MacArthur Park, a 40-acre park in the Rampart police district, west of downtown Los Angeles. While the park was once a tourist hot spot surrounded by an affluent neighborhood and upscale hotels, after World War II the area transformed into a high-density immigrant community. Beginning in the 1980s, the park experienced a substantial increase in gang activity, prostitution and drug-related crimes, and eventually earned the unfortunate distinction of having one of the highest homicide rates in the city (Leovy 2006). The park was home to five rival gangs — the Mara Savatrucha, 18th Street, Temple Street, the Playboys and the Drifters — who turned the park into an open-air black marketplace where drugs, fake ID cards, and stolen goods could be readily bought and sold. The park became notorious as a place where "anything and everything" illegal could be obtained (Interview, Beck, February 5, 2008).

A seven-camera actively monitored system was deployed in MacArthur Park in late 2003 with the help of a federal grant and a partnership with GE Hamilton at a cost of $100,000. (Blankstein and Ari B. Bloomekatz 2008; Interview, Beck, February 5, 2008). The cameras were one part of the Alvarado Corridor Initiative, a multifaceted crime prevention and reduction program that included both tactical deployments and cooperation with other city departments. For example, the Department of Recreation and Parks added recreational after-school programs in the area, maintenance crews began regularly cleaning up litter and graffiti in the park, and the Department of Water and Power doubled the park's lighting. In addition, the LAPD added standardized

Brian Vander Brug / Los Angeles Times

patrols wherein the same police officers would patrol the same beats. According to Deputy Chief Charles Beck, the cameras were used predominately to target drug dealing and document forgeries taking place in the park (Interview, Beck, February 5, 2008). Senior training officers within the LAPD at the Rampart Police Station control the cameras and can call units in to make an arrest. "At first we made so many arrests that it overloaded our system — 50 to 60 buyers within a few hours"(ibid).

While no formal evaluation of the video surveillance cameras was conducted, Sousa and Kelling (2006) report that Part I offenses fell from 38 per week before the Alavardo Corridor Initiative was put into place to 30 after it began.[22] These early successes of the MacArthur Park video surveillance system were referenced to support subsequent deployments in Los Angeles, including along Hollywood Boulevard and in Jordan Downs Housing Project.

Hollywood Boulevard cameras were initially deployed in March 2005, focusing on reducing property crimes, for sting operations, mitigating criminal behavior outside local nightclubs and retail establishments, and thwarting potential terrorist attacks. By contrast, cameras in Jordan Downs, a residential public housing project in Watts, were installed in October 2006 to target gang activity, and drug-related and violent crime.[23]

The following section explores our research questions, case studies, methodology and data collection.

RESEARCH QUESTIONS, CASE STUDIES AND METHODOLOGY

This study seeks to fill a critical information gap regarding the effectiveness of closed-circuit television (CCTV) programs in California in deterring crime. It also seeks to identify programmatic features that enhanced or inhibited the successful implementation of CCTV. We employ both quantitative and qualitative methods to determine the efficacy of CCTV systems in two Los Angeles locations: Jordan Downs Housing Project and Hollywood Boulevard. Both locations have had CCTV systems for at least one year and provide an important context to compare CCTV systems in different environments. Although each location has unique social, political and economic conditions, the problems of disorderly conduct, potential terrorist acts,

[22] It is important to note that this apparent reduction could not be directly attributed to the presence of the cameras. Moreover, the study looked at crime reduction for both the reporting district (RD) that contained MacArthur Park and the surrounding area. Finally, no comparison or control area was used in the Sousa and Kelling study.
[23] Other ongoing surveillance in Los Angeles, including a partnership with the Motion Picture Association of America to combat bootlegged DVD sales in Santee Alley in downtown Los Angeles, and cameras in MacArthur Park that target drugs, gangs and prostitution, are not included in this analysis but remain important areas for future study.

gang violence, property crime and theft, drugs and prostitution are by no means unique to these locations or to Los Angeles, and the lessons learned here may be applicable to many other areas throughout California.

Research Questions

Our analysis addresses the following questions:

1) What effect does CCTV surveillance have on crime rates in different environments?

- Does video surveillance have different deterrent effects on different types of crime? For instance, has it been more effective in deterring property crimes rather than violent crimes?
- Does CCTV displace crime to adjacent areas outside of the view of the cameras, or does it have a more robust deterrent effect on the larger community?
- How has CCTV deployment affected arrest rates for quality of life infractions? Has it increased the detection of these violations that would otherwise go unreported?

2) What factors have contributed to the success of, or present challenges to, CCTV implementation?

- Which technical aspects of implementation might other localities adopt that may contribute to success?
- Are certain kinds of environments and arrangements, such as public housing projects or heavily touristed retail areas, well-suited or ill-suited to CCTV surveillance?

While other questions, such as the effectiveness of CCTV in the identification and prosecution of suspected criminals, remain important, we viewed an in-depth legal case analysis to be beyond the scope of this report.

Case Selection: Hollywood Boulevard and Jordan Downs Housing Project

To investigate the potentially deterrent effects of CCTV surveillance on the different types of crimes that happen in different locales, we juxtaposed research on a retail environment using a matched pairs analysis and a housing development using a suitable control.

Arguably one of the most famous streets in the world, Hollywood Boulevard is home to the Walk of Fame, Grauman's Chinese Theatre, and the Hollywood and Highland shopping center. More than 10 million tourists visit various

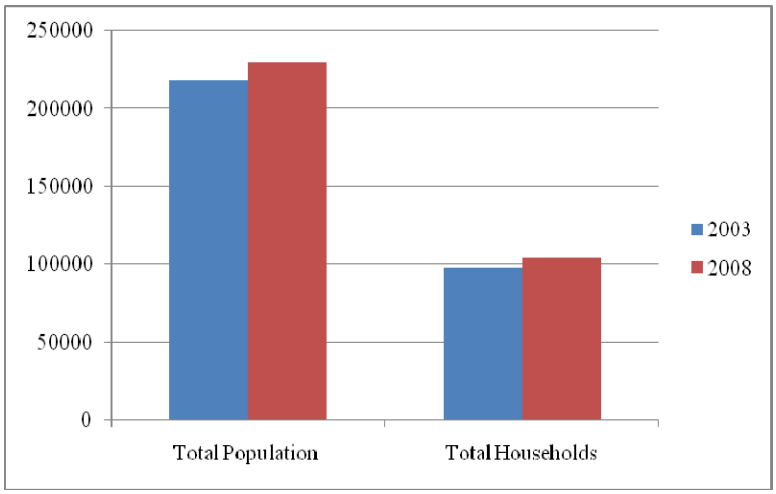
Figure 3. Case Study Locations

locations along Hollywood Boulevard each year (Economic Research Associates 2004).

Table. 5 Hollywood Boulevard Characteristics	
Site:	Retail Area
Dated Installed:	February/March 2005
Number of Cameras:	5 studied; 14 total
Cost:	$103,000 in 2004 + $100,000 in 2005
Hrs of Surveillance:	10-12 hours per day; 90% of time at night
Type of Surveillance:	Active monitoring
Funding Source:	Private donation
Implementation:	Cooperative with police and the Business Improvement District
Crimes Targeted:	Narcotics, property crimes, public nuisance, robbery, and terrorism

A 2003 LA Inc. (formerly Los Angeles Convention & Visitors Bureau) study reported that the Hollywood Walk of Fame was the fifth most visited attraction in Los Angeles; Grauman's Chinese Theatre was also in the top 10. Together with the 38 area hotels and motels, 53 nightclubs and 110 restaurants on or adjacent to Hollywood Boulevard, Hollywood is trafficked by pedestrians day and night. Hollywood Boulevard is also home to the Kodak Theatre where the Academy Awards are held and a Metrolink subway station, and is frequently the site of movie premiers, political rallies and protest marches, and festivals.

Figure 4. Hollywood Demographic Change



In addition to the large number of visitors to the Hollywood area, which encompasses roughly 20 square miles, it is also home to more than 230,000 residents (Economic Research Associates 2004).[24] As of 2003, these residents were slightly older (36.4), had a lower median household income ($41,026) and were more likely to be unemployed than Californians as a whole (Economic Research Associates 2004; American Community Survey Data Profile Highlights: California 2003). Figure 4 shows demographic changes in total population and total households between 2003 and 2008. Over the next five years, more than 4,000 new units of high-end housing will become available in and around the

[24] Note that the area size includes both Griffith Park and Los Feliz; pursuant to CA Assembly Bill 588.

Hollywood Entertainment District, representing a development investment of more than $1 billion dollars (Economic Research Associates 2004).

Jordan Downs, a 700-unit public housing development in the Watts neighborhood in South Los Angeles, is the second largest public-housing project run by the city's Housing Authority. The housing project was originally constructed during World War II to house the influx of Southern African American laborers who came to fill jobs left vacant by departing soldiers serving overseas (McGrath 2005). Beginning in the 1960s, the area suffered as the number of manufacturing jobs steadily declined. By the late 1970s, street gangs formed, and Jordan Downs became a stronghold for the Grape Street Crips (Winton and Vives 2008). While Jordan Downs was almost exclusively African American from the early 1940s until the 1980s, the number of Latino tenants has increased steadily to about 50 percent (Interview, Graham, March 26, 2008), which has increased social tensions in the area (McGrath 2005). The poverty rate for the ZIP code containing Jordan Downs was 38.1 percent in 2000 compared to 18.3 percent for the city of Los Angeles as a whole. In addition, Jordan Downs Housing Complex has been the central point in a gang war since 2005.

Table. 6 Jordan Downs Characteristics

Site:	Public Housing Project
Dated Installed:	October 2006; December 2006
Number of Cameras:	6 studied
Cost:	$1.2 million
Hrs of Surveillance:	Before and after school
Type of Surveillance:	Active monitoring
Funding Source:	Private grant, Federal grant
Implementation:	Cooperative with police and community groups
Crimes Targeted	Gang violence, property crimes, homicides, robberies

Methodology

Table 7 below summarizes our research methods, data and data sources.

Table 7. Methodology	
How does CCTV affect crime rates?	
Methodology	**Data**
Statistical analysis of monthly crime rates before and after CCTV intervention in target, buffer, and control/matched pair sites	Part I and Part II crime records; arrest records for quality of life violations
What factors of CCTV implementation contribute to success or present challenges?	
Methodology	**Data**
Semi-structured interviews; document and media report analysis	Qualitative accounts of the CCTV implementation process and other crime prevention interventions in study areas

Statistical Analysis of Crime Data

We employ a quasi-experimental research design to examine monthly crime data before and after the introduction of CCTV along the Hollywood Boulevard Walk of Fame between Vine Street and La Brea Avenue and at the Jordan Downs public housing development in Los Angeles to measure the effect of CCTV on crime. Descriptive statistics for overall crime and different categories of crime are analyzed in target, buffer and control areas to determine if there are any significant changes in crime rates and if these changes can be attributed to the CCTV system. Our geographic areas of analysis, the time frame of the analysis, measures of crime and statistical tests are detailed below.

Geographic Areas: Target, Buffer, Control

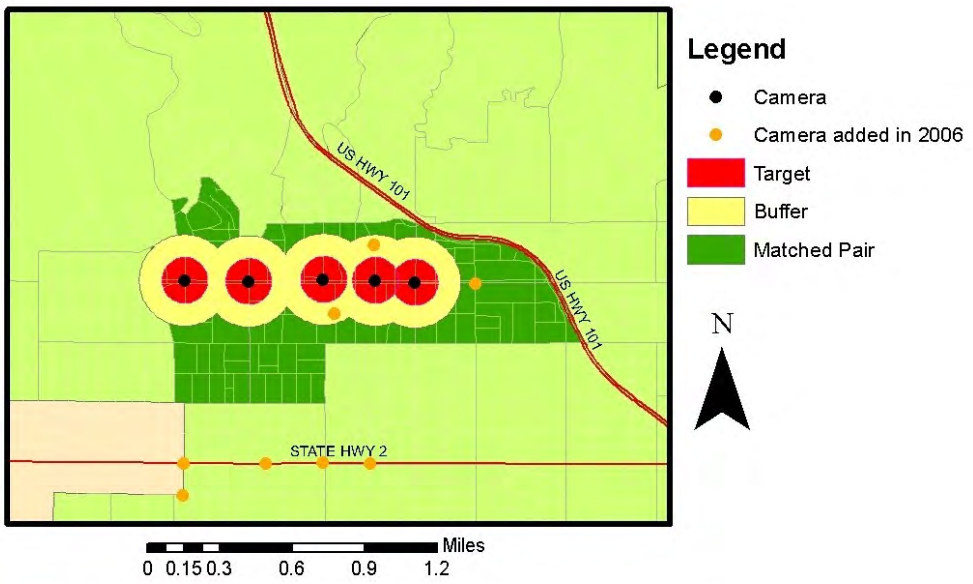
We delineated target, buffer and control areas that form the geographical basis of our analysis. The target areas consist of the public space that is directly under surveillance, which we estimated as the 500 foot radius around each camera. The buffer area is the space 500 to 1000 feet away from the cameras that is not directly under surveillance but is the most susceptible to the diffusion of benefits or the displacement of crime from the nearby CCTV systems.[25] The

[25] We base the geographic estimate on previous studies that have looked at possible displacement effects; while the cameras at each location may be capable of viewing a crime beyond 500 feet in any direction, we felt it reasonable to assume that not all crimes occurring within sight range could be viewed.

control/comparison areas serve as a point of comparison for any change in crime or arrest rates; they are geographically and socio-economically similar and do not have CCTV systems.

For the Hollywood site, the target and buffer locations run along the approximately one-mile stretch of Hollywood Boulevard between La Brea Avenue and Vine Street. Determining a control area proved to be difficult, however, due to the unique combination of establishments, tourism, armed private security and a Metrolink station along Hollywood Boulevard. Upon the advisement of the LAPD, we selected the five surrounding police reporting districts to serve as a comparison or matched pair.[26] This area is commonly referred to as "the Box" by the local police since it contains a high concentration of restaurants and nightclubs that clearly delineate it from the surrounding neighborhoods and is the focus of Hollywood Area law enforcement. Figure 5 depicts the Hollywood target, buffer and comparison areas.

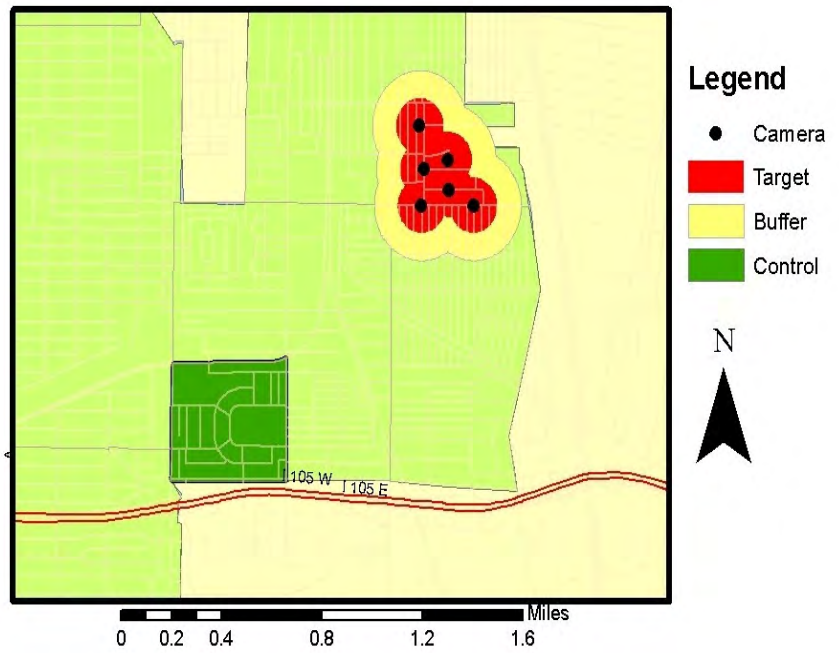
Figure 5. Hollywood Camera Locations



For the Jordan Downs location, the target and buffer areas are on the grounds of the Jordan Downs public housing development. Since the movements of the residents of Jordan Downs are tightly bounded by the territorial boundaries of the Grape Street Crips gang that operates in the complex, the buffer areas for the southernmost cameras on 103rd Street have been shortened to conform to the gang's turf boundary delineated by 103rd Street.

[26] A reporting district is the smallest statistical unit regularly reported by the LAPD.

Figure 6. Jordan Downs Camera Locations



A nearby housing project called Nickerson Gardens, the largest public housing development in Los Angeles, was used as a control. As seen in Table 8, the inhabitants of both Jordan Downs and Nickerson Gardens have similar demographic composition and incomes. Both projects house powerful gangs to which police attribute the majority of crimes — the Grape Street Crips in Jordan Downs and the Bounty Hunter Bloods in Nickerson Gardens. In addition, Jordan Downs' two main policing strategies aside from video surveillance — a gang injunction and task force — have been active at Nickerson Gardens for the duration of our study period. Figure 6 depicts the Jordan Downs study areas.

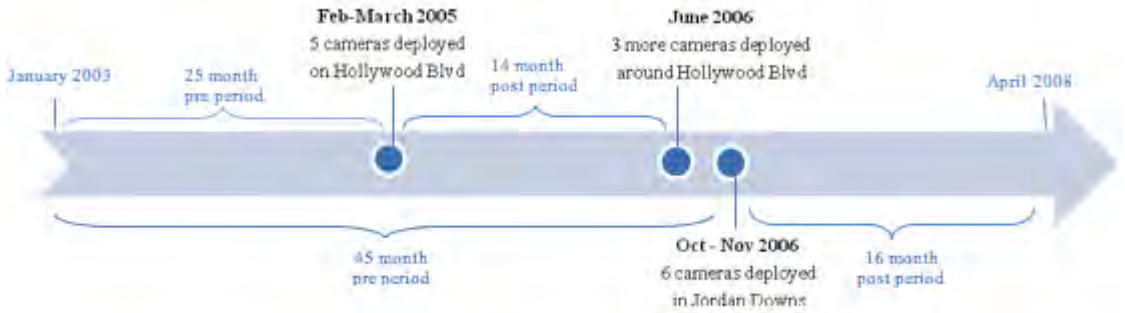
Table 8. Jordan Downs and Nickerson Gardens Demographics

	Jordan Downs	Nickerson Gardens
White alone	8%	13%
Black or African American alone	61%	47%
Not Hispanic or Latino	60%	47%
Hispanic or Latino	40%	53%
Median Household Income in 1999	$13,306	$12,053

Time Period of Analysis

We collected crime data from January 2003 — the earliest date detailed crime records were available — through March of 2008. In Hollywood, five cameras were first installed during February of 2005, followed by the deployment of three additional cameras in June of 2006. To control for the potentially confounding effect of the addition of cameras in the buffer and matched pair, we evaluated the period 25 months before and 14 months after the initial implementation, but prior to the subsequent deployment. Six cameras in Jordan Downs began installation in December 2006, so the pre-deployment period is 45 months and the post-deployment period is 16 months. In both cases, a two-month implementation period was excluded from the analysis to account for the difference between when the cameras first went up and when they went "live." (*Note:* The exact dates from when surveillance poles first went up to all cameras' going live could not be precisely determined.) These time frames are within the

range employed by studies with similar aims and will allow us to account for seasonal and longer-term crime trends.



Measures of Crime

We collected two different measures of crime: arrest records and reported crime records. We looked at both Part I crimes— homicide, robbery, aggravated assault, theft and motor vehicle theft — and Part II crimes — including battery, bomb threats and disorderly conduct. While LAPD reported that Part II crimes are less of a priority for the Department, we felt that in the case of Hollywood, at least, many of these crimes may be deterred by the presence of the cameras. Types of crime that cannot reasonably be affected by CCTV, such as fraud, were not included in our analysis.

In addition, we collected data on arrests for minor offenses, such as narcotics, prostitution and drunkenness, to measure CCTV's effect in *detecting* crime. These "victimless" violations are not reported to police as crimes; they are only recorded when police actually observe the criminal behavior and make an arrest. Therefore, these crimes are under-reported, and it is hypothesized that CCTV's "caught in the act" mechanism described earlier in "Privacy, Efficacy, and Public Opinion" (p. 10) will lead to an increase in detection and arrests for these quality-of-life crimes.

Statistical Tests

To determine if the changes in crime rates and arrests are real as opposed to the result of random fluctuation, we performed a relative effect size (RES) statistical test. This test allows us to compare before-and-after crime levels in two different areas. We compared changes in monthly crime rates between the target and control areas as well as between the buffer and control areas. If the RES is statistically significant, meaning that there is less than a 5 percent probability that the observed change in crime is due to random variance, then we can conclude that crime changed at a different rate in the experimental and control areas. It is important to note that a statistically significant RES does not prove causation. Moreover, the absence of a statistically significant result does not prove that the cameras were ineffective. For further information on the statistical test, refer to Appendix C on p. 77.

Qualitative Interviews

To supplement and aid in the interpretation of the statistical analysis, we also collected qualitative data on the implementation and operation of the CCTV systems and other policing strategies. We triangulated media reports, official documents and semi-structured interviews with Los Angeles Police Department personnel in the Hollywood and Southeast stations (which monitor our test areas), COMPSTAT (the statistical analysis unit of the LAPD), and others in the South Bureau for background information on the original implementation of video surveillance in the Hollywood and Jordan Downs vicinities. Additionally, we interviewed community leaders in the Jordan Downs area and business leaders in Hollywood. Through these interviews, we obtained descriptions of the CCTV-system implementation process from many different perspectives, as well as information on ongoing implementation practices, and the integration of the technology with other policing and community strategies. This information allowed us to identify factors of the CCTV implementation process that have been successful, what the biggest challenges have been and how those challenges have been addressed. Given the variability in the effectiveness of CCTV systems in other states and countries, this qualitative aspect of the evaluation is imperative to the interpretation of the quantitative results and highlights a number of programmatic issues that affect how the CCTV systems operate. A complete list of interviewees is listed in the references.

STATISTICAL FINDINGS

In this section we test the three prevailing hypotheses on closed-circuit television's (CCTV) effects on crime. First, if CCTV effectively deterred criminal activity, we would expect that any decrease in crime within the test area would be greater than any decrease in the matched pair or control following CCTV deployment. In particular, we would expect property crime rates to be more affected by CCTV than violent crimes, based on previous studies. Second, if the presence of cameras displaced crime from the target area to the surrounding areas (the buffers), we would expect that the crime rate in the buffer areas would increase or decline less than in the matched pair or control area. Lastly, we would expect the arrest rate for minor violations would *increase* in the target areas relative to the matched pair or control after the implementation of CCTV.

This latter hypothesis is due to the fact that, unlike property and violent crimes that are reported to police by the victims, many minor, quality-of-life violations are "victimless," and, therefore, are only recorded if the police themselves detect the criminal behavior and make an arrest. We would expect that CCTV would allow the police to better detect these minor infractions as they are happening, leading to an increase in the arrest rate. (A lowering of crimes accompanied by an increase in arrests occurred in MacArthur Park, where the implementation of an actively monitored CCTV system led to a sharp increase in narcotics arrests [Sousa 2006]).

Our statistical analysis of crime and arrest data before-and-after implementation in both Jordan Downs and Hollywood found:

- Neither cameras in Jordan Downs nor Hollywood Boulevard had any significant effect in reducing violent or property *crime rates* within the target areas;

- The monthly rate of *violent crimes* fell in both the Jordan Downs and Hollywood target areas; however, the Nickerson Gardens control site and the Hollywood Box matched pair experienced similar reductions and the results were not statistically significant;
- The monthly rate of *property crime*s decreased in Hollywood, and increased in Jordan Downs, but the results were not statistically significant in either case;
- The evidence on the *displacement of crime is mixed*; in both locations, some crimes increased at a faster rate in the adjacent areas, indicating that CCTV may displace crime, while other types of crimes decreased relatively more in the buffer areas, though results were not statistically significant;
- CCTV had no statistically significant effect on *arrest rates* for misdemeanor quality-of-life infractions in Jordan Downs or on Hollywood Boulevard.

Our statistical findings in each location are further explored below. We first examine the crime profile of each site prior to CCTV deployment, disaggregating the monthly rate of different types of arrests and suppressible crimes; we then present the results of the before-and-after analysis of monthly crime and arrest rates. Following our presentation of the statistical findings, we discuss the limitations of the analysis and provide some possible alternative explanations that may have contributed to the uncertainty of the statistical effects of our study.

Hollywood Boulevard Statistical Findings

Over the 25 months observed prior to the implementation of CCTV along Hollywood Boulevard (target area), there were 1,951 crimes we deemed as suppressible; that is, crimes that occurred outside on the street or sidewalk in areas that might have been observed by the cameras. Of these crimes, 44.3 percent were violent, 54 percent were property-related, and the remaining 1.6 percent were "other" crimes (including both violent and non-violent offenses such as shots fired, bomb threats and pandering).

Table 9. Hollywood Average Monthly Crime Rates
January 2003 to February 2005 (pre-implementation)

	Hollywood Blvd Target Area		Hollywood Box Matched Pair	
Crime Type	**% of Total**	**Avg per Month**	**% of Total**	**Avg per Month**
All Crimes	**100.0%**	**78.0**	**100.0%**	**248.0**
Violent	**44.3%**	**34.6**	**39.3%**	**97.4**
Homicide	0.1%	0.04	0.1%	0.4
Aggravated Assault	11.3%	8.8	11.1%	27.6
Robbery	7.6%	5.9	8.6%	21.2
Battery	25.4%	19.8	19.4%	48.2
Property	**54.0%**	**42.2**	**59.6%**	**147.8**
Vandalism	7.1%	5.6	10.1%	25.0
Car Theft	7.2%	5.6	10.4%	25.8
BTFV	13.0%	10.2	19.0%	47.1
Theft	26.7%	20.8	20.1%	49.9
Other Crimes	1.6%	1.3	1.1%	2.8

As shown in Table 9, theft — including purse snatching, petty theft, and grand theft person — represented the most prevalent crime in the area (26.7 percent), followed closely by battery (25.4 percent). On an average monthly basis, there were 20.8 thefts reported, 19.8 batteries, 10.2 burglaries or thefts from vehicles (BTFV), 8.8 aggravated assaults, 5.9 robberies, 5.6 car thefts and vandalism-related crimes, 1.3 other crimes and 0.04 homicides. (There was only one homicide in the target area over the 25-month pre-implementation period).

In the remainder of the Hollywood "Box," the matched pair comparison area, 6,200 crimes took place during our pre-implementation period. A higher percentage of total crimes in the Box were related to property crimes (59.6 percent). In particular, a higher proportion of cars were stolen (10.4 percent of all crimes) or broken into (19.0 percent of all crimes) in the Box, though the target area had a relatively higher percentage of thefts. In contrast, the percentage of violent crimes was lower in the Box than in the target area with a considerably lower proportion of batteries and slightly lower percentage of aggravated assaults than the target area; however, robberies and homicides represented a slightly larger share of crimes in the Box.

In addition to violent and property crime, we also examined the incidence of quality-of-life infractions, which are recorded as arrests rather than as crimes. In the 25 month period before the cameras were installed, there were 2,439 arrests in the Hollywood target area for misdemeanor offenses. As portrayed in Table 10, the most frequently occurring arrest categories were narcotics (35.9 percent of all arrests), drunkenness (25.3 percent of all arrests) and "other" arrests (37.3 percent of all arrests), which include Part II crimes that may not rise to level of being categorized into a specific category. On an average monthly basis, there were 98.9 total arrests, 35.5 arrests for narcotics, 25 arrests for drunkenness, 36.9 other arrests, and less than one arrest for liquor laws, prostitution and weapon possession.

Table 10. Hollywood Target and Control Area Arrests January 2003 to February 2005 (pre-implementation)

	Hollywood Blvd Target		Hollywood Box	
Arrest Group	**% of Total**	**Avg per Month**	**% of Total**	**Avg per Month**
Total Arrests	100.0%	97.6	100.0%	261.5
Drunkenness	25.1%	24.5	22.1%	57.9
Liquor Laws	0.4%	0.4	1.0%	2.6
Narcotics	36.7%	35.8	35.3%	92.3
Prostitution	0.2%	0.2	4.5%	11.8
Weapon Possession	0.7%	0.7	1.1%	3.0
Other	36.8%	35.9	35.9%	94.0

In comparison, there were 6,537 misdemeanor arrests in the Box. Table 10 shows that the proportion of arrests were very similar in the Box and the target area; however, in the Box, a slightly higher percentage of arrests were for liquor laws (1 percent), prostitution (4.5 percent) and weapon possession (1.1 percent) than in the target area.

Taken together, the crime and arrest summaries from the pre-implementation period indicate that the Box provided an adequate matched pair comparison for the Hollywood Boulevard target area.

Pre-Post Crime Analysis

As shown in Table 11, we found that the average monthly crime rate on Hollywood Boulevard decreased 10.3 percent following CCTV deployment, which is a slightly *smaller* reduction in crime than seen in the matched pair (11.1 percent).

Table 11. Hollywood Monthly Crime Rates

	Hollywood Blvd Target Area			Hollywood Box Matched Pair		
Crime Type	**Pre**	**Post**	**% Change**	**Pre**	**Post**	**% Change**
All Crimes	**78.04**	**70.00**	**-10.3%**	**248.00**	**220.50**	**-11.1%**
Violent Crimes	**34.60**	**33.93**	**-1.9%**	**97.36**	**93.86**	**-3.6%**
Homicide	0.04	0.07	78.6%	0.36	0.14	-60.3%
Agg. assault	8.84	7.57	-14.4%	27.60	21.57	-21.8%
Robbery	5.92	5.64	-4.7%	21.24	19.36	-8.9%
Battery	19.80	20.64	4.3%	48.16	52.79	9.6%
Property Crimes	**42.16**	**34.64**	**-17.8%**	**147.80**	**123.50**	**-16.4%**
Vandalism	5.56	6.71	20.8%	25.00	24.64	-1.4%
Car Theft	5.60	4.36	-22.2%	25.80	19.57	-24.1%
BTFV	10.16	6.00	-40.9%	47.12	34.36	-27.1%
Theft	20.84	17.57	-15.7%	49.88	44.93	-9.9%
Other Crimes	1.28	1.43	11.6%	2.84	3.14	10.7%

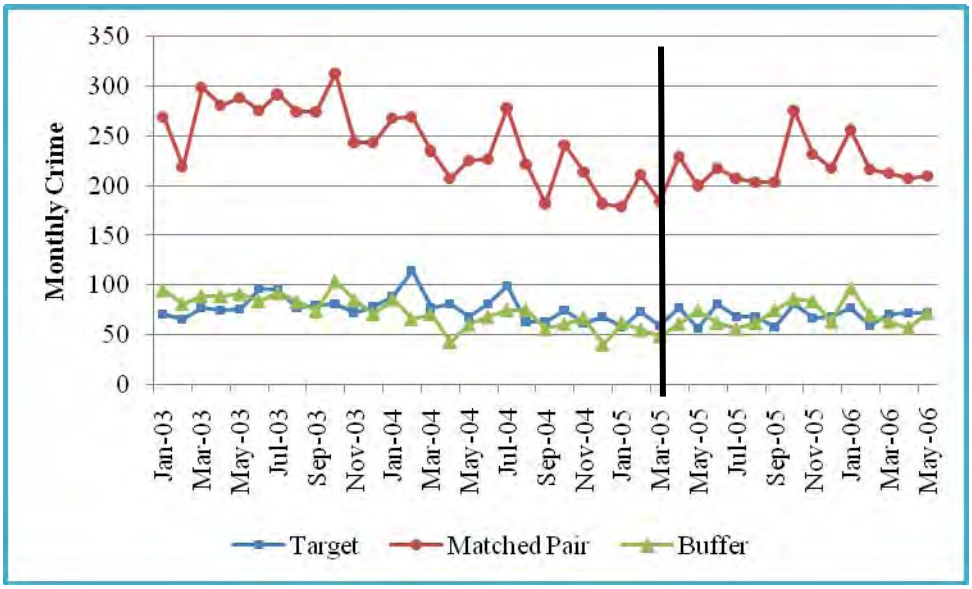
Violent crime decreased slightly less in the target area (1.9 percent) compared to the matched pair (3.6 percent) after CCTV implementation. Of the violent crimes, aggravated assault declined the most — 14.4 percent — along Hollywood Boulevard; however, the aggravated assault rate fell to a greater degree (21.8 percent) in the Box. Similarly, while robbery decreased by 4.7 percent in the target area, the Box saw an 8.9 percent reduction in robberies during same time period. Battery, the most prevalent violent crime, increased in both the target and matched pair during the post-implementation period, but Hollywood Boulevard had a relatively smaller increase (4.3 percent) compared to the Box (9.6 percent). Although the homicide rates posted large percentage changes from the pre- to post-implementation periods (78.6 percent and -60.3 percent in the target and matched pair, respectively), the number of homicides is so low that they have little effect on the overall violent crime rate.

Property crimes decreased substantially more than violent crimes in both the target and matched pair; however, in contrast to violent crimes, property crimes decreased more in the *target area* (17.8 percent) than in the matched pair (16.4 percent). Both areas saw the greatest decline in vehicle crimes, but Hollywood Boulevard experienced a relatively greater decrease in theft from vehicles (40.9 percent versus 27.1 percent in the matched pair), while the Box saw a relatively

greater reduction in the number of stolen vehicles (24.1 percent versus 22.2 percent in the target area). Thefts also decreased considerably in both areas, though the reduction was greater in Hollywood Boulevard (15.7 percent) than the Box (9.9 percent). The starkest contrast was the change in vandalism rates following CCTV deployment; along Hollywood Boulevard vandalism *increased* 20.8 percent, while the vandalism rate *decreased* by 1.4 percent in the Box.

While this comparison seems to lend some credence to the hypothesis that CCTV deters property crime, none of the observed divergences in crime rates between the target and matched pair were statistically significant at the 95 percent confidence level. Therefore, we cannot distinguish to what extent the differences were due to random fluctuation in crime or to an actual increase or decrease in crime attributable to CCTV or other factors. As seen in Figure 7, crime fluctuates widely from month to month. For more details on the statistical significance of our findings, refer to Appendix C on p. 77.

Figure 7. Hollywood Monthly Crime



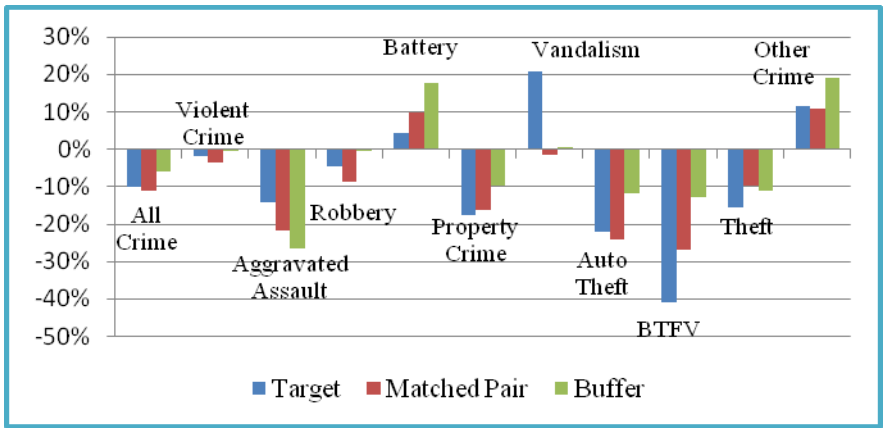
Crime Displacement Effects

We compared the before-and-after crime rates in buffer areas (i.e occurring between 500 and 1,000 feet of each camera) to the matched pair to test for the potential displacement of crime. In particular, we were interested in examining displacement of battery, burglary or theft from vehicle, and other thefts—the categories of crime where the target area experienced a relatively greater decrease (or smaller increase) in crime than the matched pair.

As seen in Figure 8, the evidence is mixed. The buffer area experienced a smaller decline in BTFV and a larger increase in battery when compared to the matched pair and the target area. This suggests that these types of crimes may have been displaced rather than deterred by CCTV. In addition, vandalism and other crimes increased relative to the matched pair, while robbery and

auto theft fell at a slower rate compared to the matched pair. Yet the buffer had a larger reduction in aggravated assaults and thefts than the Box. However, the statistical analysis revealed that none of these differences were significant. For additional information on the statistical significance of our findings, refer to Appendix C on p. 77.

Figure 8. Percentage Change in Hollywood Monthly Crime Rates Following CCTV



Pre-Post Arrest Analysis

The monthly arrest rate for minor violations rose by 7.6 percent in the target area after implementation of CCTV, an increase that was less than the rate in the Box (12.3 percent). Both the target area and the Box experienced the greatest increase in arrests for weapon possession; however the increase was greater in than Box (61.9 percent) than along Hollywood Boulevard (42.5 percent). In addition, both areas saw an increase in arrests for drunkenness and other misdemeanor crimes but the target area had a relatively larger increase in drunkenness (36.8 percent versus 14.28 percent in the Box) and the matched pair had a relatively larger increase in other arrests (25.6 percent versus 11.1 percent in the target area).

Table 12. Hollywood Monthly Arrest Rates

	Hollywood Blvd Target Area			Hollywood Box Matched Pair		
Arrest Group	**Pre**	**Post**	**% Change**	**Pre**	**Post**	**% Change**
All Arrests	**98.9**	**106.4**	**7.60%**	**261.5**	**293.6**	**12.30%**
Drunkenness	25	34.2	36.80%	57.9	66.1	14.28%
Liquor Laws	0.4	0.4	-11.60%	2.6	1.8	-30.25%
Narcotics	35.5	29.5	-16.90%	92.3	95.5	3.44%
Prostitution	0.2	0.2	-19.00%	11.8	7.4	-37.44%
Weapon Possession	0.8	1.1	42.50%	3.0	4.9	61.90%
Other	36.9	41	11.10%	94.0	118.0	25.59%

Similarly, both the target area and the Box saw reductions in prostitution and liquor infractions, but the Box experienced relatively larger declines in both categories. Further, narcotics arrests decreased by 16.9 percent in the target area, compared to a 3.4 increase in the matched pair.

Although the target area did not see a relative increase (or smaller decrease) in arrest rates for most categories as we would expect if CCTV effectively facilitated the police's detection of these crimes, none of the results were statistically significant at the 95 percent confidence level.

Jordan Downs Statistical Findings

In the 45 months prior to the implementation of CCTV in Jordan Downs, 535 suppressible crimes (crimes that occurred outside on the street or sidewalk) were reported in the Jordan Downs target area. Of these crimes, 54.0 percent were violent, 44.3 percent were property related, and the remaining 1.7 percent were classified as "other crimes," a category including shots fired, throwing objects at vehicles and brandishing a weapon. As shown in Table 13, among violent crimes, robbery (25.6 percent of all crimes) was the most prevalent, followed by aggravated assault (15.3 percent of all crimes) and battery (12.3 percent of all crimes). Among property crimes, burglary or theft from a vehicle (BTFV) (13.8 percent of all crimes) was the most prevalent, followed by car theft (12.7 percent of all crimes) and vandalism (12.7 percent of all crimes).

Table 13. Jordan Downs/Nickerson Gardens Avg. Monthly Crime Rates January 2003 to September 2006 (pre-implementation)

	Jordan Downs Target Area		Nickerson Gardens Control	
Crime Type	**% of Total**	**Avg per Month**	**% of Total**	**Avg per Month**
All Crimes	**100.00%**	**11.89**	**100.00%**	**22.93**
Violent	**54.02%**	**6.42**	**50.10%**	**11.49**
Homicide	0.75%	0.09	0.97%	0.22
Aggravated Assault	15.33%	1.82	14.15%	3.24
Robbery	25.61%	3.04	20.64%	4.73
Battery	12.34%	1.47	14.34%	3.29
Property	**44.30%**	**5.27**	**49.13%**	**11.27**
Vandalism	12.71%	1.51	15.79%	3.62
Car Theft	12.71%	1.51	13.66%	3.13
BTFV	13.83%	1.64	13.86%	3.18
Theft	5.05%	0.60	5.81%	1.33
Other Crimes	**1.68%**	**0.20**	**0.78%**	**0.18**

Nickerson Gardens, the control area for Jordan Downs, experienced 1,032 suppressible crimes in the pre-implementation observation period. Of these crimes, 50.1 percent were violent (a slightly lower percentage than in Jordan Downs), 49.1 percent were property-related (a slightly higher percentage than in Jordan Downs), and the remaining 0.8 percent were classified as "other

crimes." As shown in Table 13 above, Nickerson Gardens had similar proportions of crimes to Jordan Downs' within the broader violent-crime category. Once again, robbery (20.6 percent of all crimes) was the most prevalent type of crime; however, Nickerson Gardens had slightly more batteries (14.3 percent of all crimes) and slightly less aggravated assaults (14.2 percent of all crimes) than Jordan Downs. In both sites, homicides represented less than 1 percent of all crimes. Among property crimes, vandalism (15.8 percent of all crimes) was the most prevalent, followed by burglary or theft from a vehicle (13.9 percent of all crimes) car theft (13.7 percent of all crimes) and theft (5.8 percent of all crimes). While the rank order of crime frequency differs somewhat between Jordan Downs and Nickerson Gardens, the proportions are comparable (within 5 percentage points in all cases), indicating that Nickerson Gardens is a suitable control.

As in Hollywood, there are several quality-of-life violations such as drunkenness and narcotics that only appear in arrest records. In the 45-month pre-implementation period, there were 441 arrests of this nature in the target area. As shown on Table 14, the bulk of the arrests (67.8 percent) were for "other" misdemeanor violations, which includes arrests for Part II infractions that may not rise to the level of any other specific category; one third were for drug offenses; 5.7 percent were for weapon possession; and drunkenness and liquor laws each accounted for less than one percent of all arrests in the pre-implementation period.

Table 14. Jordan Downs Target and Control Arrests January 2003 to September 2006 (pre-implementation)

	Jordan Downs		Nickerson Gardens	
Arrest Group	**% of total**	**Avg per month**	**% of total**	**Avg per month**
Total Arrests	100.00%	9.80	100.00%	40.7
Drunkenness	1.36%	0.13	3.28%	1.3
Liquor Laws	0.45%	0.04	0.00%	0
Narcotics	33.33%	3.27	42.24%	17.2
Weapon Possession	5.67%	0.56	1.69%	0.7
Other	67.82%	5.80	52.79%	21.5

During the same period, there were 1,830 quality-of-life arrests in the Nickerson Gardens control area. The percentage breakdown of arrests by group resembles that of Jordan Downs, with the majority (52.8 percent) of the arrests falling into the "other" category and followed by narcotics (42.2 percent). There was a slightly higher percentage of arrests for drunkenness and a lower percentage of weapon arrests in Nickerson Gardens, but the differences were small. In sum, the crime and arrest profiles corroborate the LAPD's assertion that Nickerson Gardens represents an appropriate control for Jordan Downs.

Pre-Post Crime Analysis

As shown in Table 15 below, both the target and control sites experienced reductions in crime; however, crime decreased more in Nickerson Gardens (25.1 percent) than in Jordan Downs (10.6 percent). In Jordan Downs, the reduction in overall crime was due to a decline in the violent crime rate, which fell slightly more (20.2 percent) compared to the control (18.9 percent). Robbery, the violent crime most prevalent in both the target and the control in the pre-test period,

fell to a relatively larger degree in Jordan Downs (50.7 percent) than in Nickerson Gardens (20.8 percent). Yet, the aggravated assault and homicide rate declined more in Nickerson Gardens (49.9 percent and 43.8 percent, respectively) than in Jordan Downs (17.7 percent and 40.6 percent, respectively). Additionally, battery-related crimes grew faster in Jordan Downs (36.4 percent) than in Nickerson Gardens (15.9 percent).

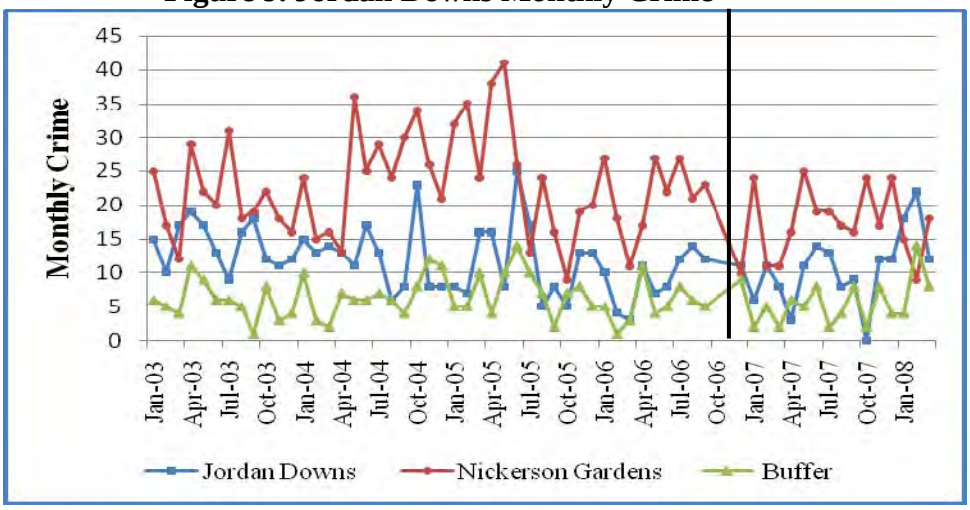
Table 15. Monthly Crime Rates in Jordan Downs and Nickerson Gardens

Crime Type	Jordan Downs Target Area			Nickerson Gardens Control		
	Pre	Post	% Change	Pre	Post	% Change
All Crime	**11.89**	**10.63**	**-10.63%**	**22.93**	**17.19**	**-25.05%**
All Violent Crime	**6.42**	**5.13**	**-20.20%**	**11.49**	**9.31**	**-18.94%**
Homicide	0.09	0.13	40.63%	0.22	0.13	-43.75%
Aggravated Assault	1.82	1.50	-17.68%	3.24	1.63	-49.91%
Robbery	3.04	1.50	-50.73%	4.73	3.75	-20.77%
Battery	1.47	2.00	36.36%	3.29	3.81	15.92%
All Property Crime	**5.27**	**5.38**	**2.06%**	**11.27**	**7.44**	**-33.99%**
Vandalism	1.51	1.25	-17.28%	3.62	2.81	-22.35%
Car Theft	1.51	1.44	-4.87%	3.13	2.69	-14.23%
BTFV	1.64	1.69	2.62%	3.18	1.19	-62.63%
Theft	0.60	1.00	66.67%	1.33	0.75	-43.75%
Other Crime	**0.20**	**0.13**	**-37.50%**	**0.18**	**0.44**	**146.09%**

The disparity between the crime rates in the target and control were most apparent for property crimes: Nickerson Gardens saw a relatively larger decline in every type of property crime compared to Jordan Downs. As a result, property crime was reduced substantially in Nickerson Gardens (34.0 percent), while it rose in the target area (2.1 percent). Although Jordan Downs did exhibit reductions in vandalism (17.3 percent) and car theft (4.9 percent), these gains were overshadowed by Nickerson Gardens' 22.4 percent decrease in vandalism and 14.2 percent decrease in theft. Moreover, theft and burglary-theft from vehicle (BTFV) increased in the target area (by 66.7 percent and 2.6 percent, respectively) while the control experienced a reduction in the same crimes (43.8 percent and 62.6 percent, respectively.)

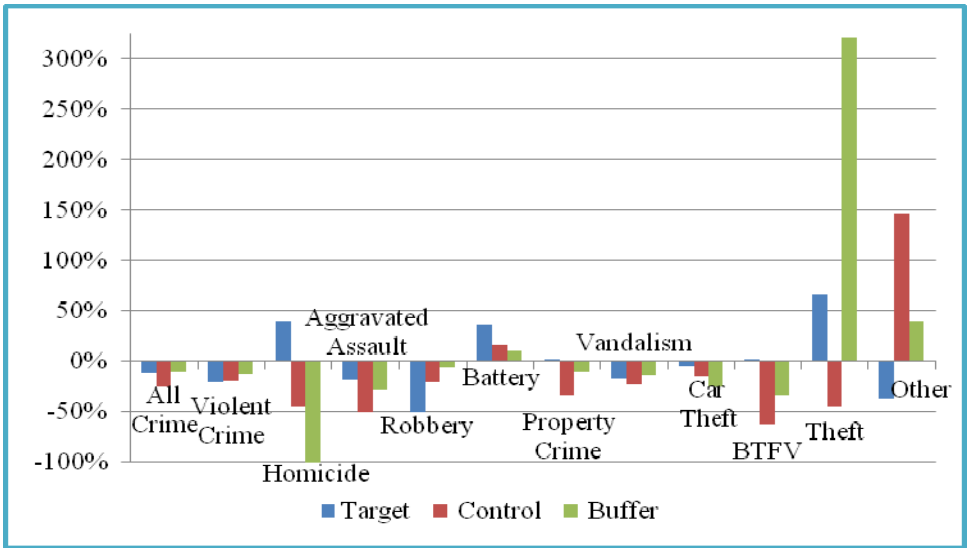
Although the disparities between the crime rates in the target and control areas from the pre- to post-implementation periods may seem considerable, they, too, failed to pass the relative effect size test for statistical significance. The high degree of variance in month-to-month crime (depicted in Figure 9) made it difficult to discern the extent to which any observed changes could be attributable to CCTV or other interventions versus random variability. The results of the relative effect size tests are detailed in Appendix C on p. 77.

Figure 9. Jordan Downs Monthly Crime



Crime Displacement Effects

Figure 10. Percentage Change in Crime in Jordan Downs Study



As in Hollywood, the evidence on the displacement of crime was inconclusive. There was some indication that certain types of crimes may have been displaced; as depicted in Figure 10, the buffer areas experienced a smaller decrease in the robbery rate (6.3 percent) than either the target area (50.7 percent) or the control area (20.7 percent). In addition, the rate of theft grew at a faster rate (321.9 percent) in the buffer areas than in Nickerson Gardens (43.8 percent) or the Jordan Downs target area (66.7 percent). However, several types of crime decreased faster or grew more slowly in the buffer areas than in the control, including homicide, battery and car theft. None of the results were statistically significant.

Pre-Post Arrest Analysis

Arrest rates for all categories, with the exception of weapon possession, increased relatively more in the target area than in the control. As shown on Table 16, all arrests rose by 86.2 percent in Jordan Downs compared to only a 14.2 percent increase in Nickerson Gardens. In particular, the arrest rate in Jordan Downs for drunkenness, liquor law violations, narcotics and other arrests outpaced those same arrest categories in Nickerson Gardens. Despite these ostensibly substantial increases in arrests in the target area compared to Nickerson Gardens, the results were not significant. (This may be due to the relatively low incidence of arrests and high degree of

monthly variance in these areas.) For further information on the results of the relative effect size test, refer to Appendix C on p. 77.

Table 16. Jordan Downs Monthly Arrest Rates

	Jordan Downs Target			Nickerson Gardens Control		
Arrest Group	**Pre**	**Post**	**% Change**	**Pre**	**Post**	**% Change**
All Arrests	**9.8**	**18.25**	**86.2%**	**40.7**	**46.4**	**14.2%**
Drunkenness	0.1	1.0	650.0%	1.3	2.5	87.5%
Liquor Laws	0.04	0.3	603.1%	0	0	0.00%
Narcotics	3.3	6.1	87.5%	17.2	23.1	34.6%
Weapon Possession	0.6	0.2	-66.3%	0.7	0.4	-36.5%
Other	5.8	10.6	83.2%	21.5	20.4	-5.1%

Discussion of Findings

In sum, we had hypothesized that crime rates would decrease at a faster rate in our target areas than in the controls. In addition, we expected that CCTV would lead to an increase in detection of misdemeanor offenses, a fact manifested in higher arrest rates. The data did not support these hypotheses. However, the lack of statistically significant results should not be taken as conclusive evidence that the cameras had no effect on crime. There are several factors that may confound our analysis or offer important alternative explanations, including limitations in the data, disparities between the target and the comparison areas, the impulsive nature of certain crimes, CCTV's potential to enhance the detection of crimes, LAPD capacity constraints and the scope of our analysis.

Data Limitations

Errors or ambiguities in the original crime and arrest reports may have affected our analysis. As the head of LAPD's COMPSTAT Unit explained "the data that we examine is only as good as what is written up in a crime report" (Interview, Godown, February 28, 2008). For example, due to missing or inaccurate addresses, approximately 2 percent of the crime and arrest records could not be mapped in the geographical information system (GIS) software used in our analysis. In addition, ambiguities in the premise codes used to identify crimes that occurred outside likely led to Type I (false positive) and Type II (false negative) errors. There are several different codes that could potentially be used to describe the location of any one crime, based on the subjective judgment of the reporting officer. For example, a robbery that occurred on the sidewalk in front of a gym may have been coded as occurring outside on the sidewalk, or coded as at a gym. If the premise code was listed as "sidewalk" it would be included in our analysis; however, if it had been listed as "gym" then it would have been excluded. It is difficult to determine the extent to which these ambiguities and errors in the data affected the analysis.

Disparities between the Target and Control

There may be inherent differences between the target areas (Hollywood Boulevard and Jordan Downs) and the matched pair (Hollywood Box) or control (Nickerson Gardens) that confounded our findings.

Hollywood Boulevard is distinct from the surrounding areas that comprise the Box as it serves as *the hub* of activity in the area. Its growth in recent years by comparison to other areas in the Box, including considerably more foot traffic, more tourists and, therefore, more targets and criminals, may have masked the cameras' deterrent effects. For example, increased patronage of Hollywood Boulevard's bars and nightclubs, which has anecdotally increased 50 to 60 percent over the past five years, may have artificially led to the absence of a statistically significant reduction in crime (Interview, Farrell, March 27, 2008).[27] According to Clay Farrell, Captain of the Hollywood Area Community Police Station, "As people's inhibitions are eased by alcohol, their chance of getting into trouble, either by committing a crime or becoming the victim of a crime, increases" (ibid). It is reasonable to posit that many of the crimes that occurred in the target area began in area nightclubs and spilled onto Hollywood Boulevard.

In addition, the Hollywood Entertainment District Property Owners Alliance (HEDPOA), which purchased the cameras for the area Business Improvement District, also employs private security to patrol Hollywood Boulevard for quality-of-life and property-related offenses.[28] It is possible that policy changes on the part of the private security company — and not the LAPD — are responsible for the increase in detection of and arrest rates for misdemeanor crimes in the target area.[29] Although HEDPOA could not provide historical data on the activities of their private security, they reported that 1,492 individuals were arrested and brought to police custody in 2007 (Email correspondence, Morrison, April 21, 2008). Therefore, the observed 20.8 percent increase in vandalism may also be due to increased detection and reporting by private security officers.[30]

Similarly, disparities in the level of gang activity and hostility in Jordan Downs and Nickerson Gardens may have confounded the analysis. Both Sgt. Graham of the Southeast Station and various stories in the media (LAPD Online 2008) indicate that during the study period a gang war was under way, and that Jordan Downs' Grape Street Crips were at the center of the controversy. This war had been going on since 2005, beginning with a loose agreement between the PJ Crips and the Bounty Hunter Bloods (of Nickerson Gardens) to band together for an attack on the Grape Street Crips (*LA Weekly* 2007). Since Jordan Downs' resident gang experienced an

[27] Today, there are approximately 180 alcohol beverage-control (ABC) sites at or near Hollywood Boulevard with a total nightclub capacity of more than 30,000 persons (Interview, Farrell, March 27, 2008).
[28] The Hollywood Entertainment District's initial purchase is discussed further in "Funding and Public-Private Partnerships" p. 47.
[29] In fact, the Hollywood Entertainment Property Owners Alliance, which manages the Hollywood Entertainment District, hired a new security patrol, Andrews Security, in November of 2006.
[30] However, HEDPOA told researchers that the private patrol primarily reported incidents of gang-related graffiti to the police, while other types of graffiti are cleaned up by another company contracted by HEDPOA. Therefore, it may be the case that vandalism is relatively under-reported in the target area, in which case, the incidence of vandalism may have actually increased by more than the reported 20 percent.

escalation in tensions with *two* rival gangs, we may expect that crime in Jordan Downs would increase or decrease to a lesser degree relative to Nickerson Gardens. Therefore, the fact that there were no statistically significant differences in crime between Jordan Downs and Nickerson Gardens may actually indicate that the cameras did deter some crime.

Another disparity between Jordan Downs and Nickerson Gardens that may have confounded our results is the faster pace at which Jordan Downs has changed demographically. Police interviews indicate that as the demographic balance between African American and Latino inhabitants within housing developments shift from majority African American to majority Latino, tensions between rival gangs living side-by-side in the complex may flare. U.S. Census data from 2000 shows Jordan Downs at 60.7 percent African American and 33 percent Latino; however, data from the Housing Authority of the City of Los Angeles (HACLA), shows that by 2007, 63.4 percent of tenants were Latino and 35.9 percent of tenants were African American. By comparison, Nickerson Gardens' 2000 demographic breakdown of 47 percent African American and 40 percent Latino changed to 55.2 percent Latino and 44 percent African American by 2007, a substantially smaller shift in the balance between demographic groups and, therefore, relatively less opportunity for racial tension and possibly crime.

Moreover, in both locations high crime rates served as the impetus for deploying the cameras, which may indicate a certain degree of self-selection bias. It could be that the designated control and matched pair areas did not receive CCTV because crime was not as much of a concern as in the target areas.

Nature of Crimes

Our findings that CCTV surveillance in Hollywood, a hotbed of bars and nightclubs, has had little effect on crime is consistent with Gill and Spriggs' (et al. 2005) finding that "[t]hose offences that are often considered impulsive and influenced by alcohol, for example public order and violence against the person (VAP), were seen to increase in number more in the target areas than in their respective control areas."[31] In Hollywood, the introduction of alcohol may not only serve as a catalyst for certain types of impulsive crimes, such as battery, to occur, but may also have reduced the chances that the criminals are cognizant that cameras are in the area. "There is a degree of subjectivity to the cameras' deterrent effects; individuals that may otherwise notice the cameras when they are sober may not if they have been drinking" (Interview, Farrell, March 27, 2008).

Similarly, because of the entrenched gang rivalries in Jordan Downs, the cycles of violent retaliatory attacks might be either unaffected by the presence of video surveillance or, possibly, positively influenced as participants often seek recognition for their crimes (Heilbrun et al. 1978) — including prison time, which becomes a mark of distinction for them (Nisperos 2008).

[31] Criminologists suggest that the prevalence of violent crime, such as homicide, aggravated assault and battery, among minority groups subject to prejudice is driven by frustration with deprivation, which results in the adoption of values that include "quick resort to physical aggression as a sign of daring, courage or defense of status" (Heilbrun et al.1978). This can lead perpetrators to act impulsively, without adequately weighing the risk of being caught — by CCTV or any other crime prevention strategy — or the consequences of their actions.

Authorities in Los Angeles have acknowledged that gangs are a social phenomenon that cannot be deterred by the threat of arrest and incarceration.[32]

Capacity Constraints

The resource constraints faced by the LAPD may be preventing the CCTV system from fulfilling its potential as a crime mitigation and deterrence tool. Captain Farrell explained, "There is a constant tug-of-war between resources. Do we put another cop on the street or get another camera in place?" (Interview, Farrell March 27, 2008). Farrell further explained that even when criminal activity is detected on the CCTV system, it is not always possible to mobilize units quickly enough to respond if there are other, higher priority calls for service. Moreover, in Hollywood, the cameras are not routinely monitored during the day, and when they are monitored, there is generally one officer monitoring footage from 14 cameras; therefore, it is likely that there are criminals who have had the experience of "getting away" with crime in the monitored areas and may no longer feel deterred by the cameras.

In Jordan Downs, only six of the nine cameras donated by Motorola are in place.[33] The resource commitment required to properly monitor the cameras already in place, coupled with technical difficulties such as not having sufficient bandwidth to accommodate the amount of data currently flowing from Southeast's cameras to the recording station in City Hall East, currently inhibit the potential utility of the last three cameras even if they were in place (Interview, Graham, March 26, 2008).

Increased Detection, Mitigation, and Resolution of Crime

Finally, we assumed that CCTV would act as a deterrent for property and violent crime and serve as a detection and mitigation tool in minor quality-of-life infractions that are not generally reported; however, it may be the case that CCTV also deters some misdemeanors like prostitution and narcotics-related offenses, and detects some violent crimes, such as aggravated assault or battery, that would have otherwise gone unreported. These two CCTV functions produce opposing influence on crime rates, and it is difficult to discern the degree to which any observed changes reflect deterrence or detection.

Moreover, by just looking at the effect of CCTV on crime rates, we do not capture the effect CCTV has on solving crime or prosecuting criminals. For example, a gang-related homicide in the vicinity of Jordan Downs was solved using footage collected by the video surveillance system. However, because the LAPD does not routinely track when CCTV is used to intervene in crimes in progress, solve crimes and prosecute criminals, it is difficult to determine CCTV's full impact. We expand upon this discussion further in "Conclusions for Policymakers" (p. 53).

[32] Jeff Carr, the Los Angeles deputy mayor for gang reduction and youth development, explains, "What we've really had in the past is a mass incarceration strategy. We've locked a lot of people up, and we still have this epidemic problem" (Mozingo 2008).
[33] For more on the Motorola donation, *see* "Funding and Public-Private Partnerships" (p. 47).

IMPLEMENTATION AND EFFECTIVENESS

We now turn to a discussion of implementation strategy for CCTV use. Through semi-structured interviews with LAPD personnel and community leaders, as well as document analysis and participant observations in each area, we isolated several challenges to the adoption of CCTV that lawmakers considering such systems will need to address. These factors are outlined in Table 17, below.

Table 17. Implementation Successes and Challenges

	Successes	Challenges
Funding	Private funding and federal grants offered alternatives to spending public monies.	Legacy systems and maintenance contracts may limit future interoperability and expansion.
Crime Prevention Strategy	CCTV can be an effective crime-prevention and deterrence tool when added to a cohesive suite of other policing strategies targeted to a specific area.	Even if CCTV were successful in reducing crime in our test areas, disaggregating its contribution would prove difficult.
Camera Placement	Cameras were strategically placed with community support in high-crime clusters to maximize their impact.	Impediments to placing cameras in strategic locations included technical issues and working with local property owners.
Technology	High-quality cameras with fast frame rates, high resolution and remote movement capabilities were installed. Control room software enabled easier monitoring of all cameras' output in Jordan Downs.	Additional resources may be needed to fully implement CCTV systems. The configuration of control room monitors may present challenges to operators in Hollywood.
Operation	Systems in both test areas were actively monitored in an effort to mitigate crime as it occurred. A specially trained subunit operated in Jordan Downs.	Neither location actively monitored CCTV 24 hours a day. Specialized training was not apparent in Hollywood.
Privacy and Community Involvement	Early buy-in of community members initially allayed concerns regarding the protection of individual privacy. LAPD has guidelines on use and storage of camera data.	Transience in the community has eroded some support for the cameras in Jordan Downs. The specter of private security officers' gaining access to cameras in Hollywood may raise new privacy concerns.

Successfully addressing these implementation issues not only facilitates the initial deployment of CCTV but can ultimately impact the system's effectiveness in deterring crime, based on findings in previous studies. For each factor, we compare and contrast systems in both locations to inform policymakers and law enforcement on the qualitative differences that may impact CCTV's effectiveness. We summarize these issues and our statistical findings with some takeaways for policymakers considering CCTV.

Funding and Public Private Partnerships

One feature worthy of exploration is the intrepid use of public-private partnerships to procure video surveillance systems throughout Los Angeles. The City's use of private donations for CCTV hardware, installation and some maintenance costs marks a notable contrast to the 68 camera-system in San Francisco that has cost taxpayers nearly $900,000 (Bulwa 2008). Camera systems in Jordan Downs and Hollywood, as well as cameras in Downtown's Santee Alley and MacArthur Park, have relied on donations from technology companies, business associations and, in one case, the movie industry. The financial incentive for these partnerships is substantial: A 1999 RAND survey found that 69 percent of local law enforcement agencies cited cost as a major barrier to purchasing CCTV systems (Schwabe et al. 2001). Such partnerships allow a city to create pilot projects and seek community support with a minimal amount of city resources.

Below we discuss the differences between the funding relationships at both sites and risks, such as legacy and maintenance issues and the need for additional public resources. Despite these issues, private funding of video surveillance seems to be gaining a firm foothold in police departments statewide. Video surveillance is viewed by law enforcement as a potential "force-" or "capability multiplier," a tool that makes existing law-enforcement personnel more efficient and productive. The fact that initial costs and maintenance contracts can be satisfied without a large investment of public funds is seen as a boon to both local government and law enforcement agencies. And, because camera technology advances quickly and prices are always coming down, many, including the LAPD, believe funding to take care of these problems will not pose a serious impediment to CCTV expansion.

Hollywood

Hardware, installation and initial maintenance for Hollywood Boulevard's first five cameras were made possible by a $103,000 donation from the Hollywood Entertainment District (HED), the local business improvement district (BID), which is managed by the Hollywood Property Owners Alliance (HEDPOA).[34] Three additional cameras and a one-year service contract were purchased by LAPD in June of 2006 for $100,000; money donated again by the BID. According to HEDPOA, after observing the apparent successes of the cameras on Hollywood Boulevard, surrounding business improvement districts located in the area donated additional cameras to the LAPD (Interview, Morrison, April 14, 2008). Presently 14 cameras are operated from the

[34] While HED is technically managed by a non-profit 501c6 organization, HPOA's board of directors largely comprises private property owners. Thus, we deem the donation of cameras as "private" donations.

Hollywood Community Police Station, most of which were purchased with non-city funds;[35] and the *Los Angeles Times* reports that the Hollywood area plans to deploy a total of 64 cameras throughout the area in coming years (Garrison 2004).

Jordan Downs

Jordan Downs' system was also purchased, in part, through private dollars. Motorola donated $1.2 million for start-up costs and a $600,000 grant from the U.S. Department of Justice (Interview, Gomez, March 17, 2008). Motorola hopes to market its Motomesh technology to other cities, as well as to "scale up" its technology to other areas in Los Angeles. In fact, Nickerson Gardens, our control area, is purportedly the next project in line to receive video surveillance, which may be again provided by Motorola (Interview, Graham, March 26, 2008), given the strength of the company's relationship with LAPD and the South Bureau.

Types of Partnerships

A distinction should be drawn between donations by technological sponsors like Motorola (Jordan Downs) and General Electric (MacArthur Park) and broader community and business partnerships (Hollywood and Santee Alley). These latter partnerships may provide more flexibility for the LAPD to choose which cameras and vendors to use. For example, HEDPOA was responsible for finding a video surveillance vendor, in collaboration with the LAPD for the BID. To this end, HEDPOA hired an FBI consultant to write and issue a request for proposal (RFP) and to vet potential vendors. While an appropriate vendor was eventually settled upon, HEDPOA said it also had to receive "buy in" from both HED property owners and the LAPD; a task that could prove difficult and time-consuming without a strong collaborative partnership between relevant stakeholders (Interview, MacPherson, April 14, 2008).

Legacy Issues and Maintenance

These unique partnerships and donations provide a good model for cash-strapped local governments and resource-constrained police departments, but local government may become locked into older or inadequate technologies that may make interoperability, maintenance and expansion more costly and difficult. For instance, the City had problems getting some of the cameras installed in MacArthur Park in 2003, paid for by a donation from General Electric, replaced — an issue that was raised by the Los Angeles City Council in the early part of 2008.[36] *The Los Angeles Times* reported "glitches with equipment that records and stores video images" and revealed that "data storage lasts only 12 hours before it is recorded over" (Blankenstein, et al. 2008). According to Sergeant Daniel Gomez, South Bureau Tactical Technology Unit, no

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35 According to the *L.A. Times*, "Garcetti has pushed for cameras in his district, which runs from Hollywood east to Echo Park and north to Glassell Park. He recently obtained a $180,000 grant to install 14 cameras in areas around parks there" (Garrison 2004).

36 Councilman Ed Reyes, whose district contains MacArthur Park, asked the Los Angeles City Council for $150,000 to add six security cameras to replace some of the cameras and add new cameras near the park. However, the *Los Angeles Times* story about the maintenance issues forced Reyes to include an "accountability provision" to his motion that would report back issues regarding equipment. To the contrary, Sgt. Gomez told researchers that most problem cameras he was aware of had been adequately handled by GE within 72 hours of reporting them.

financial plan for replacing cameras, outside the normal maintenance provided by the manufacturer, exists. Should a complete system overhaul become necessary at some point, a new funding agreement will be required, either with GE or another company.

In addition, difficulties in negotiating new maintenance contracts may arise between private and public stakeholders as CCTV systems expand. For example, the original maintenance contract with LAPD's current vendor in Hollywood, MetroVideo, has expired. All of the cameras are functioning properly, but if technical problems do arise, clients with maintenance contracts are prioritized over those without such contracts. The LAPD indicated that part of the difficulty in negotiating a new maintenance contract is deciding who will pay for it: The 14 cameras now span several business improvement districts and two Los Angeles City Council offices.[37]

Additional Public Resources

Similarly, a technologically advanced CCTV system like that in Jordan Downs requires additional public dollars to integrate into existing LAPD technology. For example, Motorola's Motomesh system, when fully installed, would allow LAPD officers to access camera footage in their cars while within the Jordan Downs area, but the amount of bandwidth currently available, while substantial, is not sufficient to permit this. Funding for upgrading the wireless network has only recently been budgeted by the City. The currently available bandwidth is provided by optical fiber that was laid in the area with funding from a grant for disadvantaged communities before the video-surveillance project was conceived of, an example of seemingly unrelated programs assisting each other. As adept as law enforcement might become in securing funding for hardware and support, the efforts and expertise of other city departments are also required for the smooth functioning of different aspects of a video surveillance program.

Finding funding partnerships, applying for grants, or deciding on vendors for innovative projects like video surveillance is a somewhat specialized skillset in the LAPD. A core group of officers in the LAPD, led by Sgt. Gomez, have learned "on the job" how to apply for federal grants and to negotiate with private donors. These officers stressed that one must be "opportunistic" in seeking funders for new projects. The generosity of corporate and business alliances to local government is certainly not something local government can or should ignore, but such an approach should be thought through strategically. As the City expands its deployment of CCTV cameras, it should consider closely evaluating area technologies and "scaling up" accordingly.

Simultaneous Crime Reduction Strategies

Simultaneous crime-reduction programs that paralleled CCTV deployment, a factor identified in our meta-analysis as influential in CCTV effectiveness, were present in both Hollywood and Jordan Downs. Even though neither of the camera systems in our study locations was individually directly related to a statistically significant reduction in crime, overall crime rates in our test and control locations did fall between 10 and 25 percent, attesting to the importance of these suites of strategies that can include everything from staggering closing times for nightclubs to mobilizing a community to watch out for its children on their way to school. These ongoing

[37] The HED paid $25,000 for the initial maintenance contract with MetroVideo for the first five cameras deployed to Hollywood Boulevard.

programs stress the importance of cameras as one tactical element, rather than a stand-alone crime-reduction strategy.

Surveillance Coverage Area and Camera Placement

Another factor that emerged as influential in determining the effectiveness of CCTV in our review of previous evaluations was the extent of surveillance coverage in an area. While we do not have the technical expertise to properly evaluate the effective placement of cameras in either location, how the LAPD deployed these cameras, and the problems they encountered, deserves some exposition.

Hollywood

In Hollywood, the five cameras located along Hollywood Boulevard's Walk of Fame surveil a roughly one-mile area that suffers from the highest overall crime rate in all of Los Angeles.[38] The captain of the Hollywood Division Police Station, Clay Farrell, indicated that 25-30 percent of all crime in the Hollywood Area occurs along Hollywood Boulevard; in 2007, for instance, he said that 21 percent of Part I crime occurred within the "Box."

According to HEDPOA, the Business Improvement District (BID) consulted with the LAPD to determine where crime clusters were occurring in the area before deciding on camera placement. Assistant Executive Director MacPherson: "You have to kind of find the ideal locations and then work backwards. You don't want to cluster too many cameras together but do want a continuous-type surveillance system" (Interview, MacPherson**,** April 14, 2008)**.** One issue was that some "ideal locations" were owned by absentee owners who weren't available or weren't interested in having the cameras on their building. Another problem was finding a building to harbor the camera which would offer a full panoramic view of the area. One factor that facilitated placement was that the Department of Transportation had already built poles to monitor traffic flow in heavily condensed areas. Another implementation challenge was getting power to the cameras and from what source. Finally, because the imagery is sent over a wireless signal, if the cameras were not in a clear line of site of the Hollywood Area Police Station, where the cameras are monitored, they had to set up "repeaters" to bounce the signal in the right direction. "I remember standing on some area rooftops while we were trying to determine just where to put the cameras (ibid)."

Jordan Downs

In Jordan Downs the six cameras currently cover approximately one square mile around the housing complex. Cameras placed on 103rd Street cameras were erected in large measure to monitor and protect children en route to and from school; other locations were chosen for maximum coverage of high traffic areas. Another concern was covering routes of ingress and egress to and from the complex in order to potentially capture images of rival gang members entering or leaving the area. Sgt. Gomez said that once the LAPD and community had agreed on

[38] According to Jane Faerber, a management analyst in the Hollywood Community Police Station's Crime Analyst Division (CAD), one of the reporting districts that runs along Hollywood Boulevard (RD645) has the most Part I crimes in the City (Interview, Jane Faerber, April 8, 2008).

the locations, installation was relatively easy, but that some poles to which the cameras could be attached were not present in each of the chosen locations. But, according to Gomez "dropping in poles is cheap" (Interview, March 17, 2008).

Technology and Monitoring

Our review of news reports indicated that many of the purported problems with cameras installed throughout San Francisco were attributed to those cameras' low-quality resolution and slow frame rate, in addition to the inability of police to "actively monitor" locations remotely. By most measures, cameras in both Jordan Downs and Hollywood are relatively "high-tech" with perhaps a slightly more advanced system in place in Jordan Downs (see Appendix D on p. 90 for specifications).

Camera Technology

Both camera systems in our test locations produce high-resolution, high-quality video footage. All cameras are remotely operable via pan, tilt and zoom features, and are supported by enough data-transmission bandwidth to allow for the manipulation of, and uninterrupted recording from, several cameras at once over an encrypted wireless signal. The cameras record at 25 frames per second in Jordan Downs and 30 frames per second in Hollywood — approximately equivalent to a video camera and significantly faster than the 2-to-4 frames per second of the San Francisco system.

Head End Monitoring Systems

The observation systems that serve as the "head ends" where the cameras are monitored by law enforcement differ substantially at the two sites. The observation system in the Southeast Police Station, where Jordan Downs cameras are monitored, is software-based, whereas Hollywood's observation system is hardware-based. This means that images being sent from Jordan Downs to Southeast appear as video windows next to each other on a single computer monitor; such a system allows for more viewing capacity than a hardware-based system. For example, officers monitoring the cameras in Hollywood must view a stacked set of 14 video monitors, a difficult task for even the most observant and experienced LAPD officer.

Moreover, the software-based system allows for multiple networked screens, including a large, flatscreen TV viewable from anywhere in the monitoring office. Controls for manipulating the cameras in Jordan Downs appear in each small, video window and images can be blown up to full screen with two clicks of the mouse. Officers in Hollywood's rather small monitoring office, by contrast, must manipulate one camera at a time with a single joystick. Some studies have indicated the difficulty in monitoring multiple video screens simultaneously by a single individual (Gill et al. 2005). These factors, compounded by the constant foot traffic in the Hollywood area and the limitations of a single controller watching multiple video screens at once, may be a vital operational deficiency in the Hollywood system, particularly for the immediate intervention of crimes as they occur.

Future Implementation

The LAPD's goal is to fully install the Motorola Motomesh system in Jordan Downs, which would allow officers to view surveillance video from the cameras in their cars. The system will provide free Wi-Fi to the residents of the complex while withholding one secure channel for LAPD activities. On this channel, officers would be able to watch video from any or all the cameras active in the area while in their cars. Additionally, the cars themselves would act as hotspot nodes, intensifying the mesh signals as they traveled in the area. Realization of the full capacity of the system requires that all nine of the planned cameras be installed. (The seventh camera's future location is currently being planned.) As mentioned elsewhere, such implementation depends on the expenditure of more City resources to supplement bandwidth for transmission. There is no guarantee, however, that a fully implemented system would have a discernible effect on crime rates and it may impose more intrusively on residents, intensifying a feeling of being "in prison" in their own community (Email correspondence, Tamika Taylor, May 1, 2008).

Operations, Training and Turnover

How cameras are monitored, including positioning and staffing, differed substantially at our test sites. While neither test location showed any significant results in crime reduction, interviews revealed different successes and challenges in this regard for each location.

Camera Configurations

Camera configuration while not being controlled manually emerged as a relevant operational issue. Hollywood's cameras are currently monitored 10-12 hours a day, 90 percent of the time at night, according to Captain Farrell (Interview, Farrell, March 27, 2008).[39] In Jordan Downs, cameras are actively monitored during times of the day and/or night when criminal activity is expected to be high and are always viewed during school hours. Area police in Southeast said that the specific times of monitoring are determined by reviewing COMPSTAT data on a daily basis, followed by discussion amongst officers as to the situation "on the ground."

Cameras in Hollywood roam when not controlled manually, moving quickly in multiple directions rather than focusing on a particular area. Therefore, one might surmise that reviewing footage after a crime to extrapolate clues or identify license plates may be more difficult here than where a camera is fixed on a single site**.** For instance, one recent homicide in Jordan Downs was essentially "solved" thanks to the cameras fixating in a single direction from which police anticipated a perpetrator might approach the area.

Leadership, Training and Turnover

Turnover of staff in police departments is anecdotally reported to negatively affect the ability of CCTV surveillance to function as an efficient crime-fighting tool by bleeding away the

[39] As discussed on page 53, in "Privacy Considerations and Community Involvement," the LAPD is also considering working with HPOA to install a single monitor that an operator at Andrews Security headquarters can "scroll through" to observe the cameras, but such a proposition is still in preliminary stages.

institutional memory necessary to fully utilize the technology. Some studies (Carley 1992) reveal that hierarchical and team structures excel at maintaining different types of institutional memory and in implementing different types of projects. The functioning of small teams, or units, within the LAPD, an organization with an overarching hierarchical structure, sets the stage for the organization to suffer from both the disadvantages of hierarchical and team structures with regard to personnel turnover.

The team structure is necessary, however, for a pilot project like that in Jordan Downs to initialize. Teams learn complex systems faster and are more flexible with new material, while hierarchies tend to be slow and distort information through simplification as it moves up the chain of command.[40] Indeed, "implement[ing] a proposed change often requires ... creating a specialized subunit that will take on the tasks" (Wilson, p. 231). Teams are very susceptible to fragmentation when they experience turnover, however, and the mission of the team can then be lost within the greater hierarchy.

The approach of Hollywood Station personnel toward the surveillance system exhibits some of these characteristics. The initial team, led by Captain Michael Downing, present at the time CCTV surveillance was brought into the station no longer functions there. Currently, only a few officers at the station have much knowledge of why and exactly when the cameras were erected in the locations they were. (Instead, researchers were referred to the HEDPOA for many of the details used in this analysis.) It is also unclear if any specialized training is currently given to camera operators in Hollywood. Although no statistically significant results were realized in either location, the system in Southeast Station has greater potential for utility as a capability multiplier due to a tight-knit team with special training that runs the video unit. Should the team there experience a loss of personnel and expertise, however, that advantage might be lost to the station, the private partner and the community.

Privacy Considerations and Community Involvement

The tension between potential privacy infringement and efficacy was discussed in some detail in Privacy, Efficacy and Public Opinion (p. 10), but how privacy protections are managed at the local level is an important consideration for policymakers implementing CCTV. In addition, the extent of community involvement and discussion of matters such as privacy, as well as managing expectations of program effectiveness, are also important for policymakers to consider.

Station Practices

According to LAPD Sgt. Gomez, "each police station has a policy that governs the use and policy of the camera systems," since the first cameras were installed at MacArthur Park in 2004 (Email correspondence, Gomez, April 14, 2008). Gomez also stated that each division captain is responsible for the proper maintenance of records, and random audits of captured video archives

[40] The team structure accompanied by specialized training in the gathering and utilization of video evidence has served the officers in the video unit at Southeast Station well, allowing them to learn from each other as they discuss and compare observations (Interview, Graham, March 26, 2008). The special training these officers have received does not preclude their taking part in other types of police work, but other officers are not able to step into their roles, should they be absent (Interview, Gomez, March 13, 2008).

ensure that the data is being used and stored properly. Recorded video that is kept as evidence of a crime is booked into the Property Division, where police and personnel from the Los Angeles City Attorney can obtain access based on need. The LAPD's Discovery Section handles all other requests. (*Note*: The Los Angeles City Attorney's office was contacted but did not respond to our request for information).

Access to camera footage is always available upon request to the district attorney's office. Officers reviewing footage will mark any that can potentially be used as evidence in solving a crime as evidentiary and put it aside. All other footage is available to the public through the same channels they would use to obtain a police report (Interview, Hernandez, May 1, 2008).

Protecting Privacy Rights

Jordan Downs. The issue of protecting privacy rights did not appear of primary concern to the people we interviewed; a somewhat unexpected finding given their location in a residential setting where the potential for misuse may be high. (For example, pointing powerful cameras into the windows of unknowing citizens in their apartments.) However, some residents have a general feeling of being imprisoned, knowing that their movements could be captured and viewed by remote observers when inhabitants of other parts of the city can move about unobserved. According to Tamika Taylor of the Los Angeles Commission of Children, Youth and Their Families: "It seems more like a liberty issue" than a privacy issue to them (Email correspondence, May 1, 2008).

Potential privacy concerns may have been reduced initially by the early involvement of community members. Before installation commenced in Jordan Downs, LAPD officers participated in a year-long series of meetings to discuss with community members why the cameras were being considered for their area, what the LAPD hoped to achieve with the cameras, and what outcomes could reasonably be expected. The video-surveillance program also became a "catalyst" for open and frank discussion between the police and the community as to what was needed to improve surroundings in the area, according to the LAPD.

Congruent anecdotal evidence from the LAPD and community leaders reveals that some community support for the cameras has eroded since the program began. Sgt. Graham noted that the attitudes expressed toward the cameras in community meetings are more negative now than when the cameras were first installed. Many of the faces at the meetings have changed, and he believes that misinformation about what the cameras can and cannot do, and how they were paid for, is the basis of some discontent (Interview, Graham, March 26, 2008). Community activists, Pastor Mike Cummings of We Care Outreach Ministries and Tamika Taylor, Community Program Assistant**,** at the Los Angeles Commission of Children, Youth and Their Families agreed, as some residents now resent that scarce resources appear to be consumed by the CCTV system without meaningful results (Interview, Taylor, April 4, 2008; Interview, Cummings, April 5, 2008).

Hollywood. In Hollywood, too, the issue of privacy was reportedly less of a concern among community members than was expected. HEDPOA's Security Committee conducted outreach to inform property owners and other community members about when the cameras would be

installed, how the cameras would be used, and in what manner the LAPD would use them. According to HEDPOA, there has not been much opposition in the Hollywood area from the community (ibid). “There were some initial concerns [about privacy] … but we don’t really receive any phone calls complaining about [the cameras]” (MacPherson, Interview, April 14, 2008). From MacPherson’s observation, “the benefits seem to outweigh the privacy costs to most community members in the effected areas” (ibid).

The apparent lack of opposition to cameras on Hollywood Boulevard along privacy grounds may be due to the Boulevard’s “public” nature — there are few hours of the day when the Boulevard is not heavily covered by pedestrian foot traffic — but also because of residents’ experience with CCTV in the past. Yucca Street, a highly active residential area just north of Hollywood Boulevard, was one of the first areas in the country to use video monitoring to target criminal activity during the 1990s. At the time, landlords placed cameras on buildings and submitted footage of “suspected drug activity” to area police (Garrison 2004). The Yucca Street cameras were removed in 1999, but new cameras were installed once again, during the second deployment of cameras to Hollywood in 2006.

Moreover, 20 to 30 signs are spread throughout the Hollywood Area warning passersby that “Video Monitoring in Progress For Your Safety.” The signs are one aspect of the area privacy guidance that serves not only as a public notice, but also as a potential deterrent to would-be criminals.

According to an excerpt of a Hollywood area order, “The Los Angeles Police Department and Hollywood Area are sensitive to individual citizen's constitutional rights and expectations of privacy” (Los Angeles Police Department, 2004). In addition to the required signage, the “CCTV system monitors only public areas where courts and case law have held there is no reasonable expectation of privacy” (ibid).[41]

The possibility of granting access to LAPD monitors by HEDPOA’s private security detail — Andrews Security — does raise some additional concerns regarding privacy. The City Attorney’s office was present for all the security meetings to help advise HEDPOA and the LAPD about privacy, and wrote an indemnification agreement severing responsibility from HEDPOA for use of the cameras. However, both the LAPD and Andrews would like to give the responsibility for camera monitoring along the Boulevard to Andrews, arguing that such capability may enhance Andrews ability to better detect and reduce crime in the area. Yet, HEDPOA suggests that liability issues, among other policy considerations, may derail the effort before it is ever placed in front of HEDPOA’s Security Committee. It may also raise eyebrows among civil liberties groups: CCTV of public space by an organization unaccountable to the public seems a prime target for legal action.

[41] The Hollywood area also has some guidance regarding the storage of video equipment. Digital video must be maintained by the Hollywood Area for a minimum of 30 calendar days, but other guidance was not provided regarding public requests for video footage.

CONCLUSIONS FOR POLICYMAKERS

Our statistical analysis and qualitative research have guided us to a number of lessons that policymakers considering video surveillance of public space should consider. We describe each briefly in our concluding remarks.

CCTV is a tool not a panacea

Policymakers considering video surveillance of public places by law enforcement should not presume that crime reduction or prevention will occur automatically — or at all. Surveillance may prove useful for targeting certain types of crimes in certain areas as a tool to aid law enforcement, but it may be less effective in deterring or reducing other types of crimes in other areas. For instance, crimes of passion, or crimes in which an individual may be inebriated or unaware of the cameras' existence, may not be deterred by video surveillance. Moreover, as the literature on CCTV suggests, video surveillance may be less effective in open environments or high traffic areas. In order to adequately cover an area like Hollywood Blvd., for instance, by creating a "continuous" type surveillance system, LAPD would need to vastly expand the number of cameras, and, likewise, the number of operators — an unlikely scenario. Also, areas that are susceptible to "crime waves" like Jordan Downs may not be the most effective deployments to *deter* crime, though they may be useful in solving crime. In sum, cameras used in conjunction with larger crime-reduction strategies should be viewed as one tactical element, not a strategy in-and-of themselves.

Public-private partnerships save costs, but raise new policy questions

The unique partnerships and donations that the City of Los Angeles has used to procure its cameras may provide a good model for cash-strapped governments, but policymakers should also be aware of potential risks. For instance, law enforcement may become locked into older or inadequate technologies that may make interoperability, maintenance and expansion more costly and difficult in the long term. In addition, difficulties regarding privacy and liability may emerge if private security patrols are ever granted access to CCTV monitors.

Sustainability can be difficult

Sustainable CCTV surveillance requires strong leadership, and, ultimately, additional resource allocation. Turnover of personnel that may have initiated a surveillance system in a particular area or helped to realize some initial success may leave an implementation gap if new personnel are not recruited and trained. New priorities for subsequent administrators, strained resources and the absence of a well-defined training regimen may further limit later success. Policymakers might consider making use of retired police detectives, as Chicago has, to monitor the cameras.

Need for universal guidance on use, storage and utility of video surveillance

Another issue for policymakers to consider is formalized privacy and use guidelines. While LAPD suggests that they have local policies in place at each location that limits the accessibility of stored footage, it seems reasonable to offer some explicit, citywide policies regarding these

matters. This is particularly true as the ubiquity of cameras in Los Angeles and elsewhere grows. Other cities, such as Fresno, have formalized guidelines for use by law enforcement.[42]

Deterrence and enforcement are strongly intertwined

Policymakers should also be aware of the linkages between CCTV's possible deterrent effect and the ability of police to enforce existing laws. Law enforcement that does not have the resources to respond to crime and enforce laws, such as certain types of property crimes and minor offenses where cameras are located, may lead to the belief by criminals that some crimes are inconsequential. Following the "broken windows" theory of policing, criminals may eventually believe that they can commit more serious crimes in the absence of consequences, nullifying any deterrent effect the cameras may have.

Need for further research into detection, apprehension and prosecution

Finally, all of our research and findings point in one direction: Local program characteristics are the key to the utility of video surveillance. However, police in Los Angeles currently do not record when they use CCTV to catch criminals, elicit confessions, or provide footage that is influential to prosecutors in a trial or plea agreement. Research that digs deeper, from initial deployment and following the adjustments of law enforcement along the way to see how CCTV data is used to enhance the capability of law enforcement, might provide clearer evidence as to its cumulative effects.

[42] The Code of Practice in the U.K. can be found here: http://www.ico.gov.uk/upload/documents/library/data_protection/detailed_specialist_guides/cctv_code_of_practice.pdf

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Meeting Attended

COMPSTAT Weekly Meeting, South Bureau, April 16, 2008.

APPENDICES

APPENDIX A. Evidence of CCTV in Crime Prevention

Author	Location	Description of CCTV System	Results	Methodology
Armitage, Smyth, and Pease, 1999	Burnley, United Kingdom	Cameras in the town center	Desirable effect: 28% reduction in crime vs. a 1% reduction control area 1, and a 9% increase in control 2. Violent crimes decreased by 35% vs. a 20% decrease in control 1 and 0% change in control 2. Vehicle crimes decreased by 48% vs. 8% declines in both control areas. Burglary declined by 41% vs. increases of 9% and 34% in the two respective control areas. There was some displacement of burglary as well as diffusion of benefits for total crime, violent crime, and vehicle crime.	Good design: comparison of crime rates 12 months before and after CCTV intervention in experimental and control areas.
Brown, 1995	Newcastle Upon Tyne, United Kingdom	16 cameras in the city center	Undesirable effect: crime did not fall as much in the experimental area as in the control area (21.6% decline vs. 29.7% decline in the control area). But there were reductions in certain types of crime: 57% reduction in burglary, compared to 38.7% decline in control; 50% reduction in theft from vehicle compared to 38.9% decline in the control, 47% reduction in vehicle theft compared to 40.5% decline in control, and 34% reduction in criminal damage.	Good design: comparison of crime 26 months before and 15 months after in experimental and control areas.

Brown, 1995	Birmingham, United Kingdom	9 cameras in the city center	Desirable effect: 4.3% decline in crime compared to a 131.6% increase in the control. Reduction in robbery, burglary, and theft from person.	Good design: comparison of crime rates 12 months before and after CCTV intervention in experimental and control areas.
Burrows, 1979	London, United Kingdom	Cameras in 4 subway stations	Desirable effect: robbery declined 22.9% compared to 23.1% and 116.3% increases in the two respective control areas. Theft decreased 72.8% compared to declines of 26.5% and 39.4% in the control areas.	Good design: comparison of crime rates 12 months before and after CCTV intervention in experimental and two control areas.
Farrington, Bennet, and Welsh, 2002	Cambridge, United Kingdom	30 cameras in the city center	Undesirable effect: crime did not decline as much as in the control areas: 13.8% decline vs. 26.9% decline in control area. Violent crime fell 6% vs. a 33.8% decline in the control. Vehicle crimes decreased by 53.1% vs. a 54% decline in the control area. The percentage of people that reporting being victimized increased by 2.1 percentage points vs. an increase of 2.2 percentage points in the control.	Good design: comparison of crime rates 11 months before and after CCTV intervention in experimental and control areas.
Flight, Heerwaarden, and Soomeren, 2003	Amsterdam, The Netherlands	29 cameras in city center	Desirable effect: significant reduction in crime, compared to no change and slight increases in the control areas.	Good design: comparison of crime rates 12 months before and after CCTV intervention in experimental, adjacent, and control areas.

Gill and Spriggs, 2005	"City Outskirts," United Kingdom	47 cameras around a park, hospital, and industrial area	Desirable effect: crime was reduced by 28% in the target area, compared to a 1% decrease in the control area. Results are statistically significant.	Good design: comparison of crime rates crime rates 1 year before and after CCTV intervention in experimental and control areas.
Gill and Spriggs, 2005	Hawkeye, London, United Kingdom	556 cameras in parking lots along the city outskirts	Desirable effect: crime declined by 73% compared to a 10% decline in the control area. Results are statistically significant.	Good design: comparison of crime rates crime rates 1 year before and after CCTV intervention in experimental and control areas.
Gill and Spriggs, 2005	"City Hospital," United Kingdom	9 of a total of 67 cameras around a hospital are evaluated	Desirable effect: crime decreased by 33% in the target area vs. a 6% reduction in the control; however due to the large difference in size these results are not statistically significant.	Good design: comparison of crime rates crime rates 1 year before and after CCTV intervention in experimental and control areas.
Gill and Spriggs, 2005	"South City," United Kingdom	51 cameras in a mixed-income city center in southern England	Null effect: crime decreased by 10%, but the control area experienced a greater reduction in crime (-12%); these results are not statistically significant	Good design: comparison of crime rates crime rates 1 year before and after CCTV intervention in experimental and control areas.
Gill and Spriggs, 2005	"Shire Town," United Kingdom	12 cameras in a Midlands town center	Null effect: 4% reduction in crime compared to a 3% increase in crime in comparison site; however, results are not statistically significant.	Good design: comparison of crime rates crime rates 1 year before and after CCTV intervention in experimental and control areas.

Gill and Spriggs, 2005	"Market Town," United Kingdom	9 cameras in an affluent market town	Null Effect: crime increased by 18% in the target area, vs. a 3% increase in the division as a whole; however, due to the size differences of the control and target areas, this result is not statistically significant.	Good design: comparison of crime rates crime rates 1 year before and after CCTV intervention in experimental and control areas.
Gill and Spriggs, 2005	"Borough Town," United Kingdom	40 cameras around a small town center	Null effect: crime increased slightly by .3% in the target area, while crime increased by 13% in the control site. The results were not statistically significant.	Good design: comparison of crime rates crime rates 1 year before and after CCTV intervention in experimental and control areas.
Gill and Spriggs, 2005	"Northern Estate," United Kingdom	11 cameras in a residential neighborhood with "deprived housing" in North England	Null effect: 10% reduction in crime in the target area compared to a 21% increase in crime in the control area; results were not statistically significant.	Good design: comparison of crime rates crime rates 1 year before and after CCTV intervention in experimental and control areas.
Gill and Spriggs, 2005	"Eastcap Estate," United Kingdom	12 cameras in a residential area with "deprived housing" in southeast England	Null effect: Crime increased by 2% in the target area, vs. a 5% increase in the control area; results were not statistically significant.	Good design: comparison of crime rates crime rates 1 year before and after CCTV intervention in experimental and control areas.
Gill and Spriggs, 2005	"Dual Estate," United Kingdom	14 cameras in a low income residential area with some commercial businesses	Undesirable effect: Crime increased by 4% in the target area vs. a 19% decrease in the control area. Results are statistically significant.	Good design: comparison of crime rates crime rates 1 year before and after CCTV intervention in experimental and control areas.

Gill and Spriggs, 2005	"Southcap Estate," United Kingdom	148 cameras in a residential area of South London with "deprived housing"	Null effect: crime increased by 14%, compared to a 13% crime reduction in the control area. Results are not statistically significant.	Good design: comparison of crime rates crime rates 1 year before and after CCTV intervention in experimental and control areas.
Gill and Spriggs, 2005	"Borough" United Kingdom	8 cameras installed in lamp posts in a mixed-income residential area in southeast England	Undesirable effect: crime increased by 73% while the control area experienced a 12% increase in crime. Results are statistically significant.	Good design: comparison of crime rates crime rates 1 year before and after CCTV intervention in experimental and control areas.
Gill and Spriggs, 2005	"Deploy Estate," United Kingdom	11 cameras along 3 residential streets, and one shopping area	Null effect: 21% increase in crime in the target area compared to a 3% increase in the control area. Results are not statistically significant.	Good design: comparison of crime rates crime rates 1 to 2 years before and after CCTV intervention in experimental and control areas.
Grandmaison and Tremblay, 1997	Montreal, Canada	13 subway stations with 10 cameras each	Null effect: there was not significant change in crime rates: total crime dropped 20% compared to 18.3% decline in the control; robbery declined by 27% compared to 30.8% in the control; assault declined 27.5% compared to an increase of 5.6% in the control; theft and fraud declined by 15.5% vs. a 16% decline in the control.	Good design: comparison of crime rates 18 months before and after in experimental and control areas.

Griffith, n.d.	Gillingham, United Kingdom	Seven cameras in the town center	Desirable effect: crime fell 44% compared to 22% decline in the control area; there was a reduction in robberies and vehicle crime.	Good design: comparison of crime rates 1 year before and 4 years after CCTV intervention in experimental and control areas.
Harada et al., 2004	Tokyo, Japan	Cameras in Kabukicho area of Tokyo	Desirable effect: 22% decrease in crime compared to 11% decrease in control area and 9% decrease in adjacent buffer areas. Reductions in vehicle crime and larceny; small decrease in violent crime.	Good design: comparison of crime rates 12 months before and after CCTV intervention in experimental, adjacent, and control areas.
Mazerolle et al., 2002	Cincinnati, Ohio	Cameras installed in a strip mall in a Northside neighborhood	Null effect: calls for service increased by 1.8% vs. a 0% increase in the control	Good design: compared the number of calls for service 23 months before and 6 months after the implementation of the CCTV system.
Mazerolle et al., 2002	Cincinnati, Ohio	Cameras installed in a mixed-use commercial and residential neighborhood	Null effect: calls for service increased by 9.8% vs. a 0% increase in the control.	Good design: comparison of calls for service 23 months before and 4 months after the CCTV intervention.
Mazerolle et al., 2002	Cincinnati, Ohio	Cameras installed in Findley Market Place	Null effect: calls for service increased by 16.9% vs. a 17.1% increase in the control area.	Good design: compared calls for service 24.5 months before and 3.5 months after CCTV intervention in an experimental and control area.

Musheno, Levine, and Palumbo, 1978	Bronxdale Houses, Ney York City, USA	Cameras in a public housing complex	Uncertain effect: crime fell 9.4% (32 to 29) in the experimental area, and fell 19.2% (26 to 21) in the control area.	Good design: comparison of crime rate 3 months before and after CCTV intervention in experimental and control areas.
Poyner, 1991	Guildford, United Kingdom	Cameras in the parking lot at the University of Surrey	Undesirable effect: crime decreased less in the experimental areas than in the control areas; theft from vehicles declined by 73.3% compared to a 93.8% decline in the control area.	Good design: compared theft from vehicles 24 months before and 10 months after the CCTV intervention in experimental and control areas.
Sarno et al., 1999	Camberwell, London	17 cameras in town center	Desirable effect: 12% reduction in crime; street, vehicle, and violent crimes rates decreased at a faster pace than prior to CCTV, while control areas experienced an increase in crime.	Good design: comparison of crime rates 24 months before and after CCTV intervention in experimental, adjacent, and control areas.
Sarno et al., 1999	London, United Kingdom	12 cameras on the East Street market	Null effect: 10% decline in crime, with reductions in vehicle crime, property damage, and robbery; however, the crime in the buffer and control areas decreased at a quicker rate than in the experimental area. Street crime increased.	Good design: comparison of crime rates 24 months before and after CCTV intervention in experimental, adjacent, and control areas.
Sarno et al., 1999	London, United Kingdom	34 cameras around the Elephant and Castle shopping center	Desirable effect: crime fell by 17%; the number of street robberies declined substantially.	Good design: comparison of crime rates 24 months before and after CCTV intervention in experimental, adjacent, and control areas.

Sarno, 1995	London, United Kingdom	Cameras in a parkling lot in the Borough of Sutton	Desirable effect: crime fell 57.3% vs. declines of 36.5% and 40.2% in the two control areas.	Good design: comparison of crime 12 months before and after the CCTV intervention in experimental and 2 control areas.
Sarno, 1995	London, United Kingdom	11 cameras in the town center in the Borough of Sutton	Undesirable effect: crime did not decline as much in the experimental area as in the control areas: 12.8% decline vs. 18% decline in control 1 and a 30% decline in control 2.	Good design: comparison of crime rates 12 months before and after CCTV intervention in experimental and 2 control areas.
Short and Ditton, 1996	Airdrie, Scotland, United Kingdom	12 cameras in town center	Desirable effect: 35% reduction in crime vs. 12% reduction in control area. Crimes of dishonesty and vandalism decreased sharply. Some other types of crime increased, likely due to increased detection.	Good design: comparison of crime rates 24 months before and after CCTV intervention in experimental and control areas.
Sivarajasingam, Shepherd, and Matthews, 2003	United Kingdom	Five towns with CCTV	Null effect: increased police detection of and intervention in violent crimes and reduced hospital visits due to violent crime compared to control groups.	Good design: comparison of crime rates and assualt-related hospitalizations 24 months before and after CCTV intervention in experimental and control areas.

Skinns, 1998	Doncaster, United Kingdom	63 cameras in the city centre	Desirable effect: crime dropped 21.3% vs. an increase of 11.9% in the control. Vehicle crime fell after the cameras were introduced; however, there was no affect on other property crimes (burglary, theft, shoplifting, and criminal damage). There was some displacement of crime to outlying areas.	Good design: comparison of crime rates 24 months before and after CCTV intervention in experimental and control areas.
Squires, 1998	Ilford, Essex, United Kingdom	Surveillance of town center	Desirable effect: 17% reduction in crime vs. a 9% increase in the control.	Good design: comparison of crime rates 6 months before and after CCTV intervention in experimental and control areas.
Squires, 2003	East Brighton, United Kingdom	10 cameras in a low-income housing complex	Null effect: crime continued to increase at a rate comparable to the control.	Good design: comparison of crime rates before and after CCTV intervention in experimental and control areas; however, crime data were not broken down into categories of crime.
Tilley, 1993	Hartlepool, United Kingdom	Parking Lot	Desirable effect: vehicle theft declined by 59% vs. a 16.3% decline in the control; Theft from vehicles declined by 9.4% vs. a 3.1% increase in the control area	Good design: comparison of crime data 15 months before and 30 months after the CCTV intervention.

Tilley, 1993	Bradford, United Kingdom	Parking Lot	Desirable effect: vehicle theft declined by 43.5% vs. increases of 5.9% and 31.8% in the two control areas. Theft from vehicle declined by 68.8% vs. increases of 4.5% and 6.1% in the two control areas.	Good design: comparison of crime data 12 months before and after the CCTV intervention in the experimental area and two control areas.
Tilley, 1993	Coventry, United Kingdom	Parking Lot	Desirable effect: vehicle theft declined by 50.5% vs. a 53.6% decline in the control area. Theft from vehicles declined by 64.4% vs. a 10.7% in the control area.	Good design: comparison of crime rates 8 months before and after in the experimental area to crime rates 16 months before and after in the control area.
Webb and Laycock, 1992	London, United Kingdom	Cameras in Underground stations	Desirable effect: the number of robberies declined by 62.3% compared to a 50% decrease in the control area. The specific affect of CCTV versus the other aspects of the strategy is unclear.	Good design: comparison of crime rates 12 months before and after CCTV intervention in experimental and control areas. The specific affect of CCTV versus other aspects of the strategy is unclear.
Webb and Laycock, 1992	London, United Kingdom	Cameras in the Oxford Circus subway station	Undesirable effect: crime increased more in the experimental area than in the control area: robberies increased 47.1% compared to 21.4% in the control; theft increased by 11.0% compared to a 1.9% decline in the control; assault increased by 29.4% compared to 36.4% in the control	Good design: compared crime rates from 28 months before and 32 months after CCTV intervention in experimental and control areas.

Williamson and McLafferty, 2000	Brooklyn, New York	Cameras in the Albany and Roosevelt public housing complexes	Null effect: no change in crime in the housing project and the .1 mile buffer, compared to a 5.3% and 4.0% decline in the control areas. There was a reduction in major felonies.	Good design: comparison of crime rates 18 months before and after in experimental, adjacent, and control areas.
Winge and Knutsson, 2003	Oslo, Norway	6 cameras in the Central Train Station	Uncertain effect: overall recorded crime increased, particularly violent and narcotics offenses; however, the authors suggest that crime did not actually increase, but rather that crime detection improved. There was some decrease in robbery and bicycle theft.	Good design: comparison of crime rates 12 months before and after CCTV intervention in experimental, adjacent, and control areas.

APPENDIX B: SORTING THE DATA

We identified "suppressible" crimes, by sorting the data through several filters, which are detailed below.

Crimes

1. Sorted by Hollywood, Jordan Downs and Nickerson Gardens police reporting-districts.

2. Sorted by crime type and crime code. Types of crimes likely to be suppressed by video surveillance given the presence of the cameras and their locations were chosen. Crime types excluded are Stolen Boat, Recovered Boat, Kidnap, Some Miscellaneous and Other coded crimes, Rape, Recovered Vehicle, Sex Crimes, Trespass. These are not crimes that would have occurred within the purview of the cameras we are studying, and therefore, would not be suppressible by the cameras' presence. Rape and Child Abuse crime-data was excluded due to privacy restrictions. The crimes included are listed in the table below.

Crime Type	Crime Codes
Aggravated Assault (AGG)	230 Assault with a Deadly Weapon 231 ADW against a Police Officer 235 Child Abuse (aggravated assault) 236 Spousal Abuse (aggravated assault) 250 Shots Fired at Moving Vehicle 251 Shots Fired Inhabited Dwelling
Burglary/Theft from a Vehicle (BTFV)	330 Burglary from Vehicle 331 Theft from Vehicle 410 Burglary from Vehicle (attempted) 420 Theft from Vehicle (petty) 421 Theft from Vehicle (attempted)
Burglary (BURG)	310 Burglary 320 Burglary (attempted)
Grand Theft Auto (GTA)	510 Vehicle, Stolen 520 Vehicle , Stolen (attempted)
Grand Theft Person (GTP)	350 Theft from Person 351 Pursesnatch 352 Pickpocket – Pickpurse 353 Drunkroll 450 Theft from Person (attempted) 451 Pursesnatch (attempted) 452 Pickpocket (attempted) 453Drunkroll (attempted)
Homicide (HOM), Miscellaneous (MISS)	110 Homicide 113 Manslaughter, Negligence
Robbery (ROBB)	210 Robbery 220 Robbery (attempted)
Vandalism (VAND)	740 Vandalism ($400+)

	745 Vandalism (< $400)
Miscellaneous – Other Theft (MISS)	341 Theft, Grand (> $400) 440 Theft, Petty (< $400) 441 Theft (attempted) 480 Bicycle Stolen 485 Bicycle Stolen (attempted)
Other (OTH)	622 Battery on Fireman 623 Batter on Police Officer 624 Battery – Misdemeanor 625 Other Misdemeanor Assault 626 Spousal Abuse 753 Shots Fired 755 Bomb Threat 756 Bomb or Poss./Mfr. Destruct. Device 761 Brandishing Weapon 762 Lewd Conduct 805 Pimping 806 Pandering 882 Inciting Riot 886 Disturbing the Peace 995 Suspicious Activity Reports

3. Sorted by premise code. Included codes of locations that likely would be affected by the presence of the video cameras in their specific locations, either by being in view of the cameras, being open to the public and possibly in view of a camera or through location in the immediately surrounding area to which crime might be displaced. Codes for locations that do not exist in any of the test or control areas, that are not open to the public and that are by definition indoors were excluded.

Category	**Description**	
Outside	101 Street/Parkway 102 Sidewalk 103 Alley 104 Driveway 105 Ped Overcrossing 106 Tunnel 107 Vacant Lot 108 Parking Lot 109 Park Playground 110 Freeway (inc. ramp) 116 Other outside 118 Construction Site 119 Porch (residential) 121 Yard	131 Redline Platform 132 Redline Mezzanine 135 MTA Prop/Prk. Lot 139 Stairwell 140 Balcony 142 Drive Thru 143 Escalator 145 Mailbox 142 Drive Thru 143 Escalator 145 Mailbox 146 Patio 147 Pool/Public 148 Public Restroom

	123 Parking Underground 124 Bus Stop 125 Pay Phone 127 Trashcan/Dumpster 128 Bus Stop/Layover	Outside 149 Riverbed 151 Tow Yard 152 Underpass/Bridge
Transportation	114 Taxi 122 Vehicle, Pass./Truck	
Business	201 Jewelry Store 202 Liquor Store 203 Other Business 204 Mfr. Co. 205 Gun/Sporting Goods 206 TV/Radio/Appliance 207 Bar/Cocktail 208 Auto Sales 210 Restaurant/Fast Food 211 Pawn Shop 213 Warehouse 214 Bus Depot 215 Train Depot 216 Swap Meet	217 Auto Repair Shop 218 Beauty/Barber Shop 219 Cleaners 220 Nail Salon 221 Public Storage 222 Laundromat 223 Video Rental Store 224 Surplus Store 225 Music Store 228 Bowling Alley 229 Check Cashing 233 Tattoo Parlor 234 Optical Office
Manufacturing	301 Gas Station	
Stores	401 Mini-mart 402 Market 403 Drug Store 404 Department Store 405 Clothing Store	406 Other Store 407 Hardware 408 Auto Supply 409 Beauty Supply
Schools	704 Elementary * 720 Jr. High * 721 High School * 722 College/Univ. *	723 Private/Preschool * 724 Trade School * 729 Special School *
Miscellaneous	705 Slip/Dock/Marina 706 Adult Bookstore 707 Garage/Carport 710 Other Premise	717 Health Spa/Gym * 726 Police Facility * 727 Shopping Mall *
Religious Facility	708 Church/Temple * 730 Synagogue * 731 Mosque *	
Entertainment	711 Arcade 716 Theater/Movie 733 Bar/Sports Bar	735 Night Club 736 Skateboard Park 737 Skating Rink

City/County Government	725 Gov't Facility * 732 Post Office *	

* Crimes with these codes that occurred at an address were assumed to be indoors and excluded; those that were recorded at intersections were assumed to be outside and included.

4. Geocoded into ArcMap GIS software to identify crimes in the target, buffer, and control areas.

Arrests

1. Sorted by Hollywood, Jordan Downs and Nickerson Gardens police reporting district.

2. Pulled data for arrests for Part II crimes ("victimless" crimes that usually go unreported unless an arrest is made, such as drunkenness or prostitution) that could likely be detected by video surveillance. These arrest categories are weapons, narcotics, drunkenness, gambling and other miscellaneous crimes. Many categories had very low numbers given the size of the reporting districts and time period of the cases represented. Aggregated Part II arrest data was utilized to gauge generally the ability of video surveillance to detect or deter Part II crime.

3. Geocoded into ArcMap GIS, and crimes that occurred within the target, buffer, and control areas were identified.

APPENDIX C: STATISTICAL ANALYSIS

Relative Effect Size Test

We employed the relative effect size statistical test that allows for a comparison of before-and-after crime rates in two different locations. The calculation of the relative effect size is detailed below:

	Average monthly crime rate before implementation	Average monthly crime rate after implementation
Target Area	a	b
Control Area	c	d

$$\text{Relative Effect Size} = \frac{[a/(a+b)] / [b/(a+b)]}{[c/(c+d)] / [d/(c+d)]}$$

A relative size effect greater than one indicates that crime decreased in the test area at a faster pace than, or did not increase as quickly as the control area. Alternatively, a relative effect size less than one signifies that crime declined at a faster rate or did not increase as substantially in the control area than in the test area.

To determine if the observed differences in crime rates are statistically significant and not due to random variance, we calculated the 95% confidence intervals. If the entire confidence interval is greater than one then the crime in the target area is said to have decreased significantly more than in the control area. Alternatively, if the entire confidence interval is less than one, then the crime in the control area is said to have decreased significantly more than in the target area. If the confidence interval includes values both less than and greater than one, then the differences in crime are not statistically significant. The confidence interval calculations are described below:

95% Confidence Interval = relative effect size +/- (relative effect size * 2 * standard error)

$$\text{Standard Error} = \text{var}(a)/a^2 + \text{var}(b)/b^2 + \text{var}(c)/c^2 + \text{var}(d)/d^2$$

Relative Effect Size Results

We compared before-and-after crime rates both between the target and control areas, as well as between the buffer and control areas to test for displacement of crime areas or the diffusion of benefits from the surveilled areas. None of the changes in crime in either our Hollywood or Jordan Downs case study areas met the criterion for statistical significant, which is likely a result of the large variance in crime month to month. The results of the relative effect size test and the 95% confidence intervals for the target and buffer areas are listed in the tables below.

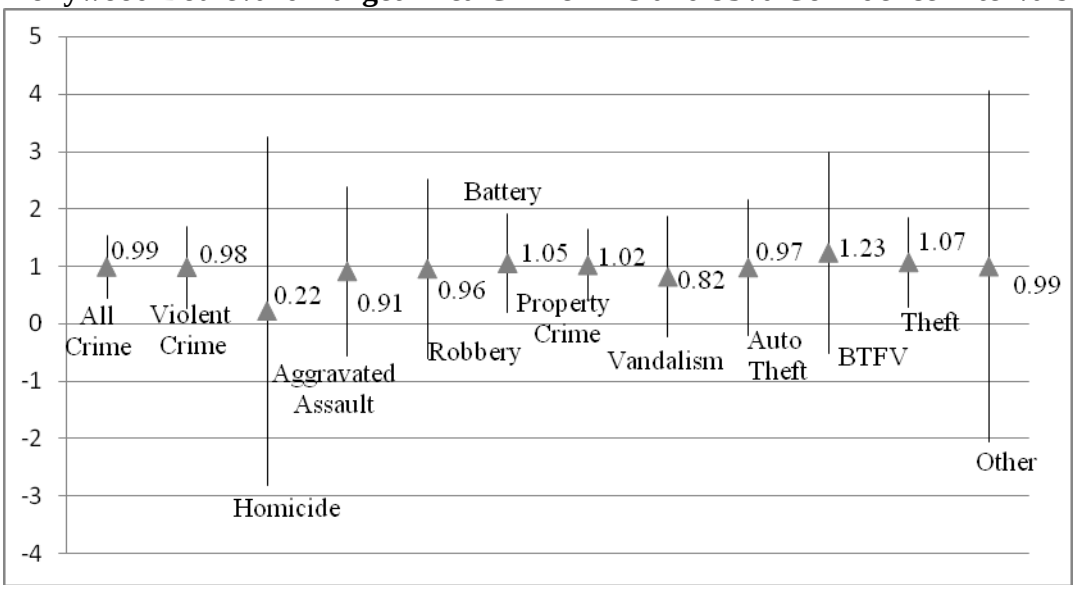
Hollywood Boulevard Target Area Descriptive Crime Statistics

Crime Type	Pre-CCTV Period (25 Months)				Post-CCTV Period (14 Months)				% Change Monthly Rate
	Total # Crimes	% of Total Crime	Monthly Rate	Variance	Total # Crimes	% of Total Crime	Monthly Rate	Variance	
All Crime	1,951	100.00%	78.04	176.1	980	100.00%	70.00	62.3	-10.30%
Violent Crime	865	44.34%	34.60	67.4	475	48.47%	33.93	32.4	-1.94%
Homicide	1	0.05%	0.04	0.0	1	0.10%	0.07	0.1	78.57%
Aggravated Assault	221	11.33%	8.84	13.6	106	10.82%	7.57	19.0	-14.35%
Robbery	148	7.59%	5.92	6.7	79	8.06%	5.64	8.6	-4.68%
Battery	495	25.37%	19.80	32.8	289	29.49%	20.64	15.5	4.26%
Property Crime	1,054	54.02%	42.16	60.4	485	49.49%	34.64	13.9	-17.83%
Vandalism	139	7.12%	5.56	4.1	94	9.59%	6.71	6.1	20.76%
Auto Theft	140	7.18%	5.60	4.0	61	6.22%	4.36	1.6	-22.19%
BTFV	254	13.02%	10.16	14.2	84	8.57%	6.00	8.0	-40.94%
Theft	521	26.70%	20.84	19.4	246	25.10%	17.57	10.3	-15.68%
Other	32	1.64%	1.28	1.3	20	2.04%	1.43	1.6	11.61%

Hollywood Boulevard Target Area Relative Effect Size (RES) by Crime Type

Crime Type	RES	Upper Confidence Interval	Lower Confidence Interval
All Crime	0.99	1.54	0.44
Violent Crime	0.98	1.69	0.27
Homicide	0.22	3.26	-2.81
Aggravated Assault	0.91	2.39	-0.57
Robbery	0.96	2.52	-0.61
Battery	1.05	1.90	0.20
Property Crime	1.02	1.64	0.39
Vandalism	0.82	1.86	-0.23
Auto Theft	0.97	2.16	-0.21
BTFV	1.23	2.99	-0.52
Theft	1.07	1.85	0.29
Other	0.99	4.05	-2.06

Hollywood Boulevard Target Area Crime RES and 95% Confidence Intervals



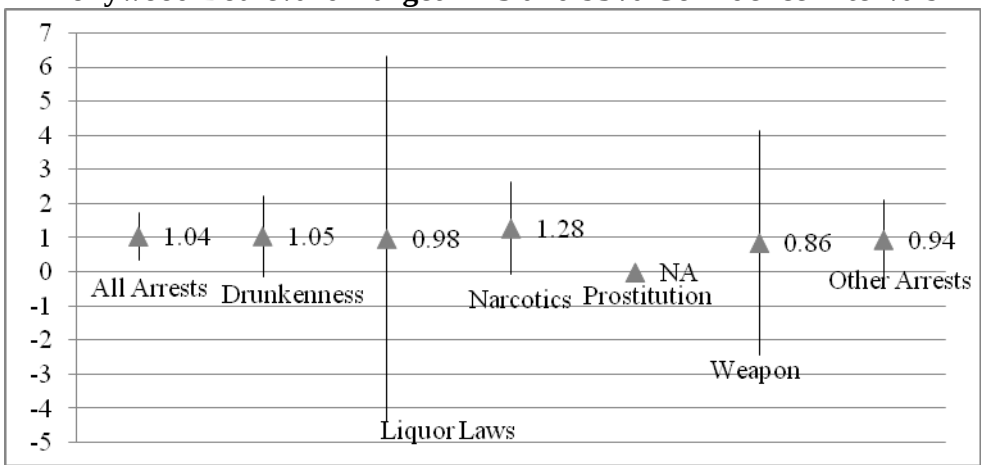
Hollywood Boulevard Target Area Descriptive Arrest Statistics

Column1	# of Arrests	% of Total Arrests	Monthly Rate	Variance	# of Arrests	% of Total	Monthly Rate	Variance	% change monthly rate
Total Arrests	2,439	100.00%	97.6	117.0	1,470	100.00%	105.0	609.4	7.63%
Drunkenness	612	25.09%	24.5	56.1	372	25.31%	26.6	60.0	8.54%
Liquor Laws	10	0.41%	0.4	0.3	4	0.27%	0.3	0.2	-28.57%
Narcotics	896	36.74%	35.8	143.5	407	27.69%	29.1	71.0	-18.89%
Prostitution	6	0.25%	0.2	0.2	0	0.00%	0.0	0.0	-100.00%
Weapon	17	0.70%	0.7	1.0	18	1.22%	1.3	1.3	89.08%
Other	898	36.82%	35.9	296.7	669	45.51%	47.8	138.2	33.03%

Hollywood Boulevard Target Area RES by Arrest Type

Arrest Type	RES	Upper Confidence Interval	Lower Confidence Interval
Total Arrests	1.04	1.75	0.34
Drunkenness	1.05	2.24	-0.13
Liquor Laws	0.98	6.32	-4.37
Narcotics	1.28	2.62	-0.07
Prostitution	NA	NA	NA
Weapon	0.86	4.16	-2.45
Other	0.94	2.13	-0.24

Hollywood Boulevard Target RES and 95% Confidence Intervals



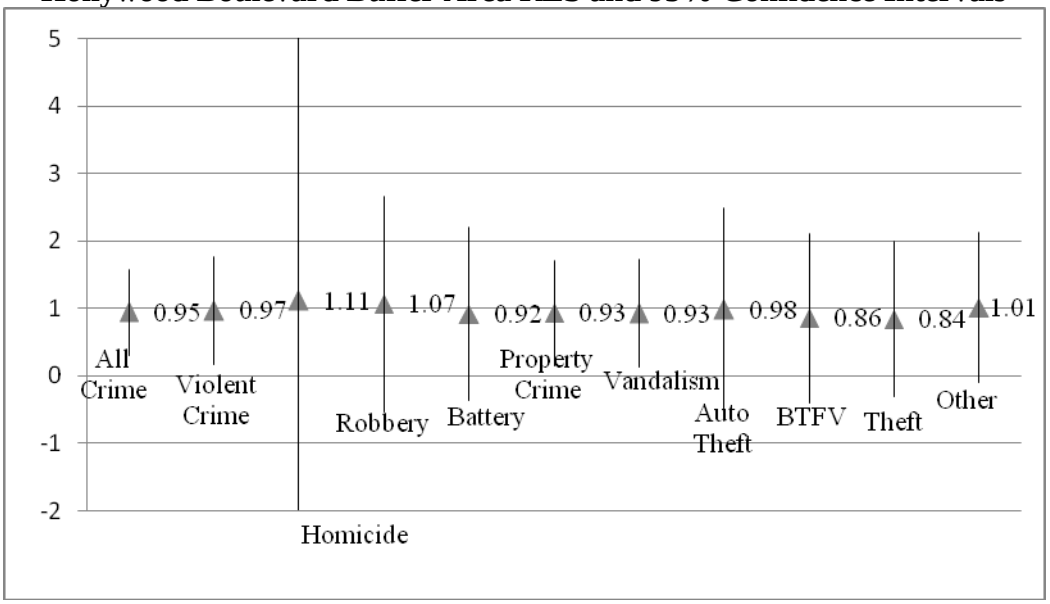
Hollywood Boulevard Buffer Area Descriptive Crime Statistics

Crime Type	Pre-CCTV Period (25 Months)				Post-CCTV Period (14 Months)				% Change Monthly rate
	Total # Crimes	% of Total Crime	Monthly Rate	Variance	Total # Crimes	% of Total Crime	Monthly Rate	Variance	
All Crime	1,868	100.00%	74.7	268.4	983	100.00%	70.2	146.6	-6.03%
Violent Crime	709	37.96%	28.4	61.6	395	40.18%	28.2	37.6	-0.51%
Homicide	5	0.27%	0.2	0.2	1	0.10%	0.1	0.1	-64.29%
Aggravated Assault	219	11.72%	8.8	11.9	90	9.16%	6.4	10.7	-26.61%
Robbery	151	8.08%	6.0	5.7	84	8.55%	6.0	4.3	-0.66%
Battery	334	17.88%	13.4	15.3	220	22.38%	15.7	11.8	17.62%
Property Crime	1,141	61.08%	45.6	164.8	576	58.60%	41.1	96.4	-9.85%
Vandalism	197	10.55%	7.9	17.1	111	11.29%	7.9	10.7	0.62%
Auto Theft	209	11.19%	8.4	14.3	103	10.48%	7.4	9.3	-12.00%
BTFV	375	20.07%	15.0	24.2	183	18.62%	13.1	38.1	-12.86%
Theft	360	19.27%	14.4	22.4	179	18.21%	12.8	22.6	-11.21%
Other	18	0.96%	0.7	0.7	12	1.22%	0.9	1.1	19.05%

Hollywood Boulevard Buffer Area Relative Effect Size by Crime Type

Crime Type	RES	Upper Confidence Interval	Lower Confidence Interval
All Crime	0.95	1.58	0.31
Violent Crime	0.97	1.77	0.17
Homicide	1.11	13.13	-10.91
Aggravated Assault	1.07	2.67	-0.54
Robbery	0.92	2.20	-0.37
Battery	0.93	1.72	0.15
Property Crime	0.93	1.73	0.13
Vandalism	0.98	2.48	-0.52
Auto Theft	0.86	2.12	-0.39
BTFV	0.84	1.99	-0.31
Theft	1.01	2.13	-0.10
Other	0.93	4.41	-2.55

Hollywood Boulevard Buffer Area RES and 95% Confidence Intervals



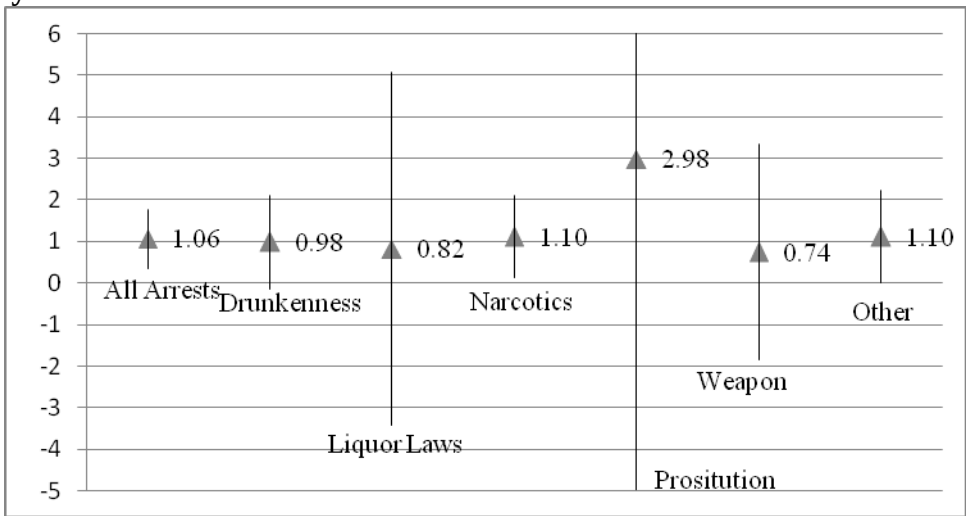
Hollywood Boulevard Buffer Area Descriptive Arrest Statistics

Arrest Type	Pre-CCTV Period (25 Months)				Post-CCTV Period (14 Months)				% Change Monthly Rate
	# of Arrests	% of Total	Monthly Rate	Variance	# of Arrests	% of Total	Monthly Rate	Variance	
Total Arrests	1,987	100.00%	79.5	232.8	1,180	100.00%	84.3	221.8	6.05%
Drunkenness	483	24.31%	19.3	54.9	315	26.69%	22.5	22.6	16.46%
Liquor Laws	21	1.06%	0.8	1.2	10	0.85%	0.7	1.1	-14.97%
Narcotics	822	41.37%	32.9	51.4	432	36.61%	30.9	68.3	-6.15%
Prostitution	17	0.86%	0.7	0.8	2	0.17%	0.1	0.1	-78.99%
Weapon	18	0.91%	0.7	0.7	22	1.86%	1.6	2.1	118.25%
Other	626	31.50%	25.0	50.5	399	33.81%	28.5	56.9	13.82%

Hollywood Boulevard Buffer Area RES by Arrest Type

Arrest Type	RES	Upper Confidence Interval	Lower Confidence Interval
Total Arrests	1.06	1.77	0.34
Drunkenness	0.98	2.11	-0.15
Liquor Laws	0.82	5.06	-3.42
Narcotics	1.10	2.09	0.11
Prostitution	2.98	20.78	-14.83
Weapon	0.74	3.33	-1.85
Other	1.10	2.21	-0.01

Hollywood Boulevard Buffer Area Arrest RES and 95% Confidence Intervals



Hollywood Box Matched Pair Descriptive Crime Statistics

Crime Type	Pre-CCTV Period (25 Months)				Post-CCTV Period (14 Months)				% Change Monthly Rate
	# of Crimes	% of Total Crime	Monthly Rate	Variance	Total # Crimes	% of Total Crime	Monthly Rate	Variance	
All Crime	6,200	100.00%	248.0	1,540.6	3,087	100.00%	220.5	473.7	-11.09%
Violent Crime	2,434	39.26%	97.4	254.8	1,314	42.57%	93.9	169.2	-3.60%
Homicide	9	0.15%	0.4	0.4	2	0.06%	0.1	0.1	-60.32%
Aggravated Assault	690	11.13%	27.6	62.6	302	9.78%	21.6	32.3	-21.84%
Robbery	531	8.56%	21.2	30.3	271	8.78%	19.4	54.4	-8.86%
Battery	1,204	19.42%	48.2	57.7	739	23.94%	52.8	55.1	9.60%
Property Crime	3,695	59.60%	147.8	784.8	1,729	56.01%	123.5	203.3	-16.44%
Vandalism	625	10.08%	25.0	54.9	345	11.18%	24.6	33.0	-1.43%
Auto Theft	645	10.40%	25.8	40.4	274	8.88%	19.6	36.0	-24.14%
BTFV	1,178	19.00%	47.1	192.1	481	15.58%	34.4	66.6	-27.09%
Theft	1,247	20.11%	49.9	91.5	629	20.38%	44.9	39.5	-9.93%
Other	71	1.15%	2.8	3.7	44	1.43%	3.1	3.1	10.66%

Hollywood Box Matched Pair Descriptive Arrest Statistics

Arrest Type	Pre-CCTV Period (25 Months)				Post-CCTV Period (14 Months)				% Change Monthly Rate
	# of Arrests	% of Total	Monthly Rate	Variance	# of Arrests	% of Total	Monthly Rate	Variance	
Total Arrests	6,537	100.00%	261.5	1,051	4,111	100.00%	293.6	2,649.8	12.30%
Drunkenness	1,447	22.14%	57.9	300	926	22.52%	66.1	217.5	14.28%
Liquor Laws	64	0.98%	2.6	8	25	0.61%	1.8	5.0	-30.25%
Narcotics	2,308	35.31%	92.3	236	1,337	32.52%	95.5	500.3	3.44%
Prostitution	294	4.50%	11.8	41	103	2.51%	7.4	23.0	-37.44%
Weapon	75	1.15%	3.0	3	68	1.65%	4.9	10.6	61.90%
Other	2,349	35.93%	94.0	659	1,652	40.18%	118.0	392.0	25.59%

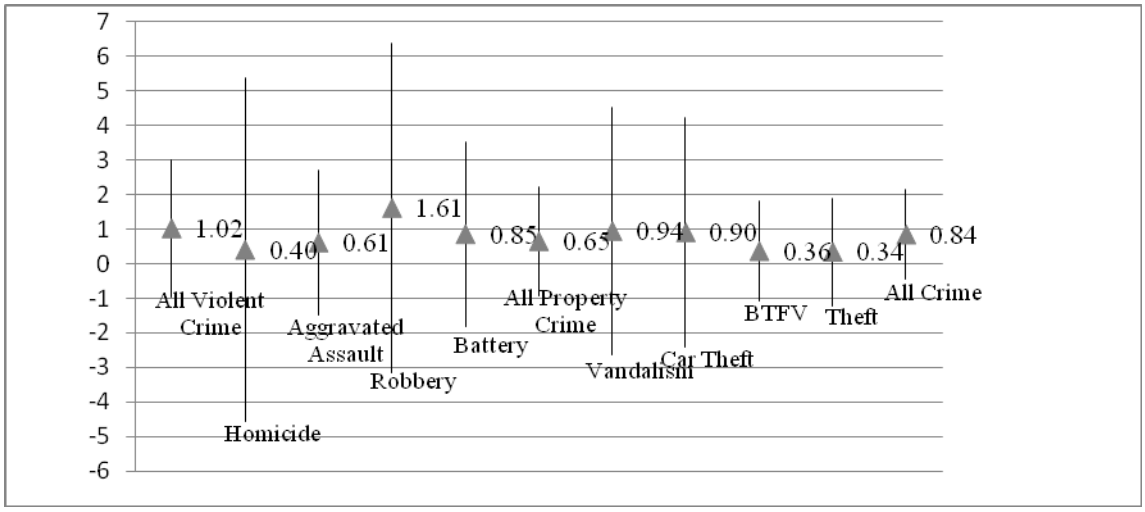
Jordan Downs Target Area Descriptive Crime Statistics

Crime Type	Pre-CCTV Period (45 Months)				Post-CCTV Period (16 Months)				% Change Monthly Rate
	# of Crimes	% of Total Crime	Monthly Rate	Variance	Total # Crimes	% of Total Crime	Monthly Rate	Variance	
All Crime	535	1.00	11.89	23.06	170	1.00	10.63	27.72	-10.63%
Violent Crime	289	0.54	6.42	14.11	82	0.48	5.13	9.32	-20.20%
Homicide	4	0.01	0.09	0.08	2	0.01	0.13	0.25	40.63%
Aggravated Assault	82	0.15	1.82	3.19	24	0.14	1.50	1.60	-17.68%
Robbery	137	0.26	3.04	5.82	24	0.14	1.50	2.00	-50.73%
Battery	66	0.12	1.47	2.39	32	0.19	2.00	2.67	36.36%
Property Crime	237	0.44	5.27	9.75	86	0.51	5.38	20.25	2.06%
Vandalism	68	0.13	1.51	3.35	20	0.12	1.25	2.33	-17.28%
Auto Theft	68	0.13	1.51	1.85	23	0.14	1.44	3.73	-4.87%
BTFV	74	0.14	1.64	2.23	27	0.16	1.69	2.36	2.62%
Theft	27	0.05	0.60	0.61	16	0.09	1.00	1.20	66.67%
Other	9	0.02	0.20	0.21	2	0.01	0.13	0.12	-37.50%

Jordan Downs Target Area RES by Crime Type

Crime Type	Relative Size Effect	Upper Confidence Interval	Lower Confidence Interval
All Violent Crime	1.02	2.99	-0.96
Homicide	0.4	5.36	-4.56
Aggravated Assault	0.61	2.72	-1.5
Robbery	1.61	6.38	-3.17
Battery	0.85	3.51	-1.81
All Property Crime	0.65	2.21	-0.91
Vandalism	0.94	4.53	-2.65
Car Theft	0.9	4.23	-2.43
BTFV	0.36	1.81	-1.08
Theft	0.34	1.89	-1.22
Total Crime	0.84	2.14	-0.47

Jordan Downs Target Area Crime RES and 95% Confidence Intervals



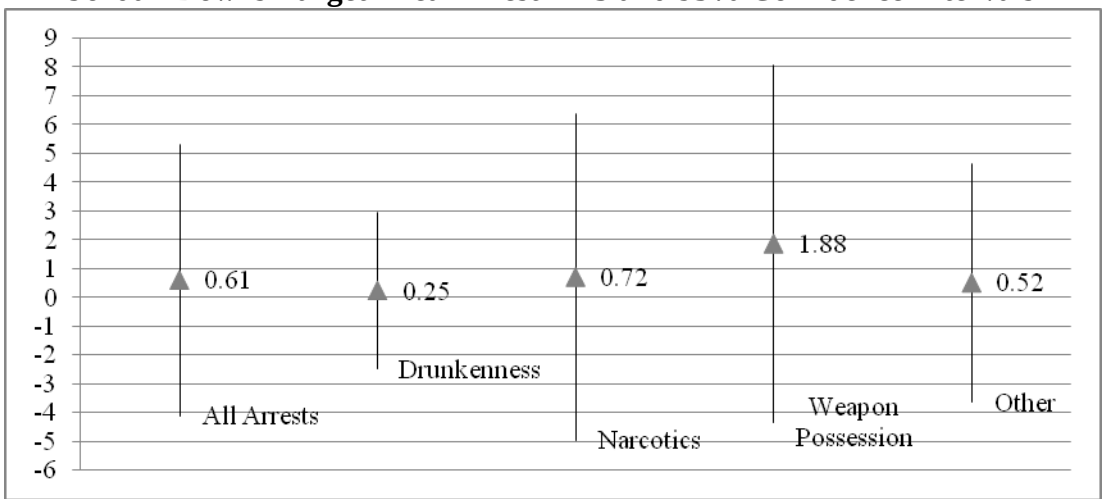
Jordan Downs Target Area Descriptive Arrest Statistics

Arrest Type	Pre-CCTV Period (45 Months)				Post-CCTV Period (16 Months)				% Change Monthly Rate
	# of Arrests	% of Total	Monthly Rate	Variance	# of Arrests	% of Total	Monthly Rate	Variance	
Total Arrests	441	100.00%	9.80	77.28	292	100.00%	18.25	4,493.74	86.22%
Drunkenness	6	1.36%	0.13	0.17	16	5.48%	1.00	15.11	650.00%
Liquor Laws	2	0.45%	0.04	0.04	5	1.71%	0.31	1.76	603.13%
Narcotics	147	33.33%	3.27	12.09	98	33.56%	6.13	522.51	87.50%
Weapon	25	5.67%	0.56	0.72	3	1.03%	0.19	0.62	-66.25%
Other	261	59.18%	5.80	49.09	170	58.22%	10.63	1,551.13	83.19%

Jordan Downs Target Area RES by Arrest Type

Arrest Type	RES	Upper Confidence Interval	Lower Confidence Interval
Total Arrests	0.61	5.33	-4.11
Drunkenness	0.25	2.97	-2.47
Narcotics	0.72	6.37	-4.94
Weapon	1.88	8.08	-4.32
Other	0.52	4.67	-3.63

Jordan Downs Target Area Arrest RES and 95% Confidence Intervals



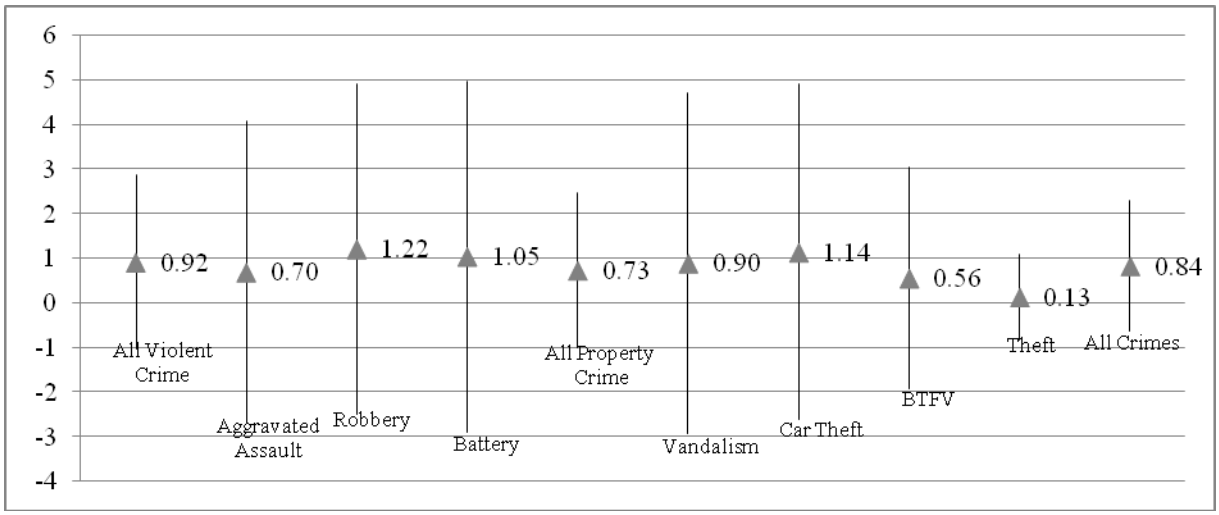
Jordan Downs Buffer Area Descriptive Crime Statistics

Crime Type	Pre-CCTV Period (45 Months)				Post-CCTV Period (16 Months)				% Change Monthly Crime Rate
	# of Crimes	% of Total Crime	Monthly Rate	Variance	# of Crimes	% of Total Crime	Monthly Rate	Variance	
All Crime	285	100.00%	6.33	9.09	91	100.00%	5.69	11.03	-10.20%
Violent Crime	134	47.02%	2.98	3.79	42	46.15%	2.63	3.05	-11.85%
Homicide	3	1.05%	0.07	0.06	0	0.00%	0.00	0.00	-100.00%
Aggravated Assault	43	15.09%	0.96	1.13	11	12.09%	0.69	1.56	-28.05%
Robbery	60	21.05%	1.33	1.45	20	21.98%	1.25	1.27	-6.25%
Battery	28	9.82%	0.62	0.69	11	12.09%	0.69	0.50	10.49%
Property Crime	147	51.58%	3.27	5.97	47	51.65%	2.94	3.93	-10.08%
Vandalism	39	13.68%	0.87	1.53	12	13.19%	0.75	1.00	-13.46%
Auto Theft	60	21.05%	1.33	1.50	16	17.58%	1.00	1.07	-25.00%
BTFV	42	14.74%	0.93	0.61	10	10.99%	0.63	0.78	-33.04%
Theft	6	2.11%	0.13	0.12	9	9.89%	0.56	1.20	321.88%
Other	4	1.40%	0.09	0.13	2	2.20%	0.13	0.25	40.63%

Jordan Downs Buffer Area RES by Crime Type

Buffer RES	RES	Upper Confidence Interval	Lower Confidence Interval
All Violent Crime	**0.92**	**2.87**	**-1.03**
Aggravated Assault	0.70	4.08	-2.68
Robbery	0.85	3.42	-1.73
Battery	1.05	4.98	-2.88
All Property Crime	**0.73**	**2.48**	**-1.01**
Vandalism	0.90	4.71	-2.92
Car Theft	1.14	4.91	-2.62
BTFV	0.56	3.05	-1.93
Theft	0.13	1.09	-0.82
Total Crime	**0.83**	**2.29**	**-0.62**

Jordan Downs Buffer Area Crime RES and 95% Confidence Intervals



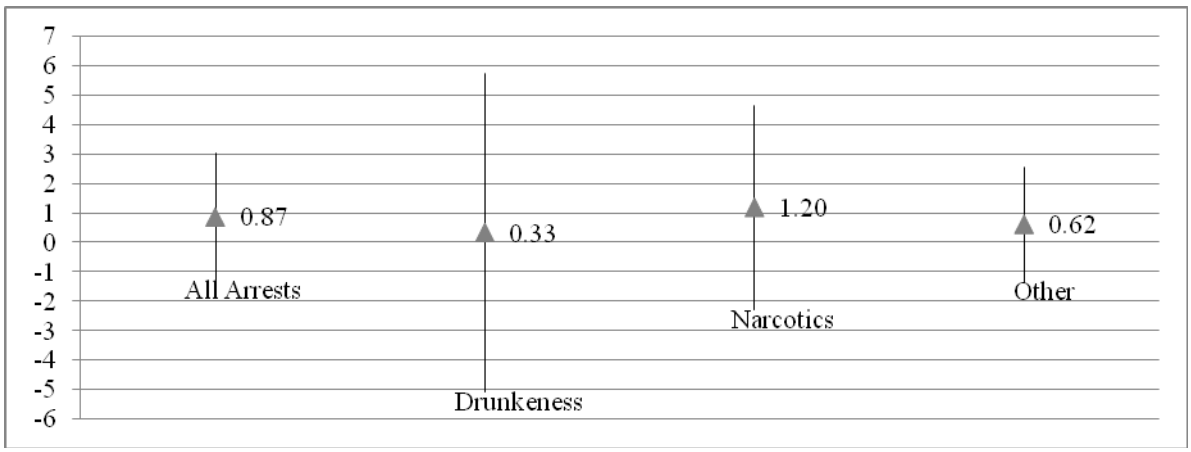
Jordan Downs Buffer Area Descriptive Arrest Statistics

Arrest Type	Pre-CCTV Period (45 Months)				Post-CCTV Period (16 Months)				% Change Monthly Rate
	# of Arrests	% of Total	Monthly Rate	Variance	# of Arrests	% of Total	Monthly Rate	Variance	
Total Arrests	**186**	**100.00%**	**4.13**	**10.6**	**87**	**100.00%**	**5.44**	**11.46**	**31.55%**
Drunkenness	1	0.54%	0.02	0.0	2	2.30%	0.13	0.25	462.50%
Narcotics	65	34.95%	1.44	2.0	26	29.89%	1.63	1.85	12.50%
Weapon	12	6.45%	0.27	0.3	0	0.00%	0.00	0.00	-100.00%
Other	108	58.06%	2.40	6.1	59	67.82%	3.69	8.50	53.65%

Jordan Downs Buffer Area RES by Arrest Type

Arrest Type	RES	Upper Confidence Interval	Lower Confidence Interval
Total Arrests	**0.87**	**3.03**	**-1.29**
Drunkenness	0.33	5.75	-5.09
Narcotics	1.20	4.68	-2.29
Other	0.62	2.58	-1.34

Jordan Downs Buffer Area Arrest RES and 95% Confidence Intervals



Nickerson Gardens Control Area Descriptive Crime Statistics

Crime Type	Pre-CCTV Period (45 Months)				Post-CCTV Period (16 Months)				% Change Monthly Rate
	# of Crimes	% of Total Crime	Monthly Rate	Variance	# of Crimes	% of Total Crime	Monthly Rate	Variance	
All Crime	1,032	100.00%	22.93	54.70	275	100.00%	17.19	27.36	-25.05%
Violent Crime	517	50.10%	11.49	17.53	149	54.18%	9.31	10.10	-18.94%
Homicide	10	0.97%	0.22	0.22	2	0.73%	0.13	0.12	-43.75%
Aggravated Assault	146	14.15%	3.24	4.10	26	9.45%	1.63	2.52	-49.91%
Robbery	213	20.64%	4.73	8.29	60	21.82%	3.75	4.47	-20.77%
Battery	148	14.34%	3.29	3.66	61	22.18%	3.81	4.83	15.92%
Property Crime	507	49.13%	11.27	21.61	119	43.27%	7.44	12.80	-33.99%
Vandalism	163	15.79%	3.62	4.56	45	16.36%	2.81	2.83	-22.35%
Auto Theft	141	13.66%	3.13	4.07	43	15.64%	2.69	2.76	-14.23%
BTFV	143	13.86%	3.18	5.47	19	6.91%	1.19	2.43	-62.63%
Theft	60	5.81%	1.33	1.55	12	4.36%	0.75	0.87	-43.75%
Other	8	0.78%	0.18	0.15	7	2.55%	0.44	0.26	146.09%

Nickerson Gardens Descriptive Arrest Statistics

Arrest Type	Pre-CCTV Period (45 Months)				Post-CCTV Period (16 Months)				% Change Monthly Rate
	# of Arrests	% of Total	Monthly Rate	Variance	# of Arrests	% of Total	Monthly Rate	Variance	
Total Arrests	1,830	100.00%	40.67	700.55	743	100.00%	46.44	187.20	14.19%
Drunkenness	60	3.28%	1.33	7.14	40	5.38%	2.50	6.80	87.50%
Liquor Laws	0	0.00%	0.00	0.00	0	0.00%	0.00	0.00	#DIV/0!
Narcotics	773	42.24%	17.18	101.47	370	49.80%	23.13	54.65	34.62%
Weapon	31	1.69%	0.69	1.13	7	0.94%	0.44	0.26	-36.49%
Other	966	52.79%	21.47	311.03	326	43.88%	20.38	63.32	-5.09%

APPENDIX D

Video Camera Specifications	
Jordan Downs: Sony Ipela	**Hollywood: Pelco Spectra III**
Color or day/night	Color or day/night
Autofocus, lowlight optics	Autofocus, lowlight optics
Frames per sec.: Max 25	Shutter Speed 1/2 – 1/30,000
Shutter speed Max 1 – 1/10,000	360-degree rotation
360-degree rotation	180-degree object tracking (autoflip)
180-degree object tracking	Pan: 360 deg. at 150 deg./sec – .1 deg/sec.
Pan: 340 deg. at 300 deg./sec.	Tilt: +2 deg. to -92 deg. at 200 deg./sec.
Tilt: 115 deg. at 300 deg./sec.	Zoom (color: 16x optical, 8x digital)
Zoom: 26x optical 312x digital	Zoom (day/night: 18x optical, 10x digital)
Resolution 450 lines	Resolution 470 lines
Multiple image-compression formats	Compatible w/fiber optic transmitters
Audio support	Multilanguage onscreen menus
Manual/auto white balance	Manual/auto white balance
Backlight compensation	Onscreen compass
Frame integration (clear, smooth images)	Color or day/night