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The Effect of Urban Fortification on Public Space

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THE EFFECT OF URBAN FORTIFICATION ON PUBLIC SPACE

by

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ABSTRACT

THE EFFECT OF URBAN FORTIFICATION ON PUBLIC SPACE

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This dissertation contributes to empirical studies on the spatial extent and intensity of

urban fortification/security zones and their influence on urban public space. Urban

public space has been based on creating open and safe environments for city dwellers.

However, ultra-secure urban spaces have been found to filter citizens, restrict movement,

and modify individual behavior. This first part of this study determines where security

zones manifest themselves, quantify the fortification of the security zones, and measure

the intensity of these spaces in three major U.S. cities. The second part of the study

offers an explanation of how social and commercial activity is being affected by security

zones.

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The Effect of Urban Fortification on Public Space

CHAPTER ONE

INTRODUCTION

On the morning of April 19th, 1995, Timothy McVeigh awoke in a rental truck

parked near a roadside motel in northern Oklahoma. As he drove into downtown

Oklahoma City, he placed earplugs in his ears and continued to drive. He stopped briefly

to light the first of two fuses connected to the bomb. Soon after, he lit the second fuse

while stopped at a red light.

McVeigh parked the Ryder rental truck near the delivery dock in front of the

Alfred P. Murrah Federal Building. He exited the truck and locked all the doors of the

vehicle, then casually walked away from the building. The people inside of the Murrah

Federal Building and within the surrounding area, were unaware of what was about to

unfold that Wednesday morning. At 9:02 AM the bomb detonated with the explosion

obliterating the front half of the Murrah Federal Building. McVeigh would later recall

that he was lifted an inch off the ground by the blast. Soon after the blast McVeigh was

in his car heading out of the city.

The Murrah Federal Building housed numerous federal agencies including the

Drug Enforcement Agency, United States Secret Service, Bureau of Alcohol, Tobacco,

and Firearms, General Services Administration, Department of the Army, Department of

Defense, Federal Highway Administration, Department of Housing and Urban

Development, Labor Department, and the Veterans Administration. The explosion

disrupted governmental services and destroyed the lives of clerks, secretaries, federal law

enforcement officers, citizens, and children.

According to the Oklahoma City Department of Civil Emergency Management After Action Report (1996), when the bomb detonated, approximately 600 employees and 250 visitors were in the building. The blast and resulting collateral damage at the Alfred P. Murrah Federal Building killed 168 people and injured over 800 other people. The force of the bomb leveled the north face of the building, and caused extensive damage to all nine floors of the building. After the dust settled, the building lay in ruins. The explosion also crippled downtown Oklahoma City.

The concussion of the blast damaged over 300 surrounding buildings, overturned automobiles, shattered windows, started fires, and blew out doors in a 50 block radius. More than 400 individuals were left homeless in the surrounding area. Approximately 7,000 people lost their workplace. It was reported that the blast was felt 55 miles from the blast site and registered a 6.0 on the Richter scale. Not only did the terrorist attack cause considerable physical devastation and death, the attack also caused a significant amount of psychological and emotional toll on the estimated 16,000 people in the downtown area at the time of the explosion. The Oklahoma City bombing marked the beginning of a national approach to security planning and building design to combat terrorist acts.

Soon after the Murrah Federal Building bombing in Oklahoma City, the U.S. General Services Administration was tasked with providing guidelines to secure areas in and around federal buildings and courthouses (Hollander and Whitfield, 2005). The agency embarked on a nationwide effort to secure its nearly 1,800 federal buildings, courthouses, and other government stations. After the inventory, public buildings began to close streets, place concrete barriers in plazas, and install numerous security devices to

provide a much more secure public building. Other recommendations by General

Services Administration included: landscape design elements; site planning and access;

vehicle circulation; standoff distance; hardening of building exteriors; window glazing to

reduce flying debris; and engineering design to prevent progressive collapse (Nadel,

2004). However, the Oklahoma City Bombing was not the last terrorist attack

experienced on U.S. soil.

On September 11, 2001 at 7:59 AM, American Airlines Flight 11 took off from

Boston's Logan Airport bound for Los Angeles. Everything about the flight was routine

until 8:14 AM, when American 11 had its last routine communication with Boston's air

traffic control center. Shortly after that Wail al Shehri and Waleed al Shehri, stabbed two

flight attendants in the first class section of the plane (National Commission on Terrorist

Attacks upon the United States, 2004). It is speculated the Shehri brothers were able to

gain access to the cockpit after stabbing the two flight attendants and slashing the throat

of another passenger.

Shortly after this incident, Mohamed Atta, the only terrorist trained to fly an

airplane, moved to the cockpit from his business class seat. After Atta was seated at the

controls, the remaining hijackers sprayed pepper spray, or some other type of irritant, in

the first class section, forcing all the passengers to the rear of the plane. Five minutes

from the hijacking, flight attendants, Betty Ong and Amy Sweeny, contacted an

American Airlines Services Office and relayed information about the events taking place.

At 8:26 AM, Ong reported that the plane was flying erratically. One minute later,

American 11 turned south for New York. Ong and Sweeny continued to relay seat

numbers and descriptions of the hijackers to American Airlines Control Center personnel.

At 8:41 AM, Sweeney reported the plane was in rapid decent. At this time air traffic controllers declared American 11 hijacked and began rerouting air traffic so American 11 could land at John F. Kennedy International Airport. At 8:43 AM, Mohamed Atta made his final turn towards Manhattan. At 8:44 AM, Sweeney frantically reported to the American Airlines Control Center, "Oh my God we are way too low!" Seconds later the phone call ended. At 8:46 AM, American 11 crashed into the North Tower of the World Trade Center.

The aftermath of the September 11th terrorist attacks left 2,996 people dead with over 6,000 more injured. World Trade Center's 1, 2, 3, 4, 5, 6, 7, Fitterman Hall, Deutsche Bank Building, and St. Nicholas Greek Orthodox Church were all destroyed with dozens of other buildings damaged in the attack (FEMA, 2002). However, the crumbling of the twin towers will forever be engrained into the minds of U.S. citizens. Preventing another terrorist attack became top priority of the U.S. government (Heyman and Ridge, 2006).

The Patriot Act was the first major piece of legislation passed in response to the September 11th attacks. In the year after the attacks, Congress passed more than 130 pieces of legislation related to combating terrorism. Such legislation included the Aviation and Transportation Security Act, and the Enhanced Border Security and Visa Entry Reform Act. The government also created the Department of Homeland Security, which is the third largest agency in the U.S. government. More than 260 government agencies were either created or reorganized following the terrorist attacks (Priest and Arkin, 2010). More than 1,200 government organizations and 1,900 private companies

engage in work related to counter-terrorism, homeland security, and intelligence (Priest and Arkin, 2010). Budgets for anti-terrorism and defense related matters also rose.

Often in times of emergency or disaster, governments utilize architecture to reassert their power and authority (Dovey, 2001). After the September 11th terrorist attacks, New York's Lower Manhattan was encased in Jersey barriers and chain link fencing (Sorkin, 2008). Throughout the country, makeshift security improvements were designed with the sole purpose of improving the safety of the building and its occupants, with little to no regard for social, economic, transportation, or aesthetic consideration. The open areas surrounding these buildings have been scenes for farmers markets, outdoor concerts, and picnics. With the implementation of these new security measures these public uses have nearly been eliminated. These new spaces often resemble sterile fortress like spaces and are known as security zones (Hollander and Whitfield, 2005).

Such terrorist attacks add further momentum to an already apparent militarization and fortification of urban public space in many U.S. cites (Coaffee, 2009). In the U.S., terrorism has been portrayed as a threat to freedom, democracy, and civilization; only countered by a need to fortify cities coupled by military action across the globe (Coaffee, 2009, Marcuse, 2006, Graham, 2007). Graham (2007) states the systemic fortification of our cities is closely related to continuing social polarization, urban sprawl, continued expansion of fortified enclaves, and a growing culture of fear.

Exploiting the culture of fear are security industries and experts who profit from providing municipalities and businesses services in communications, sensing, tracking, and surveillance systems. Shortly after September 11th, Mike Davis predicted that military and security companies of the new "fear economy" would quickly capitalize on

the nation's nervousness of future terrorist attacks in urban areas (Davis, 2001). Marcuse (2006) notes, with the threat of terrorism, the security industry is now one of the fastest growing sectors of the U.S. economy. Since the Oklahoma City Bombing, Washington D.C. has become the epicenter of a type of security industrial complex (Hoffman and Chalk, 2002).

Defensive urban design can minimize the damage of a terrorist strike on key urban spaces (FEMA, 2011). For example, bollards can be erected around building perimeters to increase standoff distance between a truck bomb and the building, thereby reducing the potential damage to the building. However, any secured boundary will always remain semi-accessible to any determined terrorist. These security zones also interfere with the fundamental accessibility of contemporary cities.

Cities are based on the freedom of movement and interaction relies and depends on intricate and open flows of people, goods, commodities, information, and capital (Coaffee, 2009). Graham (2007) worries that current government policies towards urban anti-terrorism could potentially reduce the cities "porous, open, intrinsically unpredictable city spaces and systems" to nothing more than an endless series of secured passage points. For city dwellers, urban anonymity would be lost and urban life would be intolerable and unsustainable. As Graham (2007) states:

> With the pervasive mantra of security creeping over every domain of public life and public policy – which previously were dominated by other concerns such as urban design, social, welfare, immigration policy, transportation management, and city planning – there is a real risk that with the excuse of stopping terrorists before they strike, the very processes of interchange, interconnection, privacy, political mobilization, and social and democratic innovation that make cities livable, dynamic, creative and successful, might be seriously undermined (¶ 15).

<u>Statement of Purpose</u>

It is not a matter of if another terrorist attack will occur, but when. These attacks can occur in any major city or small town U.S.A. What is known, is the fundamental counter measure to prevent such attacks is urban fortification; and the fortification itself does have a measurable influence on urban public space (Coaffee, 2009; Graham, 2010; Hollander and Whitfield, 2005; Marcuse, 2006; Savitch, 2008; and Warren, 2002). The measurable influence on urban public space is a combination of militarization/fortification/deployment of security zones, the decline of iconography, and decentralization (Briggs, 2005).

Few researchers have examined what security methods are present within the urban areas. While studies have described the existence of anti-terror security that is present in global cities like New York (Marcuse, 2006), London (Coaffee, 2009), Washington D.C. (Benton-Short, 2007) and Jerusalem (Savitch, 2008), none have conducted empirical assessments of the spatial extent of security zones. Studies that have identified the existence of security zones (Hollander and Whitfield, 2010) have only provided recommendations for a balance between open public spaces and their security.

However, these studies did not provide approximations or the degree and intensity of security zones.

Given the amount of research dedicated to the aesthetics and perception in urban security studies, the lack of studies on security zones in urban public space is an oversight. The majority of urban security research has been focused on the symbolic meaning of the security measures (Blobaum and Hunecke, 2005; Day 2006; Wang and Taylor, 2006). This dissertation contributes to empirical studies on the spatial extent and intensity of urban fortification/security zones and their influence on urban public space.

This study determines where security zones manifest themselves by quantifying the fortification of the security zones and measure the intensity of these spaces in three major U.S. cities. Once the intensity and extent of the security zones have been identified, this dissertation will show how the increased security affects demographic, economic, and social activity within the central business districts of Chicago, Indianapolis, and Detroit. By studying cities such as Chicago, Indianapolis, and Detroit, this analysis will determine whether cities that have not experienced a major terrorist attack and have a smaller population and density, have fortified buildings, areas, and neighborhoods and also restrict or close off public space in their civic and financial districts, similar to larger global cities such as New York, London, and Madrid.

The fortification of urban space dissolves many settings in which protests, demonstrations, and various other First Amendment rights can be freely utilized. Urban public space has been based on creating open and safe environments for city dwellers. However, ultra-secure urban spaces can filter citizens into oppositional groups limiting access to those believed appropriate (Nemeth, 2009). Newman (1973) found that

constant surveillance in a public space made pedestrians feel as if they were hostile foreigners who should not be present. Security zones may function well in securing property and the safety of urban dwellers, but if social and commercial activities are being affected by security zones, empirical studies are needed to better understand the frequency and intensity of security zones manifesting themselves within public space.

<div align="center">Methodology</div>

To better understand the emerging phenomena of security zones and fortifying urban public space, this dissertation will examine security zones located in the civic and financial business districts in three U.S. cities: Chicago, Detroit, and Indianapolis. Major global cities such as London and New York, having all experienced terrorist attacks, are recognized as the standard of interagency collaboration and proactive planning against terrorist attacks (Ervin, 2008). However, there is virtually nothing written about recent security measures or changing urban space in Chicago, Detroit, and Indianapolis in response to security zones.

Each city in this study is listed in the Department of Homeland Security's 2010 Urban Area Security Initiative List. The United States Department of Homeland Security has identified these cities as high risk targets for future terrorist strikes, and these cities receive federal funding in response to this threat. The Department of Homeland Security (DHS) devotes 34 percent of its operating budget to making potential terrorist targets less vulnerable to attack (Hobijn and Sager, 2007). The DHS considers Chicago to be a Tier I urban area due to its high population density and high risk for threats (DHS, 2010). An analysis of this type of city is likely to expose fortification measures at their most extreme. Detroit and Indianapolis are considered Tier II cities due to their lack of

potential terrorist targets. These cities were selected in order to determine the level and intensity of security differences between Tier I and II type cities, as well as to compare the differences in social and commercial activities between Tier I and Tier II cities.

It is also informative to analyze central businesses districts in cities other than New York, London, and other major global cities, to better understand whether security measures differ in relation to the size and population density of cities. Therefore, this dissertation will examine security zones/fortified spaces within both civic center districts, which are comprised mainly of public buildings and governmental structures, and financial business districts which encompass major banks and other financial institutions. For the three sample cities, these areas are located within their central business districts. The concentration of high-profile corporate headquarters and governmental buildings make these areas prime targets for high profile terrorist attacks (Savitch, 2008).

The districts studied within each city differ in population, density, size, and geographic location. Each city offers a very different expression of public space. This study considers public space to be: publicly or privately owned exterior space legally required to allow public access, including all plazas, parks, sidewalks, and pedestrian streets where motorized traffic is forbidden. Privately owned spaces, such as corporate plazas, are still publicly accessible, but might present different obstacles or prioritize use for employees over the general public.

A security zone is a restricted area located around a public or private building that has a combination of access restrictions, behavioral controls, or other security measures (Nemeth and Hollander, 2010). These individual zones embody a security landscape and can be located on either public or private property and enforced and managed by private

developers and property managers or governmental entities. An individual entering a

security zone will either be surveilled, have their behavior modified, or have their access

restricted to some degree, or experience a combination of these measures, while

occupying security zone space. The main attribute of a security zone is that it originates

as an aftereffect of terrorism prevention (Hollander and Whitfield, 2005).

Because the levels of security zone restrictions vary from zone to zone, a simple

and objective set of criteria is used to distinguish and classify security zones and security

landscapes based on their overall level of restriction and or the presence and intensity of

certain benchmarks.

Figure 1: Jersey Barriers

Figure 2: Bollards surrounding the Chicago Mercantile Exchange

These benchmark variables will be access restrictions, behavioral controls, and surveillance. Access restrictions will include: bollards, Jersey barriers, gates, or fences located at entrance and exit points to a space or building. Behavioral controls include posted signs prohibiting activities such as photography or loitering, or physical features that discourage sitting or gathering in small or large groups. Surveillance measures will include security guards/police officers and other human surveillance. Closed circuit television (CCTV) video surveillance cameras are also included under surveillance.

Drawing from Robert Sampson's ecometric method of observing behavioral settings, Chicago, Indianapolis, and Detroit were visited over a period of several days to collect cross-sectional systematic social observations of existing security zones. Each city's security zone variables were observed then coded for analysis. The dimensions of each security zone were also geotagged to ascertain and document the intensity of each individual security zone. While in the field, a global positioning system (GPS) digital camera was employed to define the boundaries of the security zones. Identifiable security zones were photographed with the GPS camera which embeds global positional

data, latitude and longitude, into the digital picture. This process is called geotagging photos. The geotagged photographs were then uploaded into the geographic information system (GIS) computing software program ArcGIS. The geotagged photos, with the global positioning data, were then encoded to ArcGIS. The geotagged photographs allow for the creation of security zone polygons by using the spatial calculation of the total area of each security zone polygon. High resolution photographs of each security zone were also collected. Buildings exhibiting the security zone classification criteria were observed and coded for spatial analysis in ArcGIS.

Once the security zones were identified within the ArcGIS program a spatial analysis of the data was conducted. The spatial analysis tool of inverse distance weighted (IDW) interpolation, contained within the ArcGIS program, measured for the intensity of the security zones and its neighboring space. IDW interpolation predicts a value for any unmeasured data point using values from measured data points. This method is used to measure the values of a particular phenomenon that cannot be measured at every data point. Interpolation is commonly used for measuring precipitation, temperature, soil and ground water characteristics, pollution sources, and various vegetation data.

This dissertation is the first time IDW interpolation will be employed to measure the social phenomena of security zones. IDW interpolation will provide an observable frequency and intensity of a security surface for security zones/defensible space measures deployed to protect high value terrorist targets within each city's core. ArcScene, a 3D visualization software program that allows for GIS data to be viewed in three dimensions, will be used to provide highly detailed security zone surfaces of the IDW interpolation maps. This methodology can be replicated and will allow for future researchers to

engage in cross-sectional or longitudinal analysis of Chicago, Indianapolis, Detroit or other cities.

As previously stated, this dissertation will compare demographic, economic, and social activity in the three cities, both within the identified security zones and areas outside of the identified security zones. The data used for this study will be population rates, crime rates, and office space rental rates from 2000 through 2010. In doing so, this dissertation will provide a visual representation of security zones in these cities, as well as offer an explanation of its influences over commercial and social activities within these security zones.

Chapter two provides a theoretical foundation for this dissertation. Chapter three begins with a review of the scholarly literature on the history on fortifying public and private space within cities. The chapter explains the application and evolution of combating terrorist activities with crime prevention through environmental design. A detailed description of how security zones, located in the civic and financial business districts in three U.S. cities: Chicago, Detroit, and Indianapolis, will be analyzed and the methodology that will be used to provide such analysis will be discussed in chapter four. The findings and discussion are located in chapter five. Chapter six contains the conclusion and recommendations section, which provides suggestions for future studies.

CHAPTER TWO

THEORETICAL CONTEXT

<u>Social Disorganization Theory</u>

Although the concept of community is fundamental to society in general, sociological definitions of community began with Par and Burges and the Chicago School of Urban Sociology. Park and Burgess (1924) defined community as an area developing from the competition over property, real estate, and other resources in an urbanized city. Since this definition, a neighborhood has been considered as a geographical and social subset of a community in which residents share a common sense of identity that continues over a period of time (Burskik and Grasmick, 1993). Because of this, empirical studies have approximated neighborhoods by geographical and political boundaries such as census tracts, block groups, and various physical features.

Based upon Park and Burgess' (1924) theory of urban ecology, Shaw and McKay (1942) conducted a study of the spatial distribution of juvenile delinquency in Chicago during the 1920s, which led them to propose social disorganization theory. Their study provided an explanation for the unequal distribution of criminal activity in urban spaces. They found by mapping out residential locations of juvenile delinquency over time that crime rates are highest in lower-class neighborhoods, with a concentration within the urban core. The crime rates decreased the further a juvenile was from the city center. Shaw and McKay also found that crime rates in areas of the city remain stable over time, regardless of social makeup. Therefore, juvenile delinquency was profoundly concentrated in inner city neighborhoods over time, despite an almost total change in the

racial and ethnic makeup of residents. This suggested that the setting was in some way responsible for the crime rates.

Shaw and McKay (1942) also found that neighborhoods in the inner city were characterized by numerous social problems. The inner city neighborhoods were economically disadvantaged as indicated by the high number of people receiving public assistance. Also, a high proportion of the people had low median rent, a low rate of housing ownership, and high unemployment rates. Housing conditions were poor and the jobs available to residents were mainly low skilled industrial jobs. Shaw and McKay also found the high crime neighborhoods were characterized by high residential turnover rates. They found several health problems within these neighborhoods such as infant mortality, tuberculosis, and mental disorder. Finally, high crime neighborhoods were characterized by racial diversity. Shaw and McKay believed the mixture of ethnic groups hindered the collective efficacy among neighborhood residents. With these findings, Shaw and McKay argued the spatial distribution of juvenile delinquency was a function of ecological characteristics, and not the individual characteristics of neighborhood residents. Their model suggested that neighborhood structural characteristics, such as poverty and residential mobility, led to the social disorganization of the neighborhood, which resulted in an increase in crime rates.

Shaw and McKay's empirical analysis and theoretical outline were paramount in supporting future studies of crime; however, several limitations of their work have been identified (Bursik, 1988; Kurban and Weitzer, 2003; Sampson and Groves, 1989). The most glaring problem with Shaw and McKay's theory is it did not explain the causal mechanism that links neighborhood social disorganization to high crime rates. Most

notably, two versions of social disorganization theory can be perceived from Shaw and McKay's model (Kornhauser, 1978). The first is a variation of social disorganization theory that links structural characteristics and crime through the frustrated wants of residents in disadvantaged communities. Frustrated wants are the outcome of disparities between aspirations and expectations. The strain variation of social disorganization theory hypothesizes that criminal motivation and frustrated wants, resulting from the structural characteristics of the neighborhood, is the intervening variable leading to an increase in the crime rate.

The second version of social disorganization theory links structural characteristics and crime through weakened informal social controls. Informal social control in socially disorganized neighborhoods can be diminished in several ways. Due to high residential mobility and racial diversity, inhabitants of disorganized neighborhoods do not create or maintain an agreement of norms and values. A sense of attachment to the community, social solidarity, and social cohesion are all diminished. Residents who plan to leave their communities as soon as they have the means have little or no interest in fixing neighborhood issues. With no common goals, neighborhood residents cannot implement social controls and crime rates increase. Vacant buildings, graffiti, broken windows, and vagrants become symbols that the neighborhood is in disarray.

Shaw and McKay (1942) also observed that inhabitants of disorganized neighborhoods have fewer incentives in conformity, which lowers social controls or deterrents against criminal activity. Juveniles living in disorganized neighborhoods cannot develop conformity due to a conflicting value system. Having been exposed to delinquent subcultures, the juveniles start to have low internal control and cultivate

beliefs that are not consistent with conventional norms and values. Additionally,

traditional social institutions, such as family and schools, began to deteriorate which only

contributes to the lack of conformity and decreased social controls.

The control model of social disorganization theory contends that social control,

which is shaped internally and externally, impacts the costs of criminal activity.

Neighborhoods with high levels of social control make it difficult for individuals to

commit crime. Likewise, a neighborhood with decreased informal social controls, have

diminished stakes in conformity and weakens deterrents for criminal acts. Kornhauser

(1978) compared both versions of social disorganization theory and argues that the

control version is consistent with empirical evidence rather than the strain version.

Researchers have expanded upon the control version of social disorganization

theory by using survey data to identify the role of social ties and networks among

neighborhood inhabitants in establishing informal social control measures (Bursik and

Grasmik, 1993; Lowenkamp, Cullen, and Pratt, 2003; Sampson, 1991; Sampson and

Groves, 1989). In particular, Sampson and Groves (1989) presented that the effects of

structural characteristics on the level of crime were facilitated by the degree of

participation in community activities and extent of friendship networks, and the presence

of unsupervised youths. They argued that the structural characteristics of a

neighborhood, such as poverty, mobility, and racial composition, can decrease social ties

among residents, lower participation in community establishments, and the informal

monitoring of juveniles, which results in an increase in the level of criminal activity.

Bursik and Grasmick (1993) argued that social control in neighborhoods is

founded by social and physical institutions like family, schools, churches, and political

groups. More specifically, they reasoned the level of social organization and control varies across neighborhoods. This largely depends on the scope of internal social cohesion among residents, as well as the extent of community leaders ties to outside resources. Bursik and Grasmick's version of social disorganization theory is referred to as a systemic model that stresses the importance of networks among community members. Their model suggests that structural characteristics, such as socioeconomic status, diversity, and instability, affect the creation of these networks, which affects various types of social controls.

However, Sampson (2004) disagreed with Bursik and Grasmick's version and claimed that strong social networks do not automatically result in effective social controls. Sampson argues that collective efficacy, the mutual trust among residents and the willingness to intervene when problems are present, is the key structural characteristic that links social ties and the level of social control (Morenoff, Sampson, and Raudenbush, 2001; Sampson, 2004; Sampson, Raudenbush, and Earls, 1997). Using a multilevel framework, Sampson and his associates show that collective efficacy can be reliably measured at the neighborhood level. Using 1990 census data with a survey of Chicago residents, Sampson and his team found that the spatial proximity to homicide is strongly related to increased homicide rates. Collective efficacy with concentrated disadvantage, immigrant concentration, and community instability was able to explain approximately 70 percent of the variability in neighborhood violence. They also found that collective efficacy was able to mediate a substantial amount of neighborhood violence through the levels of socioeconomic disadvantage and residential instability.

Social disorganization theory offers a theoretical framework to understand the relations between neighborhood structural characteristics and criminal activity. The strain version of the theory argues that the principle variable that links neighborhood characteristics and crime is produced by neighborhood disadvantage which increases criminal motivation. The distribution of crime over space is a result of the degree in the distribution of motivated offenders. However, the control version of the social disorganization theory links the structural characteristics of neighborhoods to the level of crime through informal social control measures. Social networks amongst residents, interests in community issues, and a shared value system strengthen informal social control. The control version of the theory explains the spatial distribution of crime by fluctuating levels of social control that neighborhoods employ.

<div align="center">Routine Activities</div>

In addition to social disorganization theory, routine activities theory has been utilized to explain criminal activity over space, particularly at the micro level. Routine activities theory views criminal events as the meeting of offenders and victims happening under a certain set of circumstances. Routine activities theory holds that a crime occurs when a motivated offender and a suitable target converge in time and space in the absence of a capable guardian (Cohen and Felson, 1979). The theory states that the amount of crime can change even without an increase or decrease in the amount of motivated offenders. Instead the number of crimes can increase or decrease as the availability of suitable targets increases or decreases. Decreasing the amount of capable guardians increases criminal opportunity, which leads to an increase in criminal activity.

It must be noted that routine activities theory does not explain the factors of criminal motivation. The theory treats criminal motivation as a truth and instead focuses on the contexts and situations in which crime is most likely to happen. When explaining criminal events, routine activities theory assumes that individuals have rational choices. Criminal behavior is then predicted on the costs and benefits involved in the commission of a criminal act. The costs and benefits vary depending on the situations and targets. Routine activities theory considers opportunity a necessary component for a crime to occur. The theory holds that crimes are not randomly distributed over space and time because opportunity in not consistently distributed over space and time.

Under this theoretical framework, places and social contexts can facilitate or reduce crime in several ways. The first, is that physical features of a space can affect the degree of social control and criminal opportunities (Clarke, 2002; McNulty and Holloway, 2000; Sampson, 2002). High rise buildings can reduce natural surveillance because residents are living vertically and are uninvolved from monitoring activities at the street level. Secondly, Residents may also not know each other because of high residential turnover, which offers anonymity for potential offenders. Regardless of physical features, the crime rates are also affected by routine activities that are present (Block and Block, 1995; Davis, 1987; Eck 1995; Roncek and Maier, 1991). In particular, vacant buildings and rundown housing units may provide a potential market for drug dealers without fear of complaints from residents.

In addition to a micro level explanation for criminal activity, routine activities theory also provides a framework for understanding crime at the macro level. Cohen and Felson (1979) originally applied their theory to explain crime rates at the collective level.

Their departure from the aggregate level was a contradiction between improving social conditions and the increasing crime rates in the 1960s (Eck, 1995). During that time, socioeconomic conditions of citizens were improving, such as median household income, education levels, and drops in unemployment. However, crime rates were increasing. Cohen and Felson (1979) believed that the increase in crime rates could be attributed to changes in the routine activity patterns of U.S. citizens. An increase in non-household activities caused by the increase in labor force participation left many houses unguarded. These activities have shifted from private to public. Also, the availability of household televisions and stereos increased the number of suitable targets for crime. Cohen and Felson (1974) measured crime data from 1947 through 1974, and found that increased non-household activities were significantly associated with increased crime rates.

Routine activities theory effectively argues that the routine activities of both legitimate citizens and motivated offenders lead to the variation in criminal opportunities. Spaces and neighborhoods become crime hotspots because large amounts of individuals are attracted for reasons unrelated to criminal motivations, such as malls and airports. The hotspots also attracted motivated offenders due to the suitable opportunity for a criminal act. Also, an increase in the level of crime can occur if the level of guardianship fluctuates. By framing criminal acts as the time and spatial intersection of motivated offenders and unguarded targets, routine activities theory provides an improved understanding for time and spatial structures of crime events.

<u>Explanation of Behavior Settings</u>

Both social disorganization and routine activities theory stress an importance of the surrounding space; which has an influence over criminal activity. However, a better

understanding of space, more specifically behavior settings, is needed to describe the influences of criminal activity. Barker (1968) was the first researcher to originate the idea of a behavior setting. Behavior settings have since been defined as "naturally occurring units with standing patterns of behavior and a physical milieu that surrounds or encloses the behavior" (Moss, 1976, pp. 215). These settings are located in time and space. Behavior settings can include communities, neighborhoods, street corners, buildings, lobbies, and classrooms. Schoggen (1989) stresses a behavior setting is not a characteristic of the individual(s) involved, instead it is an "extra-individual" behavior phenomenon; meaning the behavior setting has unique and stable characteristics that persist even when people occupying the setting are removed and replaced with new individuals.

Behavior settings are the environment that is external to the individual and may influence, by enabling or constraining, his or her actions, including criminal behavior (Block and Block, 1995). Individuals' environments can be thought of as an arrangement of behavior settings that they are exposed to during their day to day encounters. Individuals' encounters with behavior settings create perceptions of options and prospects, called situations, in which the person may express their tendencies by making judgments and choices resulting in actions (Wikstrom, 1998).

With this in mind, it is important to note, that some behavior settings may be more likely than others to create situations in which a person may act unlawfully. The above mentioned assumption aligns with the fact that crimes are not randomly distributed, and the occurrence of a particular type of crime is usually linked to a particular type of legal activity; for example, violence occurring between strangers

usually happens during public activities (Wikstrom, 1991). Block and Block (1995) conducted a study on the relationship between the locations and density of bars, taverns, and liquor stores and the criminal behavior in the surrounding neighborhoods. They used a "GeoArchive" data set of police, census, and liquor license information from January to June in 1993. The data was compared to locations, crime events occurring within those areas, and incidents occurring in the adjacent areas. To their surprise, they found the location and density of bars, taverns, and liquor stores were not a strong indicator of criminal activity within the neighborhood areas.

The question then becomes, what makes a behavior setting more criminogenic than another one? Wikstrom (1998) states this can be explained by the extent to which the setting produces three characteristics. The first are temptations, which are perceived options for particular desires. The second is provocations; these are perceived attacks on an individual's property, security, or respect that evokes anger or similar emotions that could incite unlawful aggressive responses. The final trait is weak deterrence, which are the perceived low risks of consequences or detection generally associated with engaging in unlawful activity in response to provocations or temptations.

Wikstrom and Sampson (2003) state, given the cultural and structural environment, some types of behavior settings inherently produce higher levels of temptation, provocation, and deterrence than others. However, the degree at which a person will be tempted and provoked by a situation and the likelihood they will engage in unlawful activity is dependent on their self-control and morality. It is also plausible that the deterrent effect of a particular behavior setting is also dependent on the individual's disposition to engage in criminal activity (Wikstrom, 1998). The deterrent measures of a

behavior setting may not play a huge factor for a person's course of action if they have low self-control and have little regard for the consequences of their criminal behavior (Wikstrom, 1995). If the notion that behavior settings differ in their possible criminogenic characteristics, then a key question that must be answered is why some behavior settings tend to be potentially more criminogenic than others. According to Wikstrom (1998), this can be answered by examining the role community context has in producing behavior settings with more or less criminogenic characteristics.

<center>Structural Characteristics within the Behavior Setting</center>

Neighborhoods and communities vary widely in their structural characteristics (Wikstrom and Sampson, 2003). These variations can include residential population characteristics and compositions such as poverty, ethnic heterogeneity, family factors, and stability of residents. However, structural characteristics also include the differences in the characteristics and layout of buildings and spaces and their related activities (Michelson, 1976). These include density and arrangement of the space and the presence of buildings and spaces for non-residential use. Structural characteristics of neighborhoods can also include the makeup and composition of the nonresidential population of people occupying the area. That is individuals who work, but may not live in the area, people who visit people who live within the area, or people who are attending activities within the area. Variations in community structural characteristics are, "fundamentally a result of processes of residential segregation and differential land use which, in turn, are related to aspects of wider political economy, such as means of production (technology), division of labor, and distribution of wealth (inequality)" (Sampson, 1999, pp. 261).

Wikstrom and Sampson (2003) argue that the social mechanisms, enabled by structural characteristics through their impact on the community social environment, influences individual development and actions. Wikstrom (1998) summarizes this as resources, rules, and routines. Wikstrom's basic premise is that the community structure provides the rules and resources that residents take cues from in their daily lives, which in turn influences the "patterning and content" of their daily routines, and the specific resources and rules linked with types of behavior settings created by the community routines. Wikstrom (2002) points out that even the most heinous criminal offenders only spend a fraction of their time committing criminal acts, which highlight that behavior settings may be an important factor in triggering criminal actions. Wikstrom and Sampson (2003) state the role of community context for individual action is that it either restricts or facilitates and guides a person's action through the behavior settings created by the community routines and the type of resources and rules associated to a particular behavior setting.

The importance of community resources, rules, and routines for the explanation of a person's involvement in criminal activity has been established in community centered criminological research; however, a key concept remains underdeveloped. What is lacking is the concept that directly connects the community context to individual development and actions (Wikstrom, 1998). Sampson and Wikstrom (2003) believe the behavior setting is the factor that could provide such a link. Dishion, French, and Patterson (1995) are among the few researchers that have stressed the importance of behavior settings for the explanation of antisocial behavior. While observing deviant behaviors in juveniles in both the home and school setting, they were able to link

neighborhood context to early onset antisocial behavior. However, their explanation of behavior settings is unrestrained and lumps a wide range of behavior settings which includes neighborhoods to school classrooms. Shonkoff and Phillips (2000), who also look at adolescent antisocial behavior, found that while family supervision of the child is a community factor, the community context in which the families operate, are likely to influence management strategies of the child. Based on this work, Wikstrom and Sampson (2003) argue a person's encounter with behavior settings, depending on the individual's characteristics and the characteristics of the behavior setting, will perceive their options then make choices, and take action.

Researchers have traditionally studied the impact of collective efficacy on behavior settings to better explain social disorganization. Sampson (2003) has established that social mechanisms operating within behavior settings can either restrict or facilitates people's actions. Such mechanisms can be the deciding factor between a behavior setting having high or low levels of temptation, provocation, and deterrence. Using this theoretical framework, this dissertation will draw upon the social disorganization and routine activities theories and examine a new form of social mechanisms that are being systematically implemented within urban settings across the United States.

In the post 9/11 era, cities have undergone urban fortification at an unprecedented level. While studies have described the existence of anti-terrorism security areas that are present in global cities like New York (Marcuse, 2006), London (Coaffee, 2009), Washington D.C. (Benton-Short, 2007) and Jerusalem (Savitch, 2008), none have conducted empirical assessments on the spatial extent of security zones and their effect

on the behavior settings in which they exist. Studies have identified the existence of security zones (Hollander and Whitfield, 2010; Nemeth, 2010; Nemeth and Hollander, 2010), but have only provided recommendations for a balance between open public spaces and their security. Even fewer studies provide approximations of the degree and intensity of security zones.

<div align="center">Conclusion</div>

Most research on neighborhoods and community areas have relied upon administrative data collected by government agencies such as the Bureau of the Census. Census data primarily covers socio-demographic characteristics such as race, poverty, unemployment, and family structure. Other neighborhood level administrative data includes crime reports, public health data, education, and various social service figures. Although administrative data provides insight into neighborhood activities, they are not useful for displaying unofficial activities. Common sources of data are ill equipped to explain the physical property of neighborhoods such as undetected crimes, density of business types, and security zones.

Raudenbush and Sampson (1999) describe the study of the reliability and validity of assessing ecological units, at the neighborhood level, as ecometrics. Ecometrics is used to measure neighborhood context/social processes primarily through direct observation that would not normally be cataloged by the aforementioned administrative data collection agencies (Savitiz and Raudenbush, 2009). For example, Raudenbush and Sampson (1999) studied physical and social disorder within Chicago neighborhoods by using such observational measures. They observed and coded city blocks for the presence or absence of abandoned cars, graffiti, syringes, broken bottles, and other

various forms of neighborhood garbage. Raudenbush and Sampson utilized this observational data to produce a measure of physical disorder within the sampled neighborhood.

In his 2012 presidential address to the American Society of Criminology, Robert Sampson called upon researchers to utilize advances in technology to identify and measure social phenomena across varying spatial scales. In particular, Sampson (2013) mentioned how advances in GPS and GIS technology should be and can be adapted to help transform how contextual research is conducted. Much like the Boston Area Research Initiative, which provides a vast array of visual socioeconomic information through a GIS system, ecometric research should make use of these technological advances to better visualize and provide a more accurate neighborhood context (Sampson, 2013).

Employing similar ecometric methods and answering Sampson's call for GPS and GIS integration into social research, this dissertation relies upon the direct observation of anti-terrorism security measures occurring within the central business districts of three U.S. cities. By using anti-terrorism security variables, such as access restrictions, surveillance, and behavioral controls, this study will determine where these security zones manifest themselves and measures the degree of intensity of these spaces through a geographic information system to produce an inverse distance weighted interpolation map. Once the intensity and extent of the security zones have been identified, this dissertation will then compare demographic, economic, and social activity within the identified security zones to areas outside of the identified security zones.

This dissertation will also expand upon Sampson's definition of social mechanisms to include anti-terrorism security zones appearing in urban areas. And although security zones were present prior to 2000, the drastic expansion of security zones did not occur until after the September 11th terrorist attacks. Security zones are essentially social mechanisms that have a purpose of regulating, reducing, and or displacing political crime within behavior settings. The question this dissertation asks is: are the security zones affecting demographic, economic, and social activities within the identified security zones of Chicago, Indianapolis, and Detroit.

It is reasonable to expect that security zones within these three U.S. cities are reducing and or displacing crime rates within these areas, and therefore creating a safer space for people to live and work. Therefore, over time, economic activity should increase within the security zones. Additionally, with lower crime rates and increased economic activities, it could be argued that there should also be an increase in population. The following chapter provides a detailed explanation of urban fortification and security zone literature.

CHAPTER THREE

FORTIFYING URBAN LANDSCAPES

<u>Introduction</u>

Since the September 11, 2001 terrorist attacks the privatization and fortification of public space within cities has progressed at an unprecedented rate, especially for New York City, London, Madrid, Mumbai, and other global cities that have a perceived threat of future attacks (Davis, 2001; Light, 2002; Graham, 2004; Sternburg and Lee, 2006). It should be noted that the September 11th attacks did not mark a beginning of fortifying urban areas; however, the events after 9/11 can be seen as an example emphasizing the ongoing historical trend of increased urban security (Coaffee, O'Hare; Hawkesworth, 2009).

From the beginning of civilization, cities have been designed to defend against invading armies or protect its inhabitants from the elements (Forbes, 1965). As urbanization took place, the defensive mechanisms deployed by city authorities became more advanced in repelling intruders (Morris, 1994). The most common form of these defense mechanisms was physical barriers such as gates, walls and ditches (Mumford, 1961). These structures, especially the city wall, produced an image of inclusion and exclusion. The rich would live within the well defended city and the poor would live in danger outside of the city's defenses (Pile, Brook and Mooney, 1999). Archaeologists have found ancient urban areas near the Nile, Tigris, Euphrates and Yangtze Rivers that were often surrounded by ditches, walls and other defensive measures to protect themselves from outside dangers (Morris, 1994).

The features of a city wall, tower, and ditch has become the most conjured image of an ancient city. These defensive features have changed very little since the creation of Jericho until the use of gunpowder hundreds of years later (Keegan, 1993). Once cities became more open, new defensive features began to take hold. New walls and gated spaces started to develop within the city (Luymes, 1997). By the mid-nineteenth century many cities featured secured residential housing for the social elite (Newman, 1980). Finding the appropriate defense from external attacks has been an ongoing conundrum for many urban planners (Morris, 1994).

According to Coaffee et al. (2009) cities have been characterized with feelings of insecurity and fear of crime. As cities evolved, defensive measures became more complex in order to cope with the ever changing strategies of invaders. Poyner (1983) noted that castles and walled villages of Medieval Europe were prime examples of this blueprint. Internal defenses were represented by the fortress or keep, usually surrounded by a moat, centered in the middle of the village, while external defenses, such as a city wall, were the first line of defense. As technology improved, the city wall and castle became less relevant.

In many ways, modern cities are no different from their medieval counterparts. Modern cities embed defensive features into their urban landscape. During the 1960s, the association of urban design and defensive architecture was given widespread consideration due to rising crime rates and the decay of high-rise residential buildings (Newman, 1995; Gold, 2007). The most notable are the concepts of Crime Prevention Through Environmental Design and Defensible Space. These theories advocate for controlling and/or deterring crime by "designing out" the crime through the addition or

removal of certain physical features. These features can control access, increase

surveillance, and therefore limit the opportunity for crime to occur in these spaces.

During the 1970s and 1980s, law enforcement officials in the United Kingdom and Israel

also employed these strategies in response to terrorist attacks (Brown, 1985; Coaffee,

2009).

The 1990s saw a further increase in violent crime along with various racial

conflicts which furthered segregation within the urban landscape (McLaughlin; Muncie,

1999). This was also fueled by numerous fortification and surveillance features popping

up within cities during the 1990s. Common urban fortifications can include everything

from gated communities, walls, doors, and bollards to Jersey barriers, surveillance

cameras, narrowed or obscured entrances, and manned security booths. Commercial

plazas, neighborhoods, retail stores, entertainment districts, and public facilities were

fortified due to the policy actions of urban authorities, business owners, and wealthy

citizens (Fyfe, 1997; Davis, 1998). Mike Davis (1995) argued cities were becoming

alarmingly fortified and have become places of terror rather than public spaces. Davis

believed the city was becoming militarized and was transforming into a place that policed

social boundaries through architecture (Davis, 1995).

Perceptions of fear among city residents helped increase the trend towards urban

fortification (Glassner, 2000; Furedi, 2002). Citizens living in city areas perceived to be

at risk of criminal activity construct defensive regions to protect themselves (Ellin, 1997).

These urban fortifications are costly, which divides the rich from the poor. Many

researchers have argued that present day life in the city has changed and that certain

members of society have sealed themselves away from the rest of the city. This sealing

away creates a new type of privatized space which does not allow the same level of access to all members of society (Sorkin, 1992; Atkinson and Helms, 2007).

In the past several decades the urban landscape has been repurposed and restructured due to political processes at the local and global levels that continue to separate cities into individual territories, cultures, and economies (Graham and Marvin 2001; Coaffee and Murakami-Wood, 2006). The idea of segregating and restructuring sections of the city in the attempt to group certain areas for socioeconomic advantages is nothing new (Graham, 2004; Coaffee, Murakami-Wood and Rogers, 2008). These groupings have formed financial, civic and cultural districts or enclaves within the city. This grouping phenomenon has increased in recent years due to the increased fear of crime and terrorism in urban areas as well as recent economic struggles between cities (Savitch; Coaffee and Rogers 2008).

The fortification and privatization of public space is the common response when city dwellers are fearful of criminal acts (Ellin, 1997). As a result of an increased perception of crime, or potential act of terrorism experienced by inhabitants of a particular area, fortification and privatization occurs, which leads to the modifying or repurposing of the physical form in an urban landscape (Graham, 2002; Coaffee 2005; 2006). This perception has led to a number of fortified urban features in many U.S. cities. These features can range from the removal of city benches to curtail the homeless living on the street, to the extreme of gated and guarded commercial and residential areas (Davis, 1990; Flusty 1994).

Although it may not be as obvious, contemporary cities have their own emphasis on defense. During the last several decades, many defensive measures have been

employed to respond to rising crime rates and the fear of crime, escalating social conflicts, increased racial and ethnic tensions, and the increase of attacks by terrorist groups against urban infrastructure. These risks have led to urban authorities deploying sophisticated surveillance, advanced security management plans, and urban fortification measures. These fortification measures have commonly been described as the fortress city, walled city, and gated communities. These security features reduce public access, enhance surveillance and have a number of security personnel patrolling these areas. These measures invoke notions of unfair spatial control of a certain urban area by certain social groups (Coaffee et al., 2009).

<div align="center">Public Space</div>

Public space is essential for the livelihood of cities. Public spaces are sites of interaction in which individuals cooperate with one another. Cities are full of freely accessible spaces allowing for planned or unplanned encounters and activities. Public spaces can be seen as educating city inhabitants about one another (Lofland, 2000). In order to be successful, public spaces must be unconditionally accessible and inclusive, while encouraging interaction between acquaintances and strangers (Kohn, 2004). Public spaces serve as a location where social interactions and public activities can occur for all members of the public (Mitchell, 2003).

This concept of public space has been long accepted by many urban theorists. Wirth (1938) argued that the city is an urban stage and a protector of freedom and tolerance. Jacobs (1961) believed that urban planners could increase sociability by prioritizing street level action within neighborhoods like Greenwich Village, New York during the mid-twentieth century. Rapoport (1977) contends that cities must

accommodate a diversity of uses and users by remaining adaptable and flexible. In 1974,

Henri Lefebvre published *The Production of Space*. Lefebvre's central argument is that

space is a process, or is constantly being produced, as opposed to an inanimate object.

He does not accept the traditional belief of space being a physical area that is simply

inhabited. Instead, Lefebvre argues that actions and relations among people and

processes join together to produce space (Lefebvre, 1991). Public spaces allow for city

inhabitants to engage in a social life. Marcuse (2006) states public spaces are alive,

diverse, and accessible to all and are symbols of a truly democratic city.

However, while urban planners are attempting to attract a certain type of citizen,

it comes at the expense of other less desired individuals. As public space is increasingly

organized around consumerism, individuals who contribute by purchasing goods and

services are welcomed, while those who do not or are unable are discouraged (Fyfe and

Bannister, 1998; Turner, 2002). Fyfe (1998) argues "purifying" and privatizing public

spaces to support consumerism, at the expense of others, contributes to social exclusions

and a sense of inequality for people. Critics who deplore the loss of pubic space are also

concerned with the reduction of a democratic public sphere rather than the loss of actual

physical public space (Sorkin, 1992; Mitchell, 2003; Kohn, 2004).

Blomley (2001) argues that public space only manifests itself when it is the site of

the development of the public sphere and can only do so if it is occupied or actively

creating public space for use as a political forum. The public space and the political

public sphere relationship are based on the understanding of citizenship and the

perception of who is represented in the public sphere or who occupies public space.

Representation and citizenship are related to visibility and making physical appearances

in public space (Young, 1990). Mitchell (1995: 15) states, "By claiming space in public, by creating public space, social groups themselves become public." Public spaces are the center of power and politics and provide many opportunities for interaction and representation (Gould, 1996). The model of open freedom enables flow of dialogue, promoting active citizenship and enabling political representation. Open cities are the forum for dissent and protest and where diverse users can state and discuss opposing opinions and viewpoints.

<div align="center">Crime Prevention through Environmental Design</div>

During the 1960s and 1970s, defensive architecture through urban design was widely employed by urban planners in the United States as a result of research which suggested an association between particular types of environmental design and reduction of criminal activity (Gold, 1970). These designs produced concerns that fortifying the urban environment was socially and economically detrimental and that the providers of urban security were starting to become privatized due to the lack of faith with municipal authorities to properly provide security within the urban environment. Robert Gold (1970) noted that the urban environment was being fortified due to demands from citizens and that safety had become a commodity that was being bought and sold with real estate.

Jane Jacobs was the first sociologist to propose analyzing the relationship between the physical environment and crime. Jacobs (1961) noted in *The Death and Life of Great American Cities* how urban design could jeopardize community safety. Her research criticized the urban renewal and slum clearance practices in the 1950s. Jacobs (1961) found the urban planning practices as unnecessary and destroying older

neighborhoods. Jacobs argued the older structures provided natural security techniques that were useful for the communities being studied. For example, she referenced structures that were close to the street like stoops, porches, and street level windows, which allowed community members to bond and establish a sense of community. Removing these structures would decrease the ability to identify strangers, reduce social interaction and decrease the sense of overall security felt by community members. As a result of these safety concerns, urban designers researched strategies to limit the opportunity of crime.

This shift of concern was also in response to the race riots which plagued cities in the late 1960s, as well as the problems associated with design of high rise blocks, which were perceived as breeding grounds for criminal activity (Coaffee et al., 2009). These high rise apartments were described as "indefensible space" (Newman, 1972). Urban planners began to research how the manipulation of the physical environment could produce space that would limit and even suppress criminal behavior, especially opportunistic criminal activities.

Crime Prevention through Environmental Design (CPTED) was developed by criminologist C. Ray Jeffery in 1971. He suggested that the physical environment could be modified to produce space which would discourage criminal activity while at the same time maintaining social cohesion amongst law abiding citizens. CPTED is based on four elements: natural surveillance, natural access control, territorial reinforcement, and maintenance. Natural surveillance is a design concept with the primary purpose of keeping people under observation. This can involve certain placement and design of windows, lighting, and landscaping features to deter criminal activity, through increased

observation, while providing space which encourages positive social interaction. Natural access control utilizes elements such as doors, shrubs, fences, and gates to deter admission to a target and or victim and create a perception among potential offenders that there is a substantial risk in selecting the target/victim. Jeffery's third element of CPTED is territorial reinforcement. The surrounding environment can be designed to clearly establish public and private spaces to the public. Low walls, landscaping, and pavement patterns can create a sense of ownership which would then be perceived by would-be criminal offenders to stay away. The final element is maintenance. Jeffery ties maintenance into the Broken Windows Theory. Deterioration of a space could indicate less control and concern by the owner and indicates a greater tolerance of disorder. Proper care and maintenance allows for the use of the space for its intended purpose. These elements would reduce opportunities for criminal activity to be committed and which would potentially reduce the level of fear of crime (Jeffery, 1971). In later works, Jeffery (1978) believed that in order to reduce criminal activity the environment must be changed instead of spending time attempting to rehabilitate criminals.

Jeffery's work was soon followed by a number of studies on architectural crime deterrence. Of all these studies, none evoked more debate than the publication of Oscar Newman's *Defensible Space – Crime Prevention through Urban Design*. This crime control model, which draws mainly upon Jeffery's crime prevention through environmental design theory, is also based out of the public health model. Rather than waiting for a particular disease to attack, Newman focuses on prevention and early diagnosis. Newman's defensible space theory engages in crime control, as well as trying to understand the underlying characteristics of high crime neighborhoods in order to more

effectively combat crime. Newman's work is also based upon Skinner's operant learning theory. People respond to the environment in a particular way in order to maximize pleasure and to minimize pain. Newman believed by removing reinforcements for criminal behavior, the individual will not respond to an environmental stimulus to commit a criminal act, therefore reducing crime.

Newman's research on housing in New York and St. Louis led to the concept of defensible space. Defensible space calls for thoughtful design strategies, with certain spatial features, to allow for residents to become key managers in ensuring their security. This concept can involve using a wide array of mechanisms, real and symbolic barriers as well as increased surveillance, which when combined would enable residents to be in control of the physical environment (Newman, 1972). Defensible space was viewed as an expression of social fabric that could defend itself and could be achieved by the manipulation or repurposing of architectural and design principles (Coaffee et al., 2009). Newman also suggested that security fences and electronic surveillance technologies could be employed, but only as a last resort. Defensible space is an alternative to target hardening measures which can include screening visitors, patrolling security guards and installing iron bars on doors and windows. These target hardening measures can make public space uncomfortable and discourage a sense of community.

Newman (1972) noted that anonymity within the city was associated with rises in the crime rate. His research utilized crime statistics collected by the New York Police Department as well as his own data collected through resident interviews and building analysis. He found increased crime rates in high rise apartment buildings when compared to lower rise buildings. In high-rise buildings, 55 percent of criminal acts were

committed within interior spaces, when only 17 per percent of crime were committed in low-rise buildings in interior spaces (Newman, 1972). Newman concluded that high rise building residents had little to no control or personal responsibility for spaces that were occupied by so many people. With the increased sense of anonymity and danger that urban life involved, especially for residents in high rise apartments that did not appear to know or want to know each other, neighborhood crime prevention was made nearly impossible.

The defensible space concept stresses physical communities of interest that have a common use for the space surrounding their environment. If there is no community of interest, the space becomes unused and unsafe. Therefore, a police presence can increase, and transform the space into a highly used semiprivate space; which could also be identified with a particular group of people, such as gangs, who use, maintain, and control it (Newman, 1980). This would convert public space into a militarized semiprivate space. The new semiprivate space would not limit access to non-residents, but attempt to ensure a well defined terrain by non-residents that would need the approval of the current resident population and meet their criteria of appropriate usage for non-residents (Newman, 1980).

Newman's main premise was that most criminal offenders behave logically by selecting targets in relation to perceptions of high rewards and a low risk of getting caught. Therefore crime deterrence was basically about giving potential criminal offenders a sense that if they invade a certain space, or boundary, they were likely to be observed and would have a difficult time escaping undetected. Newman argued that outside spaces become more defensible if they are marked off with physical boundaries,

such as a fence or shrubbery, and were well illuminated. However, space becomes indefensible when solid fences and tall walls are constructed; due to these objects serving as hiding places for would be criminals.

Newman offered four design features that would create a secure residential environment: first, territoriality, which is achieved by the zoning of public space, mainly residential areas, to encourage a sense of community; second, natural surveillance, this occurs by designing the placement of people, activities, and physical features in such a way to maximize visibility; third, image, which is the capacity of the structural design to provide a sense of security; and finally, milieu, these are other physical features in the landscape that can be modified so they merge with areas of the city considered to be safe, such as police stations, or commercial areas. Jacobs (1961) also advocated for mixed land use within the city to promote greater safety.

Newman's defensible space theories became a popular concept in the design of new residential communities, and were also used by many law enforcement agencies in the United Kingdom in the late 1970s and early 1980s (Coleman 1984, 1985; Dawson 1984; Goodey and Gold, 1987). Coleman (1984; 1985) proposed that the physical design of high rise housing in London and Oxford had a significant effect on the behavior of its residents and that more optimal conditions could be obtained by reorganizing access and layouts to housing estates to give residents more control over their immediate environment. These concepts became popular with local British governments as they adopted highly restrictive ordinances in order to curtail their worst housing estates (Goodey and Gold, 1987).

Newman's theory was not without flaws. Practically, the principles of defensible

space are simple to implement, but it's not always economical or possible to repurpose

existing spaces. The defensible space theory also suffered from theoretical problems as

well. Gold (1982) was highly critical of Newman's defensible space theory, indicating

that there were poor statistical analyses and unverifiable causal relationships between

physical design and crime. Many researchers (Mayhew, 1979; Poyner, 1983;

Mandanipour, 1996; Tijerino, 1998) also had difficulty in accepting Newman's modified

belief of environmental determinism. Hillier (1973) argued architectural design did not

shape social behavior and that territoriality was not the main explanation for spatial

behavior.

Several critics also believed Newman's methods were methodologically flawed.

Mawby (1977) found Newman's research to be misleading; his research found London

high-rise apartments did not have a higher crime rate when compared to low-rise

apartments. Mayhew (1979) also discovered the defensible space principles did not

apply to cities in the United Kingdom. Taylor, Gottfredson, and Brower (1980) stated the

defensible space concept had many flawed and untested assumptions. Taylor, et al

(1980) points out one of the major flaws in Newman's concept, showing that the

surveillance aspect of the theory rested on the assumption that residents will engage in a

policing function by making use of surveillance. Mayhew (1979) confirmed their

findings, stating only citizens empowered with the task, such as police, firemen, etc., will

engage in surveillance.

Greenberg and Rohe (1984) conducted an empirical test analyzing the

effectiveness of Newman's defensible space theory and Jeffrey's and Brantingham's

target and opportunity model. Greenberg and Rohe found less supportive evidence for Newman's model, and more for the target and opportunity model. Their study looked at the distribution of targets in relation to streets, vacant lots, housing units, commercial buildings, and parking lots experiencing high crime rates. They found low volume streets, single-family homes, and a select few vacant plots and parking lots had lower crime rates.

Another problem often associated with the defensible space model is the problem of displacement. By deterring crime originating in one locale, the motivated offender may simply choose an alternate target. Therefore, the criminal act is merely displaced and not prevented. Siegel (1995) suggests that environmental crime prevention may only produce short term benefits, but once criminals adjust their behavior to the new measures they will continue in criminal behavior.

Newman's defensible space model has influenced many theories and crime prevention projects. In a more extreme case of architectural crime prevention, Poyner (1983), who took many queues from Newman's work, proposed a simplistic architectural solution for every kind of criminal act. Poyner stated that the layout of streets, neighborhoods, and communities could be designed in such a way to eliminate all criminal activity, although he never specifies what type of crime he is attempting to suppress. He also advocates for the suppression of semi-public environments, such as platforms and decks, and a militaristic regulation of children density in personal residences. Poyner envisioned a city where every facet of urban life could be observed and controlled.

Another crime prevention strategy which borrows heavily from Newman's model is situational crime prevention. Hirschi and Gottfredson (1986) asserted that criminality is a necessary condition, this alone is not sufficient for a criminal act to be committed; instead, crime requires situational incentives found in the form of motivation and opportunity. Ronald Clarke became the most significant contributor to the situational crime prevention model. Clarke (1983) focused the theory on the immediate physical and social settings, as well as the societal arrangements, rather than the individual perpetrator. Thereby, decreasing the amount of opportunities for crime by using specific measures, such as the management, design, or manipulation of the environment, for certain crimes, is a more effective approach than reforming the offender themselves (Clarke, 1983). His crime prevention strategies were originally divided into three types of measures: target hardening measures, environmental management, and degree of surveillance. The foundation of situational crime prevention relies upon the assumption that more opportunities lead to more criminal acts.

The main strength of situational crime prevention is the scope of criminal acts of which it can be applied. The core principles are deliberately broad and the prevention strategies can be applied to a wide array of crimes. This applies to crimes that are political in nature, emotionally driven, opportunistic, sexual, or premeditated; they are all affected by situational characteristics. For instance, homicide rates are heavily influenced by the easiness and accessibility of handguns. The higher the availability, the higher the homicide rates (Clare, 1997). Situational crime prevention relies on a broad collection of literature to support different crime prevention measures.

Poyner and Webb (1987) found that in increased utilization of access controls in British buildings, including fences and automated access to buildings reduced the amount of vandalism and theft when compared to buildings not using access controls. Hunter and Jeffery (1992) concluded that having two clerks on duty in convenience stores, especially during night hours, was an effective prevention against robberies. Both of these studies are examples of controlling access to facilities and increasing surveillance and place mangers to reduce the potential of crime, key components of the situational crime prevention model. Researchers Birkbeck and LaFree (1993) determined that threat, frustration, and reward were continually found as situational correlates of crime, as well as the subjective experiences of the perpetrator. According to their study, criminals choose, weigh, check, suspend, and alter the meanings of the situations they experience.

The approach of environmental management, when the main objectives are independent of crime control, can also produce effective crime prevention measures. In the United Kingdom, laws requiring motorcyclists to wear helmets were enacted to reduce fatal motorcycle accidents, but it has also indirectly reduced motorcycle thefts as thieves were unlikely to have a spare helmet and would be stopped and arrested by law enforcement (Mayhew, Clarke, Sturman, and Hough, 1976). Clarke (1995) argued that criminal conduct was found to be influenced more by changes in opportunity and external motivations. Research conducted by Scarr, 1973; Reppetto, 1974; and Waller and Okihiro, 1978, support Clarke's argument through a series of interviews with convicted residential burglars which found that the avoidance of risk and minimizing effort is a key component of target selections decisions.

Situational crime prevention has also been largely criticized over the years. Much like the criticisms of the defensible space model, displacement has been the main argument against situational crime prevention. It is argued that the situational aspects of the theory may determine the timing and location of criminal acts, but reducing opportunities in a certain time and place results in displacing offenders to other times, places, or crimes with no net reduction in criminal acts (Clarke and Feslon, 1993). Displacement occurs when an offender may attempt to commit the crime elsewhere, at a different time, choose a different target or victim, or engage in a different type of crime (Reppetto, 1976).

Other studies have also concluded that the displacement of criminal acts does occur and that situational prevention measures were a waste of time and resources. Mayhew et al. (1976) found reducing the potential for theft for new vehicles in the United Kingdom simply lead to older vehicles experiencing higher rates of theft. Allatt (1984) established that target hardening techniques employed in a particular United Kingdom neighborhood decreased burglaries in the neighborhood, but was soon followed by an increase in property crimes in the surrounding neighborhoods. Several studies examined the relationship between the allocations of police resources and the distribution of crime. In these studies, it was believed that areas with a decreased police presence would have higher crime rates due to offenders being spatially displaced. This test was conducted for approximately 50 U.S. cites. It was found that areas with a lower police presence did experience higher crime rates, especially for property crimes (Mehay, 1977 and Fabrikant, 1980).

Another argument against situational crime prevention is the cost of employing such crime measures. Some techniques may be too expensive or unavailable to the average citizen. Shover (1991) collected data on imprisoned property offenders on the effectiveness of various security measures. He found the most effective crime prevention measures to be burglar alarms, electronic window sensors, CCTV cameras, and security patrols.

While CPTED, defensible space, and situational crime prevention may make places safer, the question remains as to whether people feel any safer in these secured environments. An urban dweller may be statistically less likely to experience a criminal act, but the person may not feel any safer. Newman's (1973) research found that constant surveillance in a particular space made pedestrians feel as if they were a hostile stranger who should not be in the fortified space.

Since the work of Jeffery and Newman, CPTED and defensible space concepts have evolved over time to include new measures that include advanced technologies such as closed circuit television, access control, and tactics which include target hardening, to augment the natural surveillance of space (Moffat, 1983; Crowe, 2000). Community safety is a far reaching issue, one of which many urban leaders and planners are attempting to create sustainable communities and to secure public spaces (Coaffee, Moore, Fletcher and Bosher, 2008).

<div align="center">No Right to the City</div>

Many researchers (Boddy, 2008; Purcell, 2008; Marcuse, 2005; Warren, 2002) argue that having a fortified public space erodes many public rights and privileges. The concept of "right to the city" was first introduced by Henri Lefebvre. Lefebvre (1968)

explained a right to the city is composed of three interrelated entitlements: the right to

access physical urban space; the right to be social and interact with others; and the right

to create space. The first right allows anyone to be in public space. However, this right

to the city has been disrupted due to the modification of the physical urban landscape.

These changes in the landscape are the most visible expression of urban security.

Benton-Short (2007) argued that post September 11th fortifications or architectures of

terror, have created a segregated society. These fortified landscapes are mostly found in

densely populated cities which produce architecture of dis-assurance (Boddy, 2008).

Architecture of dis-assurance is the sudden transformation of public space into defensive

security measures, which in turn leaves surrounding residents questioning their own

safety. Boddy (2008) explains the Jersey barrier (Figure 1) is the most common form of

this type of architecture. He contrasts this visible security with passive-aggressive or

invisible security measures. These invisible features, such as artificial waterfalls used as

a dividing walls or a building wrapping moats, are becoming more common and are now

a statutory code requirement in some new development projects which include One

World Trade Center also known as the Freedom Tower.

The second right to the city is the ability to live an urban lifestyle. For example, a

cosmopolitan lifestyle that provides the option to engage in interaction or to retreat into

anonymity. Marcuse (2005) believes this right allows people to live a diverse lifestyle

where people gather to encounter one another and exchange ideas. This lifestyle is

potentially threatened by fortifications within the city and can create fear and distrust

among inhabitants. Davis (1990) contends that "the social perception or threat becomes a

function of the security mobilization itself, not crime rates" (page 224). The National

Capital Panning Commission (NCPC) reported in 2002 that a rapid and severe

mobilization of urban security measures would increase fear and undermine the basic

assumptions of an open and democratic society.

The third right to the city involves the ability to produce space and determine ones

use of the space (Young, 1990). This can entail suitable representation, participation and

appropriation, and involves access to decision making processes (Purcell, 2008).

However, when this right is invoked it is often in defiance of the owners, managers, or

authorities who seek to limit undesirable actions in public space. These undesirable

actions include acts of protest, dissent, or resistance to hegemonic powers threatening this

right of representation (Mitchell, 2003). The curtailment of this right can also refer to the

reduced use of public space by certain populations, especially those wishing to express

political dissent or wanting to exercise their freedom of assembly. The War on Terror is

a perfect example of this right restriction. Warren (2002) argues that city officials use

security concerns to justify the "repression, prevention and control" of city inhabitants

wanting to engage in political mobilization activities. The right to the city concept allows

one to understand that public space is linked to the creation of a public realm, and that the

public realm is being eroded by an inclusive and or exclusive form of public space. With

the implementation of anti-terror security measures, which are meant to protect

inhabitants and key infrastructure, are potentially homogenizing and normalizing space

and denying the right for a true experience of urban life (Flusty, 1994; Savitch, 2008).

<u>Privatization, Urban Fortification, and Anti-Terrorism Security</u>

Critics believe that the privatization of public space points to the loss of the public

realm and the erosion of democratic expression and that privatized spaces prioritizes

citizens, as opposed to fostering interaction among diverse social groups (Crawford, 1992; Kohn, 2004).   However, Garvin (2002) supports the use of private sector entities to aid public needs in urban spaces, mainly due to the ability of these entities to rejuvenate deteriorating urban centers. With current re-development efforts in U.S. cities, municipalities are allowing for private investment entities to create and manage open spaces. However, it must be noted there are consequences of public spaces that are owned and managed by entities other than the government.

Banerjee (2001) offered three critical trends that add to the recent increase in privatized urban spaces. The first trend involves the increased use of private entities, rather than the government agencies, to provide public goods and services. This parallels the government's recent reduction in providing services to the public (Banerjee, 2001). The second is the expansion of transnational corporations and their focus on the global economy over local interests. According to this trend, cities are viewed only as places of investment, rather than sites of social collaboration. The final trend Banerjee states that is the advancement of technology and communication has transformed social interactions and altered traditional beliefs of place and location.

While researching gated communities, Low (2003) found cities have a strong incentive to privatize public spaces, because developers then take over accountability for constructing and maintaining infrastructures such as roads or providing services such as security patrols or trash collection. Low (2003) also found residents living within privatized spaces experienced a heightened sense of fear and insecurity due to a lack of social interaction. Kohn (2004) argues that the privatization of public space is the warning sign for the disintegration of the public realm. He believes privatized spaces can

prioritize public consumption for specific urban dwellers, as opposed to allowing diverse groups access to these spaces. Valentine (1996) and Wilson (1991) have both found some public spaces can constrain female use and reinforce oppressive gender relations. Many researchers believe, with governmental approval of the privatization of public space, it will lead to the total withdrawal of citizens from the civic realm leading to the "end of public space." (Banerjee, 2001; Kohn, 2004; Sorkin, 1992).

Since the September 11th terrorist attacks, public and private officials have pushed for implementation of anti-terror security as the rationale for increased security and fortification of streets, sidewalks and public spaces (Mitchell, 2003). Urban administrators use the threat of a potential terrorist attack as their justification to increase security measures for many public buildings (Nemeth and Hollander, 2010). Some claim the security measures used limit civil liberties by controlling behavior, restricting movement and eroding the quality of life in cities (Marcuse, 2002). Savitch (2008) believed security enhancements allow for ensuring certainty, order and homogeneity. However, the essence of a city lies in its diversity, openness and difference; without the opportunity to interact with other city dwellers urban life becomes no more (Savitch, 2008).

Marcuse (2002) describes how high profile public space has become noticeably less public due to city officials limiting access, controlling and inhibiting activities which are considered "normal to a democratic society." Marcuse (2006) explains the city has now been secured from the public rather than for the public. Both Graham (2004) and Marcuse (2004; 2006) believe that anti-terror policies are used to curtail rights and undermine public dissent, social activism and protest. Warren (2002) argues the public

officials implementing the War on Terror have covertly used policies to legitimize the repression and control of mass political mobilization within cities.

Marcuse (2006) provides the key difference between safety and security: safety refers to the actual protection from danger while security is the perceived protection from danger. Marcuse explains how anti-terror officials employ a rhetoric of security to create limitations on the right to public space. However, a recent study by Nemeth and Hollander (2010) has shown that levels of fear in public space do not always decrease as security increases, as well as an increase in safety does not always increase feelings of overall security. Koskela (2008) argues that urban fear is produced from threats of global, ideological terror rather than from the risk of local or petty crime. While an individual can avoid certain situations that jeopardize their safety, threats of terror, according to Koskela (2008), is perceived to be out of the public's control.

Federal planners and designers are tasked with designing out terror, which creates a situation of "form follows fear" (Ellin, 1997). Creating feelings of safety is a critical component of successful urban projects (Talen, 2008), but critics often point out how secured spaces within cities increase fear and distrust. The fundamental question urban planners must ask themselves is how to balance anti-terror measures to secure city space and reduce public fear while not making inhabitants feel less safe. As Davis (1990) explains, the social perception of danger becomes a function of the security mobilization, and not actual criminal acts. Nemeth and Hollander (2010) also contend that over secured public spaces has a negative impact on the marginal groups of our society; mainly the poor, ethnic minorities, and the homeless.

Boddy (2008) explains how there are two types of security present in cities. The first type of security is described as "an architecture of dis-assurance," which is most commonly associated with obvious physical barriers. These include Jersey barriers, surveillance cameras and bollards (Figure 2) which are easily perceived symbols of security; however, they may not be effective at preventing an actual terrorist attack.

The second type of security is called "a passive-aggressive urban design style." This includes defensive measures such as tiered open space plazas surrounding high value buildings to prevent truck bombs or a city street constructed of composite fill which is set to collapse under the extreme weight of a truck carrying a bomb. These new security measures are starting to become the norm in major global cities.

The Emergence of Security Zones

The first notable appearance of a security zone appeared in 1983 with the installation of a Jersey barrier in front of the White House in response to the Beirut barracks bombings. However, security zones did not fully develop until 1995, in answer to the Oklahoma City bombing, when security officials closed off Pennsylvania Avenue in front of the White House. The federal government's street closing was generally criticized as having a "bunker mentality" (Hoffman and Chalk, 2002).

Cities are dependent upon an open, diverse and tolerant environment, and the most observable security measures often increase fear, minimize the public realm and rob the city of its openness and vibrancy (Savitch, 2008). The National Capital Planning Commission (NCPC) expressed concern that implementing visible security measures would increase fear and undermine the basic premises of the city being an open and

democratic society (Boddy, 2008). Unfortunately, federal planners mainly install visible security measures, such as a Jersey barrier or bollard, to harden potential targets.

After the 1995 bombing of the Alfred P. Murrah Federal Buildings in Oklahoma City, OK, the U.S. General Services Administration (GSA), whose primary purpose is to manage and support the basic functioning of federal agencies, produced a report suggesting that all government buildings be identified as "public assets" and should be retrofitted with perimeter security measures responding to an explicit set of criteria (GSA, 1999). Shortly after the GSA's report, the NCPC (2002) developed the first perimeter security standards for the Federal Triangle in Washington D.C., and later added upon these standards in 2005. It should be noted that the Federal Triangle is a triangular area in Washington D.C. which houses key Federal agencies including: the Federal Trade Commission, National Archives Building, Department of Justice Headquarters, Department of Commerce Headquarters, the Environmental Protection Agency as well as a the Federal Triangle Metro Station. Since the Oklahoma City Bombing, many of the pedestrian areas within the Federal Triangle have been restricted to federal employees or those with official business. The National Capital Planning Commission's 2005 signature planning report includes explicit terminology of security zones which are referred to as a secured "layer" of perimeter space around public buildings. The layer of perimeter space concept was quickly adopted by federal agencies and cities around the country (Hollander and Whitfield, 2005).

The NCPC defined a space by breaking it into three separate zones: the building yard, the sidewalk, and finally the curb or parking lane. A particular site is divided to allow distance requirements to protect a building from an explosion detonated from the

street or sidewalk. Each security zone is subject to different levels of public uses, obstruction and surveillance. Security zones were originally designed to improve the safety of the building and its occupants, with no consideration for social, economic, aesthetic, or transportation considerations. Both the concept and mechanisms of security zones were intended to be temporary; however, Coaffee et al. (2009) argues security zones have started to establish permanence in the contemporary urban landscape.

Security zones are considered a specialized category of land use called marginal spaces (Hollander and Whitfield, 2005). Conventional open spaces are designed; such as parks and plazas. However, marginal spaces are created as by-products of urban spatial development and remain as inferior spaces (Garde, 1999). Zoning, security requirements, and land use regulations typically result in marginal spaces. The central problem of security zones is they are not normally designed or planned for. Instead they instantly materialize or evolve on a site and create a unique problem for urban spaces. Marginal spaces are argued to have negative impacts on city blocks, neighborhoods, and urban space in general (Garde, 1999). Marginal spaces reduce the number of productive uses for urban areas. Security zones are marginal spaces developed as a result of enhancing the security of urban space. As with other marginal spaces, security zones have negative impacts. Security zones intensify the discomforting nature of marginal spaces (Garde, 1999). These spaces can turn a bustling, dynamic street into a deserted town. Active shopping centers are turned into empty storefronts. Security zones and restricted roads can scare people and businesses away for blocks.

The Fortified City

The response to urban insecurity has been dramatic, particularly in Los Angeles, CA during the late 1980s and early 1990s, where some have argued that the implementation of anti-crime measures had been taken to the extreme (Coaffee, 2009). During that time, Los Angeles was portrayed as an urban testing ground, with an overemphasis on urban militarization and extreme anti-crime measures (Davis, 1990; 1995; 1998; Flusty, 1994; and Crawford, 1995). The obsession with urban security lead to these anti-crime measures manifesting themselves into the urban landscape. For example, Blakely and Snyder (1995) found that 16 percent of Los Angeles residents were living in some form of a secured access setting. The transformation of Los Angeles into a fortress city also reflected the middle class paranoia combined with the necessity of economic activity. It has been argued that the privatization of public space and implemented security measures was a systemic effort by corporate Los Angeles to protect its economic interests by excluding individuals and groups who were not necessary, or dangerous, to the continuing profit margin of the city's new globalized economy (Haywood, 2004).

Mike Davis is the primary researcher who outlined how urban authorities and private citizen groups in Los Angeles responded to the increase fear of crime by militarizing the urban landscape. In *City of Quartz* (1990), Davis portrays Los Angeles as a miserable and oppressed place, with the Los Angeles Police Department engaged in territorial defensive measures. Davis (1990) explains how urban design, architecture, and the police apparatus are merged into a comprehensive security effort.

The fortification of commercial buildings and their borders become strongpoints of sale (Flusty 1994). Coaffee (2009) notes defensible space, which is primarily utilized on a micro level scale, is employed at a meso and macro level scale in Los Angeles. This wide scale use of defensible space is employed primarily to protect city properties and residences through target hardening and various forms of surveillance. Davis (1990) maintains the militarization of Los Angeles leads to an increase of repression in public access and movement. Haywood (2004) also compares how security and surveillance in Los Angeles are as valuable as floor space; while the community, instead of making investments in health and education, are forced to invest in physical security measures instead.

Los Angeles, with its intensified security apparatus, has often been described as postmodern urbanism (Dear and Flusty, 1998; Dear, 1999). Davis portrays fear and anxiety in Los Angeles as an outcome of economic disparities created by the negative consequences of increased capitalism. Dear and Flusty's (1998) explanation of postmodern urbanism within Los Angeles is focused on the social, political, and economic inequalities appearing in fortified and privatized spaces.

Steven Flusty (1994) elaborates on Davis's work by arguing that an extensive cloud of security and surveillance has covered Los Angeles, and attempts to understand this phenomenon by categorizing the different types of fortified space. Flusty refers to these fortified security spaces as "interdictory space," which is primarily designed to intercept, repel and or filter individuals. The five types of interdictory spaces are: stealthy space, which is often hidden from normal view by buildings and is a passive aggressive design measure; slippery space, which cannot normally be accessed by

uninterrupted approaches; crusty space, which is block by walls, barriers, and checkpoints; prickly space, are areas that are uncomfortable to occupy; and finally jittery space, which are areas pervasive with surveillance devices.

Although Davis has influenced academics studying urban fortification, he has also had his share of critics. The main criticism is that Davis was selling fear and anxiety about living in Los Angeles (Stewart, 1998). Friedman (1998) also expands this argument by stating Los Angeles is painted as the most dangerous city in the United States. Despite the landscape of fear present in Angeles, other researchers stress these defensive trends are not widespread and appear to be localized to Los Angeles (Merrifield, 1997).

<u>Planning for Urban Security</u>

In order to gain a better understanding on how the physical security landscape is defined and validated, existing management policies governing security zones must be reviewed. Due to the risk of exposing confidential information to the public, security zones on public or private spaces are not officially listed on zoning or planning documents. However, the planning and application of security zones does not occur without specific guidelines. For example, current and future Department of Defense facilities are now designed and upgraded for progressive collapse avoidance, have minimum standoff distances for personnel and vehicles, building overhang avoidance and or hardening, mailroom modification or relocation for isolation and ventilation purposes, building and structural isolation (decentralization), as well as mandatory polyvinyl-butyral glazing of all windows and skylights for high impact projectile resistance. These

are only several examples from the recently adopted Department of Defense Minimum Antiterrorism Standards.

Urban security policy has become decentralized since the September 11th terrorist attacks (Ervin, 2009). Since the federal government does not have a specific organization that deals with urban security, each city has its own guidelines for dealing with perceived terrorist threats (Bugliarello, 2005). Unfortunately, even the largest municipalities are not properly equipped to develop and implement a comprehensive urban security policy. Therefore, many cities have called upon the private sector to support such urban security agendas. Due to the fact that many key urban assets are owned and operated by the private sector, they have become responsible for preventing acts of terrorism on their properties. Critical homeland security operations have shifted from governmental to nongovernmental organizations and the obligation of combating terrorist threats is now placed upon developers, businesses and other civil societal entities (Bugliarello, 2005).

Governments have created public and private partnerships which are designed to address terrorism by the free sharing of information between these partnerships. For example, New York City engages in interagency coordination to allow private sector security agents' access to national counterterrorism intelligence; the expertise of these agents is called upon to ensure essential city infrastructure is protected from a potential terrorist strike (Ervin, 2008). In New York City these interagency collaborations include: *Infragard,* which is a program aimed at infrastructure protection and includes officials from the Federal Bureau of Investigation (FBI), and the New York Police Department (NYPD); *Shield Program,* an association of police officials and private sector agencies to help protect critical assets; and finally the *Joint Terrorism Task Force,* a program

overseen by the U.S. Department of Justice that teams local police departments with FBI specialists. The Los Angeles Police Department (LAPD) has *Operation Archangel* which is identical to the NYPD's Shield Program, and Los Angeles also has the *Homeland Security Advisory Council* which coordinates over 300 private security experts with LAPD officers with counterterrorism expertise.

The flow of intelligence between public and private allows for improved building standards, rating systems and guidelines which trickle down from a federal level to local. Urban planners and local authorities are increasingly requiring anti-terrorism measures as part of private building permit applications. As a result, private security officials, architects and designers are now called upon to design new security measures to buildings and public spaces. Security planning is starting to become normalized in everyday building activities, and many professionals are allowing the systematic target hardening of key urban assets as concerns move away from public to private entities and prioritizing law enforcement and security concerns (Marcuse, 2004). These fortifications can lead to a separation of those who are "security cleared" from those who are considered risky, and feed into a culture of fear (Ellin, 1996). With public spaces being fortified, cities now have elites that cut themselves off within fortified bunkers and government coalitions that work to create new systems of securitization within urban life (Graham, 2010).

To combat urban terrorism, governments have focused more on collaboration than on intervention (Coaffee et al., 2009). Security decision making is being shifted from the national to local level, as well as from public to private entities with the creations of consortiums and intelligence sharing programs. As urban security policy moves away

from federal guidelines, Bugliarello (2005) argues the general public will be more

accepting of such security implementations.

<u>Risks of Security Zones and Urban Fortification</u>

When sociologists such as Jane Jacobs, C. Ray Jeffery, and Oscar Newman began

to develop design principles that would prevent crime, their ideas received a large amount

of criticism. Fortified architecture was perceived as oppressive and gave an appearance

of a prison like atmosphere (Katyal, 2002). However, with advances in design concrete

can be modified to enhance visibility, access barriers can be aesthetically pleasing; and

plastics can be utilized that appear to be welcoming, but are actually stronger than most

metals.

Architecture can serve as a regulatory force (Katyal, 2002). Structural design can

be substituted or used in combination with customary governing mechanisms like laws or

social norms (Shah and Kesan, 2007). The question remains as to how security

zones/urban fortification can influence and affect human behavior. The influence can be

minimal by encouraging communication through the placement of certain objects within

the interior of buildings. At the opposite side of the spectrum, movement can be

restricted and people's ability to interact with others can be curtailed.

Public space is structured to encourage or discourage social interactions (Shah

and Kesan, 2007). For example, Osmond (1957) showed that hallways generally

discouraged social interactions, while circular rooms encouraged communication. Much

like Poyner's previously mentioned argument for controlling all facets of space, the

design of buildings can effectively dominate and control people in an orderly fashion

(Shah and Kesan, 2007).   Foucault (1979) highlighted the importance of surveillance in penalizing people.

Foucault's research, based upon Jeremy Bentham's panopticon, found a prisoner in a panopticon would feel as if they are always being watched. A panopticon is a cylindrical wall of prison towers surrounding a central tower. The tower allows for a guard to observe inmates without them knowing if and when they are being watched. Out of fear, the panopticon would maintain order over numerous inmates through surveillance (Markus, 1993). Foucault (1979) found that the architectural setup of the panopticon disciplined its subjects through surveillance.

Video surveillance of urban public space is also a potential risk of security zone implantation. Davis (1990) argues that CCTV cameras linked to police stations cause urban dwellers to feel less safe due to the social perception of a potential threat. Prior to September 11th, only 13 city police departments in the U.S. were utilizing CCTV surveillance cameras to monitor urban public spaces. In the months after September 11th, 25 city police departments were actively using CCTV cameras (Nieto, Johnston-Dodds, and Simmons, 2002). The increase of CCTV cameras in major US cities since the September 11th attacks is cause for concern and raises issues with privacy and public uneasiness. Although little research has been conducted on police surveillance and CCTV cameras in the U.S., research in the United Kingdom has shown a racial bias in police officers CCTV monitoring of citizens (Norris and Armstrong, 1997). Norris and Armstrong (1997) found: black people were 1.5 to 2.5 times more likely to be surveilled than a white person, and 30% of targeted surveillances on black people were prolonged, lasting nine minutes or more, compared to 10% with white people.

Fyfe and Bannister (1998) demonstrated how surveillance of citizens has proven mostly unsuccessful in major cities; that is crime rates in surveilled areas have decreased only to have crime displaced to other locations. Bianchini (1990) states the use of CCTV cameras leads to the disenfranchisement of citizens who do not conform to the perceived social norm of a well regulated public space. As CCTV surveillance continues to show signs of excluding certain individuals, it curtails the notion of the city being an open and accessible form of space (Fyfe and Bannister, 1998; Walzer, 1986). Further research in the area may be needed with the dramatic increase in CCTV video surveillance after the September 11th terrorist attacks.

With the continuous threat of urban terrorism, many cities have regularly planned for terrorist strikes with advanced security design features that are constantly being updated (Coaffee and Rodgers, 2008; Haynes, 1995; Hoffman, 1998). Studies have shown that if a public urban space is susceptible or perceived by the community to be at risk from a terrorist attack, there is a reduction in business confidence and an increase in public anxiety (Brown, 1985; Compton, Murray, and Osborne, 1980; Jarman 1993). The constant fortification of space can lead to businesses relocating from the threatened area as well as the unwillingness of citizens to visit certain parts of the city. During the Provisional Irish Republican Army's bombing campaign of the late 1970s and early 1980s, businesses were in favor of high levels of security to ease public concerns over safety (Brown, 1985). Brown (1985) also found that terrorism did increase fears for public safety, which lead to the increased fortification of the city of Belfast.

Since the 1960s, terrorists have particularly targeted military organizations, government buildings, elected leaders, and particular racial or ethnic groups (Rees,

2006). However, during the 1990s the tendency of terrorists shifted towards economic

targets, with the main purpose of creating economic disruption, social nervousness, and

applying political stress on governments (Coaffee, 2000). Terrorist targeting began to be

focused against business districts, transportation networks, or critical infrastructure

(Coaffee, 2009). Important financial centers became desirable targets because of their

cosmopolitan workforce, devastating side effects of economic disruption, and mass media

coverage and publicity of targeting such a building (Coaffee, 2009). Such economic

targets include: the 1993 and 2001 World Trade Center attacks, 1993 Bombay attacks,

2005 London Attacks, 2007 Yazidi community bombings, and the 2008 Mumbai attacks.

Terrorism over the last fifteen years has had a huge effect upon the contemporary

urban landscape in areas perceived to be at risk (Savitch, 2008; Coafee, 2009). Coaffee

(2009) notes with the Provisional Irish Republic Army bombings of Belfast, which

eventually lead to the creation of a "ring of steel" surrounding the city, there was a

profound influence on the look of the city, the way occupants utilized the space, and how

they felt about being present within the fortified walls.

Putting all of this together, the overall impact security zones have on the urban

landscape is realized. The city landscape is fortified and placed in a state of perpetual

vigilance in response to a perceived threat that may never arrive. Access to the city has

now become restricted, and residents and visitors are no longer able to freely explore the

landscape. Citizens are filtered through spaces in order to ensure the desired individual is

occupying the correct space. Once beautiful architecture is now littered with CCTV

cameras, bollards, and crash rated planters. Social and public activities are increasingly

becoming privatized. The rich, living in citadels, or gated buildings which provide

private security, restaurants, gyms, transportation, and entertainment, become

increasingly segregated from the poor.

CHAPTER FOUR

METHODOLOGY

Methodology of Identifying and Analyzing Fortified Urban Space

Critics and researchers both address the issue of a decaying public realm in present day cities, but few empirically assess the extent of the fortification of the urban landscape in public spaces. And some critics assume that anti-terror measures employed around high-profile targets creates a "landscape of fear" (Sorkin, 2004). No researchers attempt to conceptualize the "district-wide security apparatus," instead they provide limited analyses of individual and iconic spaces (Miller, 2007). If different fortification measures produce varying visual, perceptual and representational meanings it is paramount to empirically study the fortification of our cities.

To better understand the emerging phenomena of security zones and fortifying urban public space, this dissertation will examine security zones located in the civic and financial business districts in three U.S. cities: Chicago, Detroit, and Indianapolis. According to the 2010 Census, Chicago ranks as the third most populated city in the United States, while Indianapolis comes in at twelve and Detroit at eighteen. Major global cities such as London and New York, having all experienced terrorist attacks, are recognized as the standard of interagency collaboration and proactive planning against terrorist attacks (Ervin, 2008). However, there is virtually nothing written about recent security policies or changing urban space in Chicago, Detroit, and Indianapolis.

Nemeth (2010) studied the location and intensity of security zones located in New York, Los Angeles, and San Francisco. This study provided a glimpse as to what security zones look like and where they manifest themselves. However, there were several

oversights in Nemeth's study as well as intriguing questions that need to be answered. First, Nemeth only examined Tier I cities and ignored Tier II cities. New York, Los Angeles and San Francisco were three of the top five cities to receive the most funding from the Department of Homeland Security's Urban Area Security Initiative from 2002 through 2012 (Coburn, 2012). Research is needed to compare Tier I cities security landscape to Tier II cities.

Although Nemeth's research did identify security zones present in New York, Los Angeles, and San Francisco, he did not identify the zones influence on surrounding urban public space. Using an inverse distance weight interpolation on the security zone phenomena allows for a true representation and displays the overall invasive nature of security zones in urban public space. Nemeth also compared security zones against civic and financial districts. For this research, civic and financial districts were fused together for a more realistic sense of security zones in the urban core of the selected cities.

Nemeth's study also analyzed several policy variables that were not included in this study. Nemeth's policy findings suggested security zones were the most intense when it was controlled by federal and local policies. For this study, the policy variables were removed and replaced with a category of determining if the building was either publicly owned (city, county, and federal) or privately owned to determine if security zones were more intense in these types of buildings.

For the surveillance criteria, Nemeth chose not to include CCTV cameras. In a previous study, Nemeth (2009) estimates 95% of buildings in midtown Manhattan to have some type of CCTV camera surveillance present. With prior research suggesting a racial bias in police surveillance of citizens (Norris and Armstong, 1997) and Foucault's

(1979) study establishing that surveillance can be used as a form as punishment, it would seem the inclusion of CCTV video surveillance cameras would be a necessity for such a study. For these reasons, CCTVs were included in the surveillance category for this study.

Once the intensity and spatial extent of the urban security zones are identified, this study will then compare the effects on social and commercial activity within the identified security zones to areas outside of the identified security zones. The social and commercial activity data used for this study will be population rates, crime rates, and office space rental rates from 2000 through 2010. Crime rates will consist of crimes against persons and crimes against property. Crimes against persons will include: robbery, battery, assault, homicide, and criminal sexual assault. Crimes against property comprises of: theft, burglary, motor vehicle theft, and arson. This dissertation provides a visual representation of the security zone extent and intensity in these cities, and it will also offer an explanation of the impact security zones have on commercial and social activities within the sample areas.

This dissertation will add to existing literature on security and public space and also expand upon Sampson's definition of social mechanisms to include anti-terrorism security zones appearing in response to the threat of terrorism. The study will quantify the loss and or fortification of public space and measure the intensity of these spaces in three major U.S. cities. While previous studies have described the spatial impacts of anti-terror security, none have conducted empirical assessments outside of global cities like New York (Marcuse, 2006), London (Coaffee, 2009), Washington D.C. (Benton-Short, 2007) and Jerusalem (Savitch, 2008). This analysis will measure the spatial extent and

intensity of security zones in urban space and determine whether cities with substantially

smaller population and density numbers (Chicago, Indianapolis, and Detroit) have

fortified buildings, areas, and neighborhoods; and also restrict or close off public space in

their civic and financial districts, similar to larger global cities such as New York,

London, and Madrid.

Chicago, Detroit, and Indianapolis have been selected for numerous reasons. First,

each city is listed in the Department of Homeland Security's 2010 Urban Area Security

Initiative List. The United States Department of Homeland Security have identified these

cities as high risk targets for future terrorist strikes and receive federal funding in

response to this threat. The DHS considers Chicago to be a Tier I urban area due to its

high population density and high risk for threats (DHS, 2010). An analysis of this type of

city is likely to expose fortification measures at their most extreme. Detroit and

Indianapolis are considered Tier II cities. These cities were selected in order to

determine the level of security differences between Tier I and II type cities.

Second, it is informative to analyze both civic and financial districts in cities other

than New York, London, etc., if there is to be a better understanding whether security

measures differ in relation to the size and population density of cities. Therefore, this

dissertation will examine fortified spaces within both civic center districts, which are

comprised mainly of public buildings and governmental structures, and financial business

districts which encompass major banks and other financial institutions. The

concentration of high-profile corporate headquarters and governmental buildings make

these areas prime targets for high profile terrorist attacks (Savitch, 2008). Although more

iconic public spaces can be found outside these districts, studying these districts offers a

more in-depth understanding of whether significant physical or regulatory differences occur within these districts, and or around public or private buildings.

Finally, the districts studied within each city, differ in population, density, size, and geographic location. Each city offers a very different expression of public space. This study considers public space to be: publicly or privately owned exterior space legally required to allow public access, including all plazas, parks, sidewalks, and pedestrian streets where motorized traffic is forbidden. Privately owned spaces, such as corporate plazas, are still publicly accessible, but might present different obstacles or prioritize use for employees over the general public.

For the purpose of this dissertation, the presence and intensity of security zones will be analyzed in the civic center and financial district neighborhoods of three cities: Chicago, Detroit, and Indianapolis. A security landscape is the aggregate geography of individual security zones in a certain geographic location. A security zone is a restricted area located around a public or private building that has a combination of access restrictions, behavioral controls, or other security measures. These individual zones embody a security landscape and can be located on either public or private property and enforced and managed by private developers and property managers or governmental entities.

Chicago
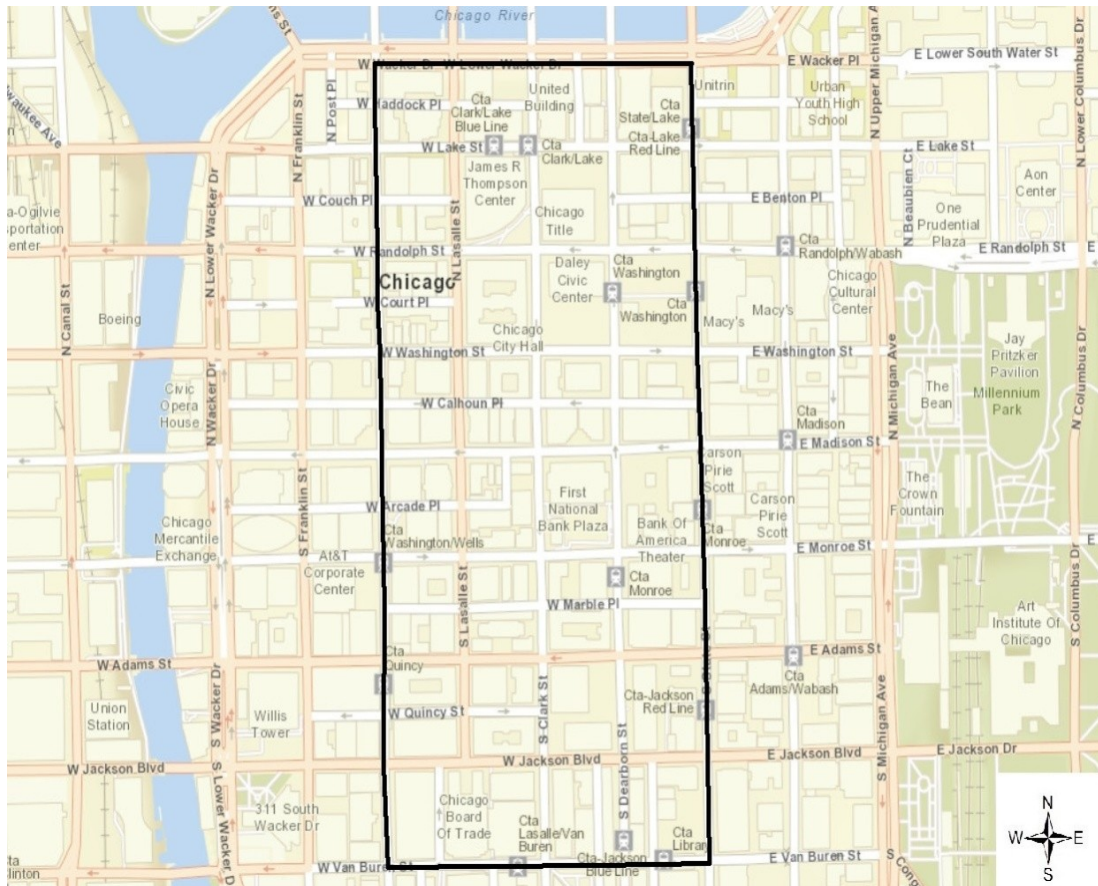
Figure 3: Chicago Central Loop

The first site selected was the central loop in the City of Chicago. The central

loop is located within Chicago's Loop neighborhood which is also considered the central

business district for Chicago. The central loop contains the commercial center as well as

all major governmental entities in the City of Chicago. The city of Chicago is considered

a Tier I city by the Department of Homeland Security's Urban Areas Security Initiative

and has received $477,545,452 in federal funding from 2003 through 2012 to combat

terrorism (Coburn, 2012). The boundaries of the central loop are West Wacker Drive and

East Van Buren Street for north and south; and State Street and Wells Street for east and

west. The boundaries were taken from the City of Chicago's official website. The population of the sample area was obtained by adding up Census block level population numbers from the 2010 Census. The exact 2010 population the central Loop is 2,044 (IL Cook County - Census Tract 8391, Block Group 1). The area being examined is 0.219 square miles; 137.272 acres; and 6,031,486.895 square feet.

<div align="center">Indianapolis</div>
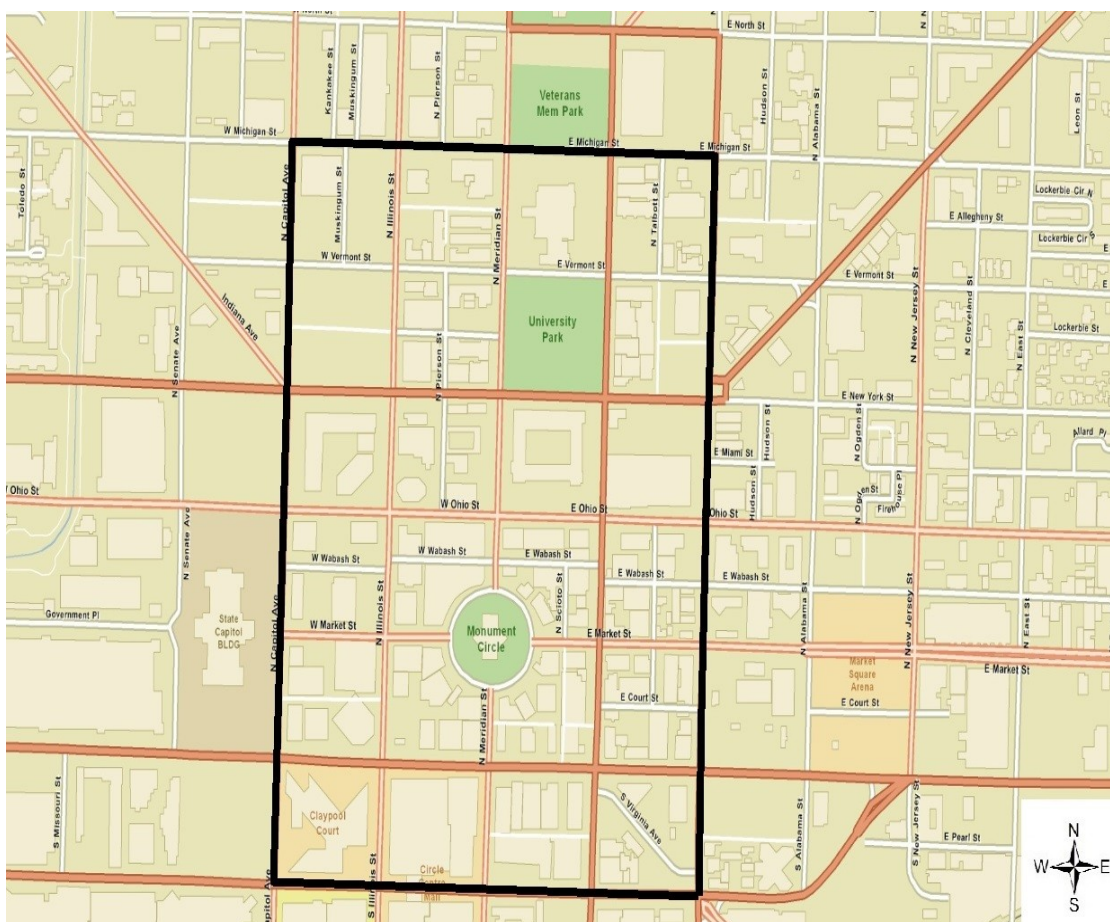
Figure 4: Downtown Indianapolis (Central Business District)

The second area selected was downtown Indianapolis' Central Business District. The boundaries are taken from the Indianapolis Regional Center Plan 2020 report. The Indianapolis Regional Center Plan 2020 was prepared by the City of Indianapolis, the

Greater Indianapolis Progress Committee, Indianapolis Downtown INC., and Ball State

University's College of Architecture and Planning. The boundaries are Michigan Street

to Maryland Street for north and south; and North Delaware Street to Capitol Avenue for

east and west. Indianapolis is considered a Tier II city on the Urban Areas Security

Initiative and has received $50,774,706 in federal funding, from 2003 through 2012, to

combat terrorist activities (Coburn, 2012). The exact population of the sample area is

581 (IN - Marion County - Census Tract 3910, block group 3). The area being examined

is 0.226 square miles; 142.357 acres; and 6,363,793.282 square feet.

<div align="center">Detroit</div>
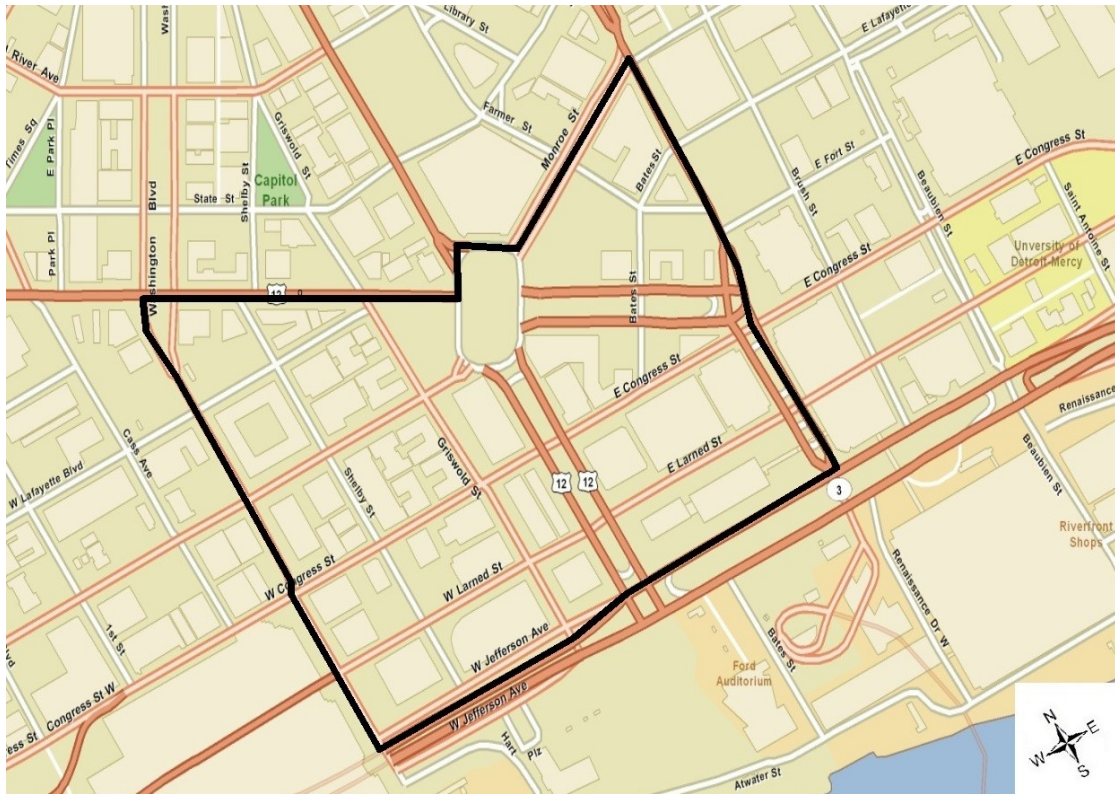
<div align="center">Figure 5: Downtown Detroit</div>

The third area examined will be Downtown Detroit. Downtown Detroit contains a designated central business district. The boundaries were defined from the National Register of Historic Places listing in Downtown and Midtown Detroit. The boundaries are Michigan Avenue and Monroe Street for north and Jefferson Avenue for south. Randolph Street and Washington Boulevard are the boundaries for east and west. The City of Detroit is also considered a Tier II city and has received \$132,614,497 in federal funding from 2003 through 2012 (Coburn, 2012). The exact population for the sample area is 303 (MI - Wayne County - Census Tract 5208, Block Group 1 and Census Tract 5172, Block Group 1). The area for Downtown Detroit is 0.103 square miles; 64.46 acres; and 2,834,124.051 square feet.

Collection of Data

Because the level of security zone restrictions vary from zone to zone, a simple and objective set of criteria is used to distinguish methods and classify security zones and security landscapes based on their overall level of restriction and or the presence and intensity of certain benchmarks (see Table 2). Access restrictions will include: bollards, Jersey barriers, gates, or fences located at entrance and exit points to a space or building. Behavioral controls include posted signs prohibiting activities like photography or loitering, or physical features that discourage sitting or gathering in small or large groups. Surveillance measures will include security guards/police officers and other human surveillance. Closed circuit television (CCTV) cameras are also included under surveillance. Zone level data on seven descriptive variables (see Table 1) will be collected.

Table 1. Security zone analysis variables

Variable name	Description of variable	Type of variable	Coding
Tier	Tier type of city	Dichotomous	0 = Tier I urban area 1 = Tier II urban area
Control (Total)	Total score of security zone classification criteria (Behavior + surveillance + access)	Ordinal	1-2 = Low security 3-4 = Moderate security 5-6 = High security
Control (Behavior)	Behavior score of security classification criteria	Ordinal	0 = No restriction 1 = Minor restriction 2 = Major restriction
Control (Surveillance)	Surveillance score of security classification criteria	Ordinal	0 = No restriction 1 = Minor restriction 2 = Major restriction
Control (Access)	Access score of security classification criteria	Ordinal	0 = No restriction 1 = Minor restriction 2 = Major restriction
Building owner	Ownership of building at which security zone is located	Dichotomous	0 = Public 1 = Private
Duration	Permanence of physical barriers found within zone	Dichotomous	0 = Temporary 1 = Permanent

Table 2. Classification and criteria for security zone control variables.

	No restriction (0 = Points)	Minor restrictions (1 = Point)	Major restrictions (2 = points)
Control (Behavior)	Behavior unrestricted	Behavior reduced by either physical or legal restrictions	Behavior reduced by both physical and legal restrictions
Control (Surveillance)	No security personnel or CCTV present	CCTV or one security guard present	CCTVs and one or more security guards present
Control (Access)	No physical obstructions to access	Few physical obstructions to access, but no entrances blocked	Several physical obstructions to access and/or entrances that are blocked

Figure 6: Access restriction

Figure 7: Behavioral control

Figure 8: Surveillance measure

The classification criterion is a modified version of Nemeth's (2010) zone level

data table and aligns with Robert Sampson's ecometric method of observing behavioral

settings, especially at the neighborhood level. Nemeth employs a simplified version of

Flusty's (1994) interdictory space classification system which only focuses on three

typologies: access restrictions, behavioral controls, and surveillance measures. Each

zone is assessed on the following three criteria: one point will be received for any minor

restriction and two points for any major restriction. The total scores range from 0 to 6

points. The zones have been grouped into three categories based on an overall restriction

level: low (0-2), moderate (3-4), or high (5-6). For example, if a building were to be

equipped with a CCTV camera and have a visible security guard the building would

receive a score of 2 in the Surveillance category. If the building were also to have

signage warning of loitering and have no designated area for the public to converse (e.g.

lack of city benches) the building would receive a score of 2. If the same building were

to have bollards surrounding the perimeter, the building would receive a score of 1 in the

access category. If the building were to have bollards as well as having only one access

point to the building the score would be 2. This scoring system allowed for comparisons

of intensity across zones. This researcher must acknowledge that certain criteria might

have been weighted, or included additional measures or restrictions, however the

simplicity of the tool allows for future replication of this methodology which could be

used for future cross-sectional or longitudinal analyses.

Each city was observed over a period of several days at a time to collect cross-

sectional systematic social observation data on each security zone. Each city's central

business district was observed over a course of several days to geotag the dimensions of

each security zone as well as ascertain and document the intensity of each security zone. While in the field a Casio Exilim H20G hybrid GPS digital camera was employed to define the boundaries of the security zone. Observed data was collected with a notepad and later typed into a Microsoft Excel spreadsheet. Identifiable security zones were photographed with the GPS camera which was embedded with global positional data.

The GPS camera was used to take a JPEG image that also contained metadata in the form of an Exchangeable image file format (EXIF). The EXIF file contained latitude and longitude information which could be read by multiple software programs, including geographic information systems. The geotagged photographs will then be uploaded into the geographic information systems program ArcGIS 10.1 and the geotagged photo will be encoded to ArcGIS. High resolution photographs of each security zone will also be collected. The security zone classification criteria will also be observed and coded for spatial analysis in ArcGIS. The geotagged photographs will also be uploaded into ArcGIS to allow for the creation of security zone polygons which allow for the spatial calculation of the total area of each security zone polygon. ArcGIS Explorer will be employed to help check for accuracy of the geotagged photos and measurements of the security zone polygons.

Once the security zones have been identified within the ArcGIS program a spatial analysis of the data was conducted. The spatial analyst tool of inverse distance weighted (IDW) interpolation within the ArcGIS program estimates the intensity of the security zones and neighboring space based on a known set of points. The geotagged photos of security features construct a set of known data points for Chicago, Indianapolis, and Detroit.

IDW interpolation predicts a value for any unmeasured data point using values from measured data points. This is done by calculating the set of known data points to unknown data points with a weighted average of the values available at the known data points. IDW interpolation weights the points closer to the prediction location more than points farther away. Therefore, measured data points will have more influence on predicted values closest to the known data point and diminish with distance. The most accurate results from IDW interpolation are achieved when sampling is dense with measured data points from the sample area. If the measured data points are sparse or uneven, the results may not accurately represent the surface area (Watson and Philip, 1985). IDW Interpolation is commonly used for sampling precipitation, temperature, evaluation, pollution sources, and mineral concentration. This dissertation is the first time IDW interpolation is employed to measure the social phenomena of security zones.

IDW interpolation provides the spatial variation of the intensity of a security surface for security zones/fortified space measures deployed to protect high value terrorist targets within the each city's core. ArcScene 10 was be used to provide highly detailed security zone 3D surfaces of the IDW interpolation maps. This methodology can be easily replicated and will allow for future researchers to engage in cross-sectional or longitudinal analysis of Chicago, Indianapolis, Detroit or other cities.

Once the mapping of the security zones has been accomplished, crime rates, office space rental rates, and population is compared from 2000 through 2010. This comparison allows for a better understanding of the changes occurring within security zones. The rates also are compared to similar rates outside of the security zone

boundaries. This allows for a comparison of impacted areas to areas which are not

generally associated with security zones or urban fortification in general.

CHAPTER FIVE

FINDINGS

<u>Introduction</u>

This study uses geotagging and spatial analysis to conceptualize and quantify security zones located within three major U.S. cities. Over the course of several days, Chicago, Indianapolis, and Detroit were visited, and cross-sectional systematic social observations on security zones and their intensity were collected. The sample area for each city was located within the central business districts of each city. The intensity of each security zone was also coded and documented. The dimensions of each security zone were geotagged using a Casio Exilim H20G hybrid GPS digital camera. Observed data was collected with a notepad and later typed into a Microsoft Excel spreadsheet. Identifiable security zones were also photographed with the GPS camera which was embedded with global positioning data. High resolution photographs of each security zone were also collected. The GPS camera took JPEG image of the security zone that contained metadata in the form of an Exchangeable image file format (EXIF). The EXIF file contains latitude and longitude information which can be read by multiple software programs, including geographic information systems, for a precise location of the security zone.

The geotagged photographs were uploaded into the geographic information systems program ArcGIS 10.1 and the geotagged photo, with the global positioning data, was encoded to ArcGIS. Security zone classification criteria was also observed and coded for in Microsoft Excel. The Excel spreadsheet was uploaded into ArcGIS as an attribute table for spatial analysis of each geotagged point. The geotagged photographs

were also uploaded into ArcGIS to allow for the creation of security zone polygons. These photos allowed for the spatial creation and calculation of the total area of each security zone polygon. ArcGIS Explorer, a companion program, was employed to cross reference accuracy of the geotagged photos and measurements of the security zone polygons.

The spatial analyst tool of inverse distance weighted (IDW) interpolation, a feature of the ArcGIS program, was used to measure for the intensity of the security zones and neighboring space. The geotagged photos of security features construct the set of known data points for Chicago, Indianapolis, and Detroit. IDW interpolation predicts a value for any unmeasured data points using values from measured data points. This is done by calculating the set of known data points to unknown data points with a weighted average of the values available at the known data points.

IDW interpolation weights the points closer to the prediction location more than points farther away. Therefore, measured data points will have more influence on predicted values closest to the known data point and diminish with distance. IDW interpolation provides an observable intensity of a security surface for security zones space measures deployed to protect high value terrorist targets within each city's core. ArcScene 10 was used to provide highly detailed security zone surfaces of the IDW interpolation maps.

With the intensity and extent of the security zones identified, this study will then compare social and commercial activity within the identified central business districts to areas outside of the identified security zone areas. The social and commercial activity data used for this study will be population rates, crime rates, and office space rental rates

from 2000 through 2010. This will offer an explanation of security zone influences over commercial and social activities within security zones.

<div align="center">Chicago</div>

The first site sampled was the City of Chicago. As of 2011, Chicago is home to 2,703,713 residents. Chicago's economy is mainly based on manufacturing, printing and publishing, finance, and food processing. The city is also a major transportation and distribution center due to O'Hare International Airport and the Port of Chicago. Chicago is also home to eleven Fortune 500 companies, the Chicago Mercantile Exchange, Chicago Board of Trade, a Federal Reserve Bank, and over 230 government agencies.

Chicago is considered a Tier I city by the U.S. Department of Homeland Security: Urban Area Security Initiative list. The area selected for this study was the central Loop. The central loop is located within Chicago's designated Community Area 32, which is also known as the "Loop." The Loop is the central business district for Chicago. The name is derived from cable car tracks making a large circle through the middle of the city. After experiencing rapid growth during the Civil War, the Fire of 1871 completely destroyed the Loop. The fire cleared the way for skyscrapers and the reorientation of the business district from retail to commercial growth (Holt and Pacyga, 1979). The number of people entering and leaving the Loop peaked at one million per day in the late 1940s and began to decline with suburban development and the increased use of the automobile (Holt and Pacyga, 1979). Presently, the city government and business leaders have continued to produce a building boom to provide office space for corporations, government agencies, and banks.

The central loop contains the commercial center as well as all major governmental entities in the City of Chicago. The boundaries of the central loop are West Wacker Drive and East Van Buren Street for north and south; and State Street and Wells Street for east and west. The boundaries were taken from the City of Chicago's official website. The total population is 2,044 (IL Cook County - Census Tract 8391, Block Group 1). The area being examined is 0.216 square miles; 138.463 acres; and 6,031,486.895 square feet.

The following buildings were observed to have a detectable security zone: Chicago Board of Trade, Ralph H. Metcalfe Federal Building, Everett M. Dirksen U.S. Courthouse, John C. Kluczynski Federal Building, Burling Bank, BMO Harris Bank, Federal Reserve Bank of Chicago, First American Bank, Chase Tower, McDonald's, BMO Harris Bank, Northern Trust Bank, 181 W. Madison, Fifth Third Bank, WBBM-TV (CBS), Daley Civic Center, Cook County Building, 55. W. Wacker, and 205 W. Wacker. The security features of each building were observed and cataloged. The perimeter of each building and every security feature was geotagged for spatial calculation by ArcGIS.

BUILDING	X	Y	Behavior	Surveillance	Access	Total	Building Type
Lakeside Bank & Chase Bank	-9755226.741	5142557.672	1	1	1	3	Bank
Chicago Board of Trade	-9755125.692	5142563.439	2	2	1	5	CME Group
Chicago Mercantile Exchange Center (Offices)	-9755014.329	5142562.831	1	1	1	3	CME Group Offices
77 W Jackson Blvd	-9755001.143	5142562.804	1	1	2	4	Ralph H. Metcalfe Federal Building
77 W Jackson Blvd CCTV Camera	-9754987.966	5142566.773	0	2	0	2	Ralph H. Metcalfe Federal Building
Security Booth (Dirksen Building)	-9754758.797	5142760.967	0	2	2	4	Dirksen Fed Building
Everett M. Dirksen U.S. Courthouse (Jackson & Plmouth)	-9754794.992	5142760.808	2	2	2	6	Dirksen Fed Building
Everett M. Dirksen U.S. Courthouse (Jackson & Dearborn)	-9754842.776	5142759.855	2	2	2	6	Dirksen Fed Building
Federal Protective Service Officers	-9754841.188	5142796.209	0	2	0	2	Dirksen Fed Building
John C. Kluczynski Federal Building (Jackson & Dearborn)	-9754853.571	5142753.823	2	2	2	6	Kluczynski Fed Building
john C. Kluczynski Federal Building (Jackson & Federal)	-9754906.911	5142753.823	2	2	2	6	Kluczynski Fed Building
Federal Protective Service Squad	-9754983.852	5142737.207	0	2	0	2	Dirksen Fed Building
141 W Jackson Blvd	-9755132.284	5142732.445	2	1	0	3	Burling Bank
BMO Harris Bank	-9755219.464	5142730.725	0	1	1	2	Bank
Federal Reserve Bank of Chicago	-9755244.864	5142748.584	0	2	2	4	Fed Reserve Bank
Federal Reserve Bank of Chicago Truck Entrance	-9755336.939	5142831.134	0	2	2	4	Fed Reserve Bank
First American Bank	-9754821.794	5143123.632	0	1	0	1	Bank
Chase Tower (Monroe & Dearborn)	-9754871.007	5143140.697	2	1	2	5	Bank Headquarters
Chase Tower (Monroe)	-9754963.082	5143134.744	2	1	2	5	Bank Headquarters
McDonald's	-9754999.198	5143140.697	1	0	1	2	Restaurant
BMO Harris Bank	-9755138.501	5143111.725	0	1	1	2	Bank
Northern Trust Bank (Monroe & Wells)	-9755334.558	5143132.363	1	1	1	3	Bank
Northern Trust Bank (Wells)	-9755337.336	5143204.594	1	1	1	3	Bank
181 W. Madison	-9755302.808	5143303.813	2	2	1	5	Office Building
Chase Tower (Madison)	-9755004.357	5143308.973	2	1	2	5	Bank Headquarters
Fifth Third Bank	-9754761.072	5143314.926	0	1	1	2	Bank
WBBM-TV (CBS)	-9754855.529	5143522.757	0	0	1	1	T.V. Station
Daley Civic Center (Clark & Randolph)	-9755019.042	5143677.803	1	2	2	5	City and County Building
Cook County Building (Sheriff, City Clerk, Ciy Council, etc.)	-9755184.671	5143678.861	1	0	1	2	City and County Building
55. W. Wacker	-9754953.213	5144040.494	1	1	1	3	Office Building
205 W. Wacker	-9755323.895	5144026.207	0	1	0	1	Office Building

Table 3: Observed data for Chicago

Table 3 describes the observed data for the central loop of Chicago. The building column lists the name or addresses of the building exhibiting defensible space measures. X and Y contain the coordinate data of the defensible space measures on the Earth's surface. The X and Y coordinate data was collected by using a Casio Exilim H20G hybrid GPS digital camera. Behavior, Surveillance, Access, and Total was the observable data that was collected. Building Type serves as a brief description of the building. The average score for buildings exhibiting security zone variables for the behavior criteria was 1.25. Surveillance and access were 1.21 and 1.34, respectively.

Figure 9 displays all of the identified buildings exhibiting security zones in Chicago's central Loop.   Each green box represents a building or cluster of buildings displaying security zone characteristics in Chicago's central Loop. When taking the square footage of the central Loop and dividing it by the square footage of fortified space; it was found that 22.6688% of the central Loop exhibited fortified space.

Several security zones stood out in the central Loop area. The first two were the John Kluczynski Administrative Building and the Everett Dirksen Courthouse. Both of these buildings are part of the Miles van der Rohe Chicago Federal Center. The Metcalfe federal building and a U.S. post office are also located within the federal complex. Both the Kluczynski and Dirksen buildings maxed out on the security zone criteria. The Federal Emergency Management Administration (FEMA) utilizes a basic three layers of defense for site security. The "layers of defense" is a cumulative protection strategy known as protection-in-depth and relies heavily on CPTED strategies for protecting and hardening assets behind several barriers (FEMA, 2011). The Dirksen and Kluczynski federal buildings apply all three layers of defense.
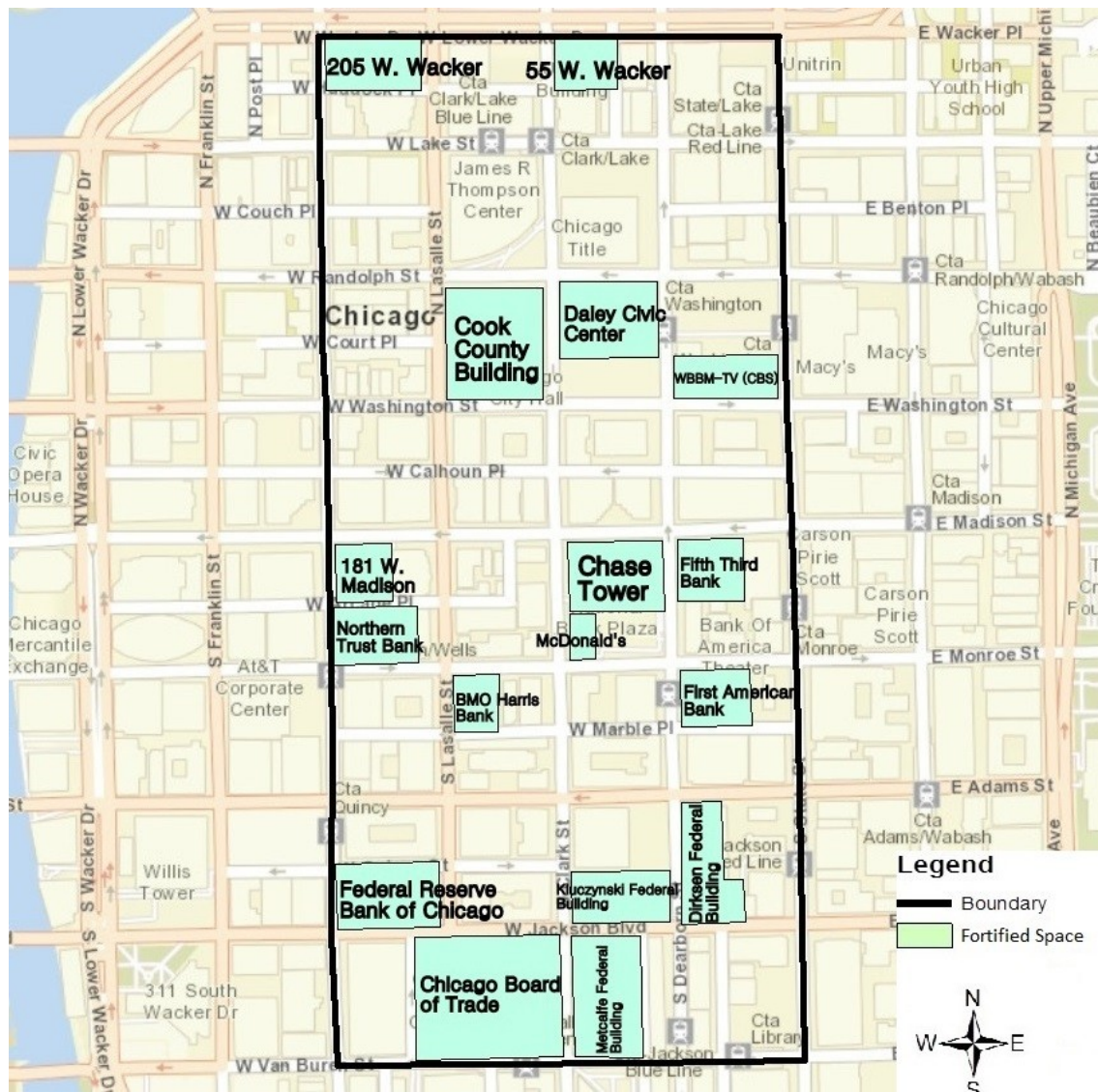
Figure 9: Buildings exhibiting fortified space in Chicago

The first layer of defense usually consists of natural or manmade barriers at the property line or sidewalk. Both federal buildings have their perimeter surrounded with bollards, granite planters, and granite benches. The bollard system was installed in 2002 in response to increased security requirements for federal buildings.

Figure 10: Bollards surrounding Dirksen and Kluczynski federal buildings

Figure 11: Bollards and planters surrounding Dirksen and Kluczynski federal buildings

The second layer of defense extends from the perimeter of the site to the exterior side of a building. Both federal buildings have public seating and crash rated planters within the plaza to provide inconspicuous barriers while allowing for public openness. FEMA (2007) stresses public buildings must employ perimeter barriers and streetscape enhancements while maintaining and augmenting the beautification of the public realm.

Figure 12: Public seating also serving as a barrier

Another part of the second layer of defense is setbacks. According to FEMA (2011), urban areas, particularly central business districts, are restricted in size because the availability of building space and high cost of property which impacts security designs. Most buildings in this study had a zero setback, meaning the buildings start right on the property line. This makes the building more susceptible to extensive damage from truck bombs containing chemical, biological, and radiological materials. Both the Dirksen and Kluczynski federal buildings had significant setbacks from the city street.

Figure 13: The plaza provides additional standoff distance for the buildings

Both the Dirksen and Kluczynski Federal Buildings had larges standoff distances. The plaza was originally designed to serve as public communal space for farmers markets and public gatherings (FEMA, 2007). The plaza also allows for a more effective second layer of defense in an urban setting.

The third layer of protection is the building itself. Both the Dirksen and Kluczynski federal buildings utilize pilotis, i.e. ground level support columns, to provide further setback for
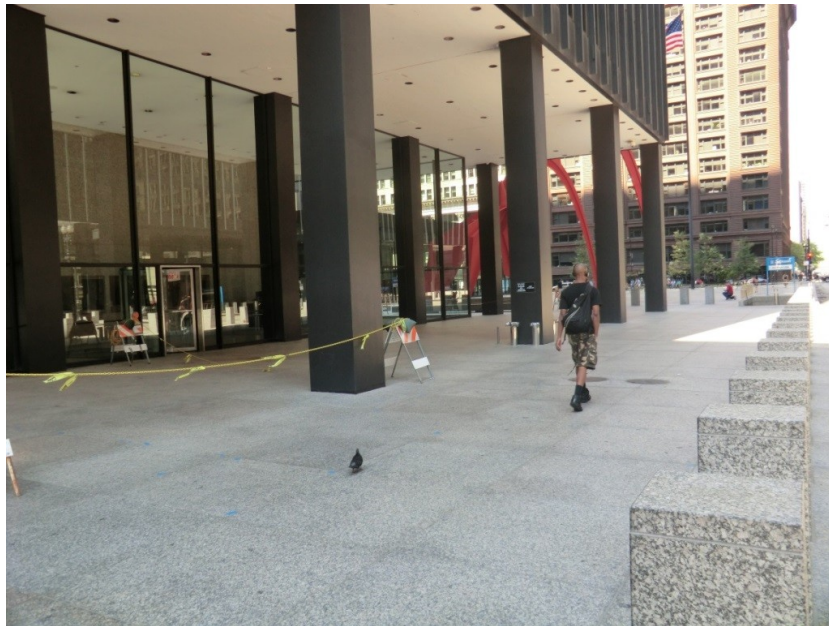
Figure 14: Pilotis surround each building

potential attacks. All of these access restrictions attributed to these buildings scoring

high for the access variable.

Figure 15: Federal law enforcement SUV

Figure 16: Security Booth

Figure 17: Armed patrols

The Dirksen and Kluczynski federal buildings also had multiple signage and surveillance measures in place. A security booth with CCTV camera was located on the perimeter of the Dirksen federal building. Several Department of Homeland Security Federal Protective Service officers were patrolling the grounds at all times. Several of their sport utility vehicles were parked around the Dirksen, Kluczynski and Metcalfe

federal buildings. All three federal buildings had numerous CCTV cameras around the perimeter of the buildings. These factors lead to both the Dirksen and Kluczynski federal buildings to score high on the behavioral and surveillance variables as well. The Metcalfe federal building scored just below the Dirksen and Kluczynski federal buildings. For reference, the Everett McKinley Dirksen United States Courthouse houses the U.S. Court of Appeals for the Seventh Circuit, the U.S. District Court for the Northern District of Illinois, the U.S. Bankruptcy Court, the U.S. Marshal Service, the Federal Public Defender, and the U.S. Probation Service. Tenants of the John C. Kluczynski Federal Building include: the Department of State Passport Agency, Department of Labor, the Internal Revenue Service, Drug Enforcement Agency, Air Force Recruiting Service, Office of Personnel Management, the Consumer Product Safety Commission, General Services Administration, and offices for both U.S. senators from Illinois.

Figure 18: Reserve bank vehicle entrance

Figure 19: Federal Reserve Bank of Chicago

The Federal Reserve Bank of Chicago also stood out with an intense security zone protecting the building. The building was surrounded with fixed bollards and crash rated planters. The CCTVs were too numerous to count. The main vehicle entrance had a rising wedge barrier accompanied by U.S. Department of Homeland Security Federal Protective Service officers. The building also had bars on all of the street level windows. On a side note, after taking several pictures of the building perimeter, a Federal Protective Service officer followed me for one city block and effectively chased me away from the building.

Another location that stood out was Chase Tower. The building itself has an interesting curving feature. The building has a wider base than at the top of the building. The building site also includes a multi-terraced plaza on its south side. Although the Chase Tower plaza was designed for public openness and hosts a wide variety of public

Figure 20: Curved building form

Figure 21: Raised Planters

Figure 22: Chase Tower plaza

events, the plaza does exhibit a number of security zone features. First and foremost the

plaza provides a large setback distance for the building. Raised planters surround the

entire perimeter of the plaza as well. The multi-leveled plaza does not allow any vehicle

access to the southern side of the building. The shallow fountain at the bottom of the

terrace is a perfect example of Boddy's (2008) invisible security features. Boddy (2008)

describes these types of fountains as a passive aggressive design strategy; with the

fountain quietly discouraging public assembly. Planted trees, which can also be viewed

as a type of physical barrier, surrounded the perimeter of the plaza. On the north side of

Chase Tower, there is zero setback from the street to the building. Bollards have been

installed, on the north side of the building and partially on the east and west side, to
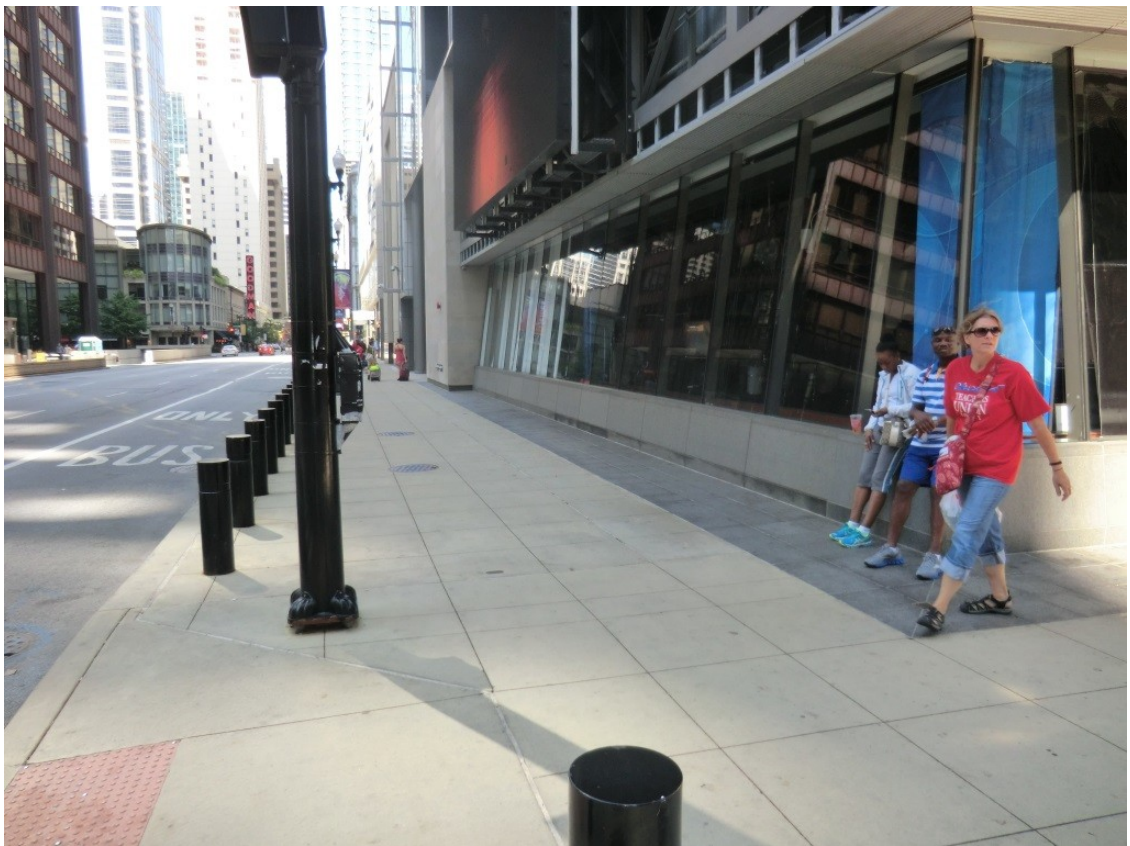
Figure 23: Bollards surrounding Chase Tower

prevent ramming by a motor vehicle. The north side also had several CCTV cameras

positioned throughout the perimeter.

Next to Chase Tower was a McDonald's. At first glance there is nothing notable about the building. However, on closer inspection the building did exhibit several security zone

Figure 24: Defensible space features surrounding McDonald's

features. The first was the difficulty in moving around the building. There was only one entrance and exit point and the building was surrounded by a giant low-rise planter on the west side of the building and a five foot planter on the eastside. This McDonald's is a prime example of finding an appropriate balance between maintaining security while preserving the public realm beautification. The balance was also identified and more prevalent Indianapolis' Central Business District.

The number of banks employing security zones within the central Loop was also of interest. Burling Bank, Lakeside Bank, and two BMO Harris Bank's all had common

security zone features like bollards, CCTV cameras, security guards, and numerous signage forbidding loitering and parking of vehicles.

Figure 25: BMO Harris Bank

Figure 26: Burling Bank

Figure 27: Another BMO Harris Bank

Figure 28: Lakeside Bank

An interesting note about Chicago was the staggering amount of CCTV cameras present in the central Loop. The buildings that did have security zones in place almost all had numerous CCTV cameras surrounding their perimeter. Further research found that Chicago has been actively installing CCTV cameras throughout the city for the purpose of terrorism prevention and crime control (Pastor, 2010). Chicago's Crime Prevention Information Center gathers intelligence from national, state, and local levels to deal with

terrorist activities. A key component of the intelligence gathering is the CCTV camera

network within the City of Chicago. Interestingly enough, when there are lulls of

terrorist activities, the extensive CCTV camera network is utilized to combat street crime.

It was also found that Chicago is also instituting the Private Sector Video Domain

(PSVD) program which allows Chicago's Office of Emergency Management personnel

to access private sector cameras to monitor for terrorist activities (Pastor, 2010).

Figure 29: One of many CCTV cameras located in the central Loop

However, in times where terrorism is not present the PSVD program is

incorporated into Chicago police communications systems. Pastor (2010) concludes

federal, state, and local law enforcement officers have access to over 2,000 public and

private CCTV cameras. For example, in 2003 Chicago police were observing a

suspiciously parked vehicle through a police observation device installed several weeks

prior. These observation devices are bulletproof and able to record a suspect from up to

150 feet away. While observing the suspect parked in his car the suspect began smoking

marijuana. Shortly thereafter, members of Chicago's Targeted Response Unit swarmed
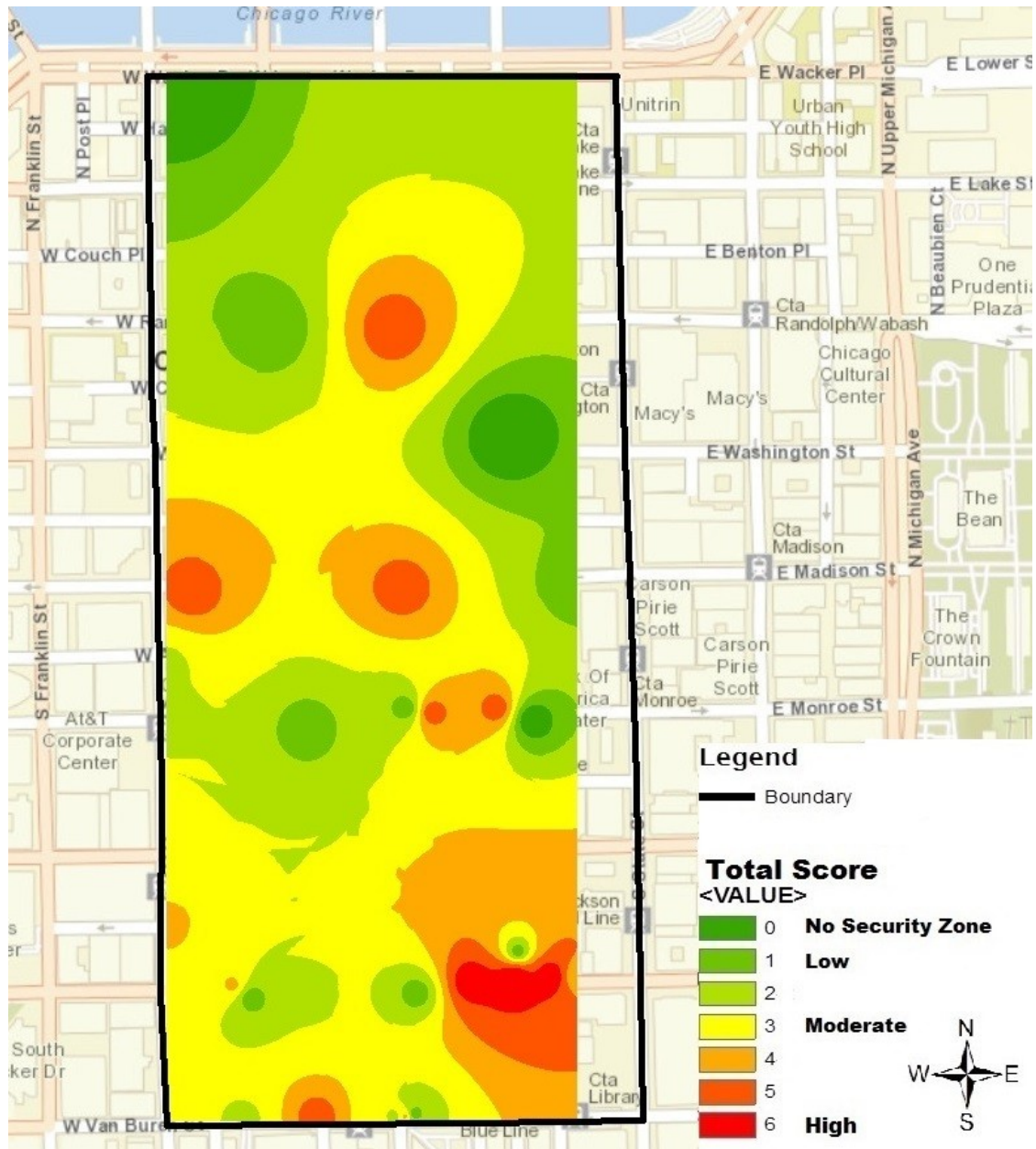in and arrested the suspect for a felony drug charge (Main, 2003).

Figure 30: Variation of Security Scores in the Central Loop (interpolated by IDW
method)

Figure 30 displays the IDW interpolation data of the behavioral, access, and surveillance variables in the central Loop of Chicago.   The dark green areas have no security zones present in that vicinity. The dark green to light green areas displays no security zone or a low security zone presence. The yellow and orange areas exhibit moderate security zones. Light red and dark red indicate intense security zones present in that area. The score was measured from definable security zone criteria. The IDW interpolation map displays that the security zone influence is regional and does not limit itself to the perimeter of the building employing the security zone. Both the Dirksen and Kluczynski federal buildings scored at the highest possible level and show up on the IDW interpolation map as red. The plaza next to the Rohe Chicago Federal Center is displayed on the map as a single green dot next to the red and orange areas. However, the surrounding security zones quickly diminish the openness and lack of a security zone within the plaza. Other intense security zones in the central Loop included: the Chicago Board of Trade, the Daley Civic Center, and181 W. Madison Street (Paine Webber Tower).

Figure 31 provides an overlay of identified security zone areas with the IDW interpolation map. When a person enters a security zone they will have their access restricted, behavior modified, or be surveilled. The degree to which this happens is based on the intensity of the security zone. The more intense the security zone, the more likely the person may feel the effects of the security zone.
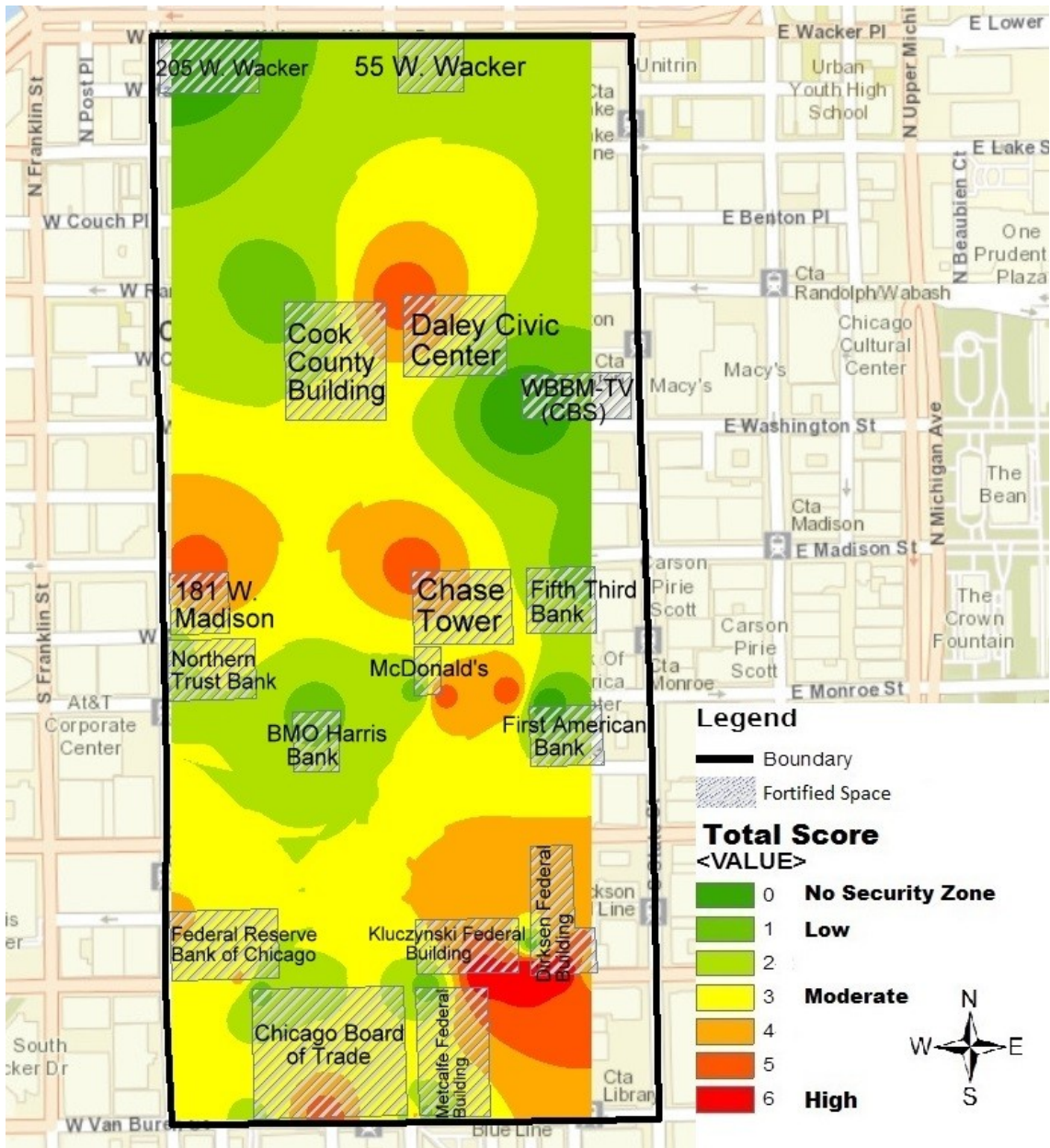
Figure 31: IDW interpolation map with fortified space in the central Loop
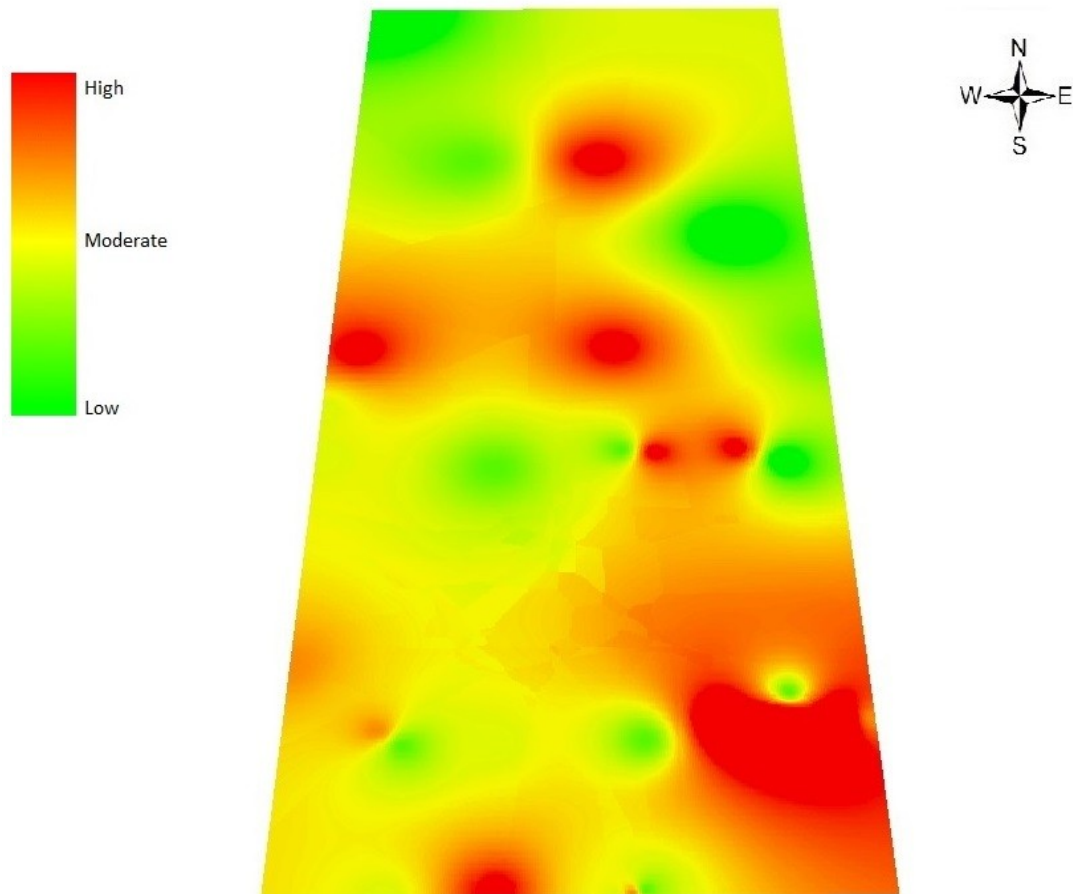
Figure 32: Security surface of Chicago

Figure 32 is a thematic map created from raster data provided by the central Loop

IDW interpolation map. Raster data is a matrix of cells organized into rows and columns,

where each cell contains a value representing information. For this dataset the raster data

are the security zone criteria. This can be viewed as a temperature map for security zones

within the central Loop of Chicago. The color ramp for this map is: green=low,

yellow=moderate and red=high. Simply put, the more red the map is, the more intense a

security zone; the more green the map, the security zones becomes less to nonexistent.

This image was accomplished by importing the IDW interpolation map into ArcScene, a

three dimensional visualization application that allows for GIS raster data to be view in

three dimensions.
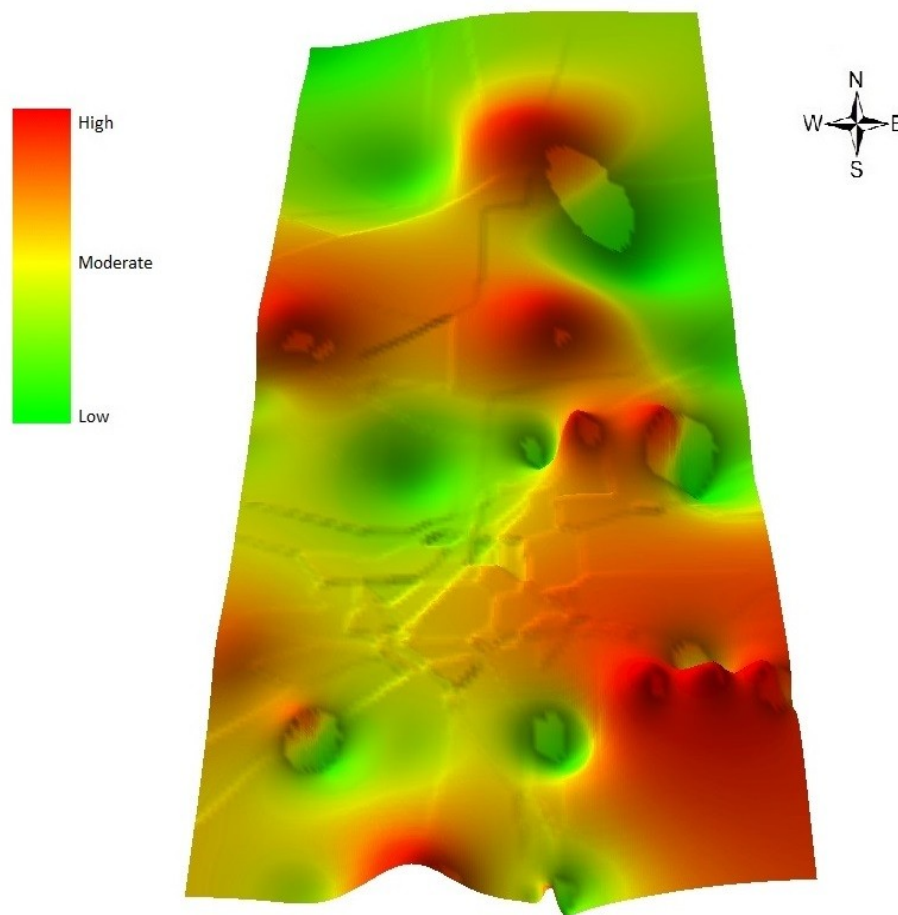
Figure 33: Topographical security surface of Chicago

Figure 33 provides a topographical security surface of the central Loop in downtown Chicago. The more intense areas are displayed as a raised red mound. The lower the security zone, the area descends and becomes green. This topographical map was accomplished by importing the IDW interpolation map into ArcScene. ArcScene was used to provide a vertical exaggeration of the security surface. Vertical exaggeration is typically used to emphasize subtle terrain differences. However, the exaggeration was applied to the IDW interpolation map allowing for high and low scoring security zones to act as terrain and to represent a three dimensional surface map for display.

The buildings that have been identified as using security zone criteria correlate with this topographical security surface map. The security zone being generated by the Miles van der Rohe Chicago Federal Center can be seen at the lower right side of the map. The three points in the vicinity of the Rohe Federal Center represent the Department of Homeland Security Federal Protective Officers, a security booth, and combination of bollards, planters, signage, and CCTV cameras surrounding a particular area.

Figure 34 has the buildings in Chicago's central Loop superimposed onto a 3D prism map that was generated in ArcScene. Rather than their real elevations, the 3D prism map displays the buildings total security score of the behavioral, access, and surveillance variables.
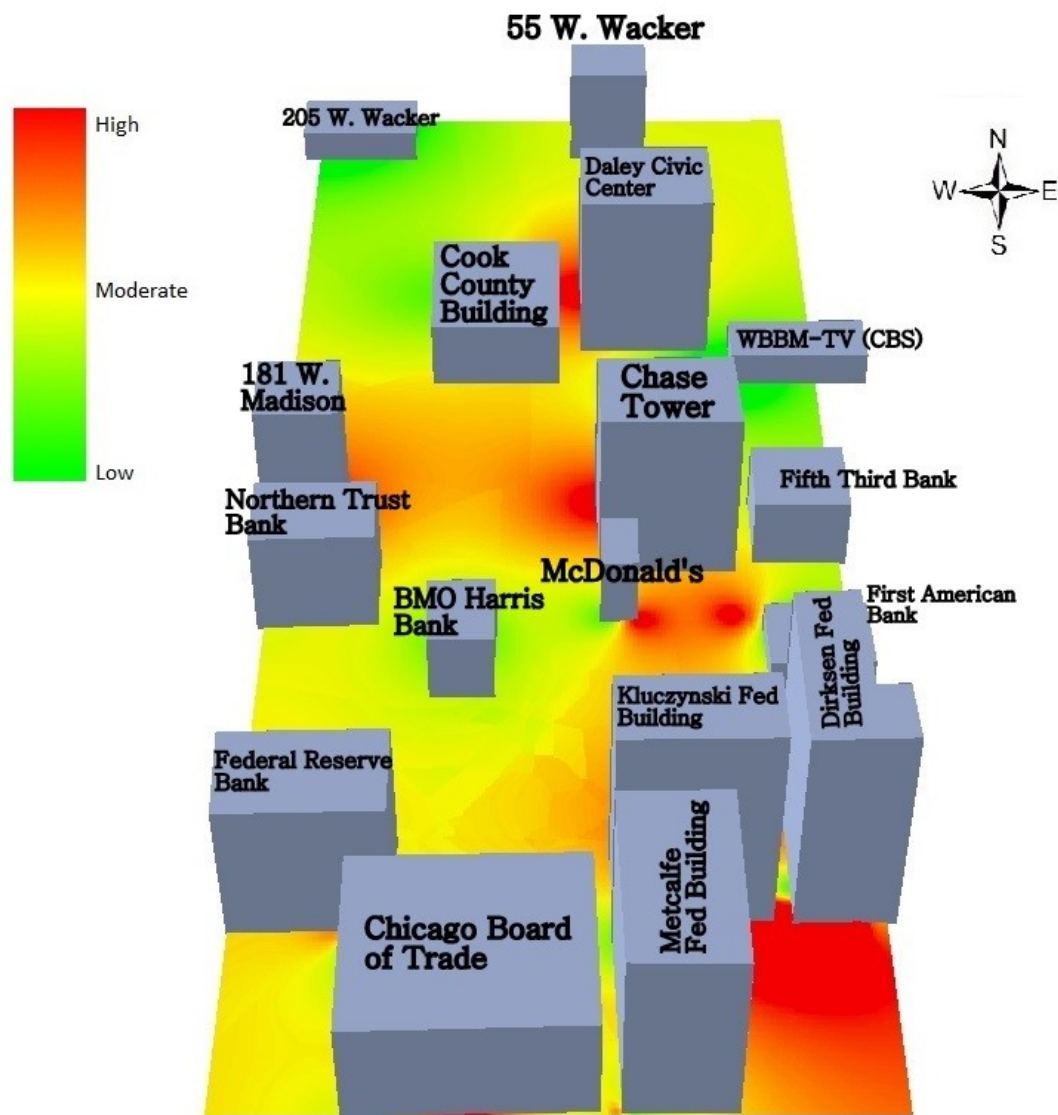
Figure 34: Central Loop 3D prism map with fortified buildings

The buildings with less of a security presence have less height, while buildings

that manifested high levels of security are taller. The Dirksen and Kluczynski Federal

Buildings are the tallest buildings on Figure 34. The Metcalfe Federal Building, Chicago

Board of Trade, Chase Tower, 181 W. Madison, and the Daley Civic Center also

registered as taller buildings. WBBM-TV (CBS), 205 W. Wacker, and First American

Bank only score a one on the security zone criteria and the elevation of those buildings

reflect their low security score.
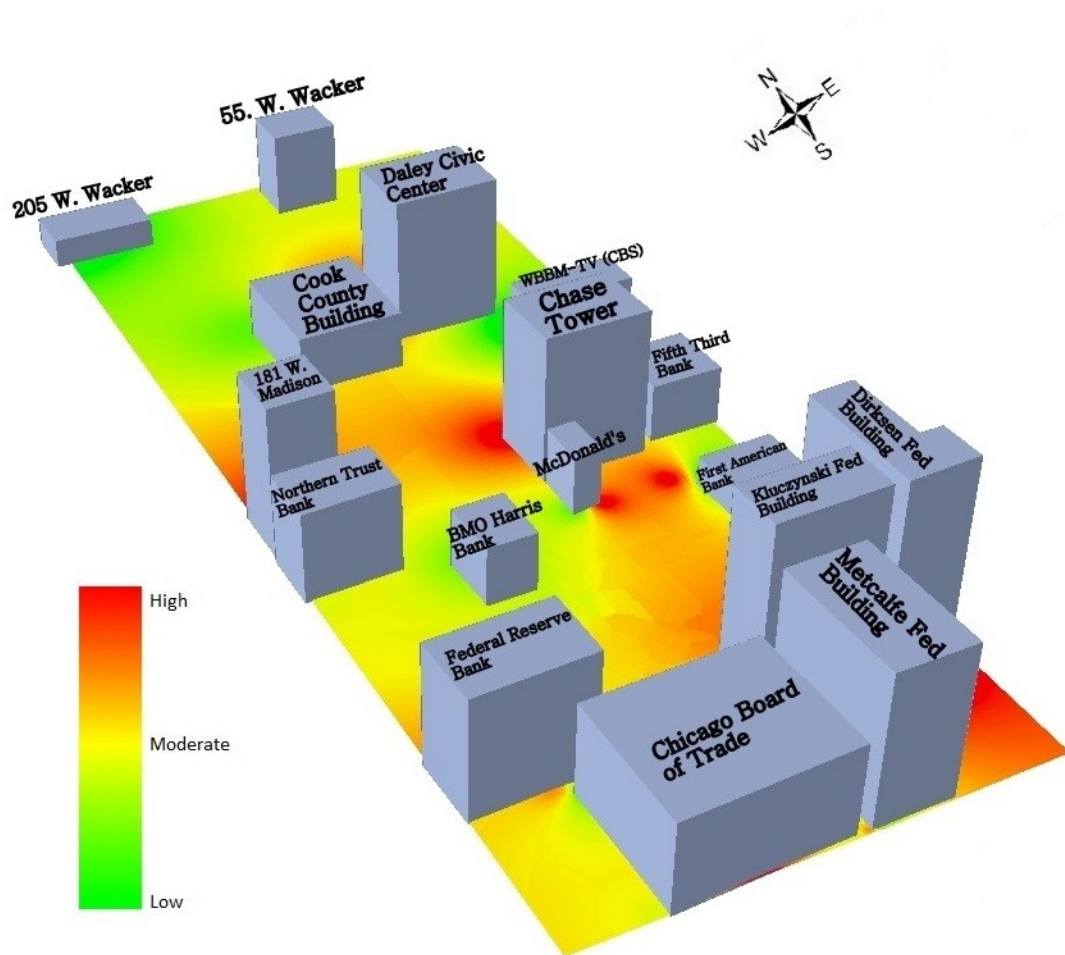
Figure 35: Central Loop 3D prism map - alternate image

Figure 35 reveals the central Loop security surface with the superimposed buildings at an

alternate angle. This angle provides a better view of the buildings exhibiting security

zones in the central Loop. Some buildings, such as 205 W. Wacker (located on the upper

left side of the map) and WBBM-TV CBS (located on the middle right side of the map) employed minimal security zones measures, but still register on the security surface map.

<p style="text-align:center">Indianapolis</p>

The second city that was analyzed was Indianapolis. The Indianapolis economy is primarily focused on industrial, commercial, and transportation. Tourism and sporting events are also major economic factors. Indianapolis has aggressively quadrupled its sporting and tourism trade during the 1980s. The 2011 population of Indianapolis is 833,024. The site chosen was Indianapolis' central business district. The Department of Homeland Security lists Indianapolis as a Tier II city. Although Tier II cities are at less of a risk from a terrorist attack than Tier I cities, the Department of Homeland Security still provides the city with significant funding to combat potential terrorist strikes.

Indianapolis' central business district is located in downtown Indianapolis. It did not become prominent until the Civil War. During the war, the U.S. Army placed 24 camps and an ammunition plant in Indianapolis. The city became a major wartime location to launch campaigns against the Confederate States. Indianapolis also experienced a post-war boom when business and industry reshaped the city. The central business district, which also houses the Wholesale District, began to decline during the Great Depression. During the 1970s and 1980s, the central business district was aggressively revitalized. Aided by the creation of Unigov, the consolidation of city and county government, the central business district has seen the addition of over 100 new businesses and renovation projects since the mid 1990s (Discover Wholesale District, 2013).

The boundaries of Indianapolis' central business district are taken from the Indianapolis Regional Center Plan 2020 report. The Indianapolis Regional Center Plan 2020 was prepared by the City of Indianapolis, the Greater Indianapolis Progress Committee, Indianapolis Downtown INC., and Ball State University's College of Architecture and Planning. The boundaries are Michigan Street to Maryland Street for north and south; and North Delaware Street to Capitol Avenue for east and west. The population of the sample area is 581 (IN - Marion County - Census Tract 3910, block group 3). The area being examined is 0.228 square miles; 146.092 acres; and 6,363,793.282 square feet.

BUILDING	X	Y	Behavior	Surveillance	Access	Total	Building Type
575 N. Pennsylvania St.	-9590827.813	4833174.925	2	2	2	6	Minton-Capehart Federal Building: DEA, ICE, SSA, Dept. of VA, IRS, GSA
575 N. Pennsylvania St.	-9590732.166	4833172.544	2	2	2	6	Minton-Capehart Federal Building (South Side)
1 Inidiana Square	-9590725.763	4832571.859	2	0	1	3	Regions Bank Tower
1 Inidiana Square	-9590839.005	4832575.034	2	0	1	3	Regions Bank Tower (Southwest Side)
200 E. Washington St.	-9590647.446	4832236.367	2	2	1	5	Indianapolis City and County Building
141 E. Washington. St.	-9590706.713	4832125.27	1	0	1	2	Riley Bennett & Egloff, LLP. (Law Firm)
45 North Pennsylvania Street	-9590830.728	4832338.039	1	0	0	1	Huntington National Bank
107 North Pennsylvania Street	-9590833.526	4832362.522	1	0	0	1	The National Bank of Indianapolis
46 East Ohio Street	-9591040.528	4832672.234	1	2	2	5	U.S. District Court - Southern District Indiana (West)
46 East Ohio Street	-9590959.169	4832574.338	1	2	2	5	U.S. District Court - Southern District Indiana (South)
46 East Ohio Street	-9590949.247	4832741.688	1	2	2	5	U.S. District Court - Southern District Indiana (North)
46 East Ohio Street	-9590868.549	4832662.312	1	2	2	5	U.S. District Court - Southern District Indiana (East)
220 N. Meridian St.	-9591154.977	4832575.288	2	0	1	3	Indiana headquarters for AT&T (Southwest Side)
220 N. Meridian St.	-9591065.945	4832572.113	2	0	1	3	Indiana headquarters for AT&T (Southeast Side)
111 Monument Circle	-9590984.332	4832391.627	1	1	0	2	Chase Tower - Indiana headquarters for Chase Bank
111 Monument Circle	-9590944.314	4832365.83	1	1	1	3	Chase Tower - Southern Side
1 South Capitol Ave.	-9591301.401	4831964.524	1	0	1	2	Hyatt Regency Indianapolis - PNC Center
200 West Washington Street	-9591486.174	4832364.27	2	0	0	2	Indiana Statehouse
201 N. Illinois Street	-9591246.892	4832750.477	1	1	1	3	Capital Center North Tower
1 American Square	-9591279.105	4832584.88	1	1	0	2	OneAmerica Tower
1 American Square	-9591447.645	4832590.701	1	0	1	2	OneAmerica Tower (Southwest Side)
1 American Square	-9591276.724	4832744.689	1	0	1	2	OneAmerica Tower (Northeast Side)

Table 4: Observed data for Indianapolis

Table 4 features the observable security criteria for Indianapolis' central business district. The only building receiving a maximum score for the security zone criteria was the Minton-Capehart Federal Building. The averages for buildings exhibiting security zone criteria were as follows: behavior 0.95; surveillance 0.5; and access 0.5.

Figure 36: Fortified buildings in Indianapolis' Central Business District

Figure 36 displays the buildings with a detectable security zone. Three buildings fell outside of the boundaries of the central business district, but were included in this study due to the close proximity of the border. These are the Minton-Capehart Federal Building, Indiana Statehouse, and Indianapolis City and County Building. The total square footage observed has been adjusted from 6,363,793.282 square feet to 7,268,163.137 square feet to include the additional buildings. An analysis of the square footage reveals that 25.2% of Indianapolis' central business district displays some type of security zone. The building that employed the most security zone features in Indianapolis' central business district was the Minton-Capehart Federal Building. Maxing out on the security zone criteria, the Minton-Capehart Federal Building is a prime example of Brutalist architecture.

Figure 37: Minton-Capehart Federal Building-West view

Brutalist architecture is mainly characterized by features such as the use of raw concrete, top-heavy massing, and the use of slender base supports (Whiteley, 2003). The most notable features of the Minton-Capehart building are pilotis surrounding the entire building as well as the inverted ziggurat form. In the late 1960s to the mid 1970s, defensive architecture was used frequently as a result of research which indicated a relationship between certain type of environmental design and reduced levels of violence (Coaffee, 2009). The Minton-Capehart Federal Building, constructed in 1976, appears to be a product of defensive architecture.

This building exhibited raised planters surrounding the west side of the building and half of the north and south side of the building. The remaining north, south, and east perimeter of the building was protected with a ten foot high concrete wall which protected the employee parking lot. The building and parking lot occupy the entire city block. There is also a noticeable setback from the city street. Due to the limited access points of the building and other defensible space features, a maximum score was giving for the access variable. Two security booths and numerous CCTV cameras were present on the north and south side of the buildings perimeter.

Figure 38: Minton-Capehart-South view   Figure 39: Minton-Capehart-Security wall

Figure 38 and 39 shows the concrete wall surrounding over half of the building. Department of Homeland Security Protective Service officers were also present throughout the perimeter of the building. These factors contributed to the maximum scores of surveillance. The building, which is open to the public, had few areas for the public to sit down and congregate. The lack of public seating, benches and chairs, was noticeable. It almost seemed as if the lack of seating was by design. Perhaps building administrators do not want people loitering around the open spaces of the building. This building received a maximum score in behavioral due to the lack of public openness. Tenants of the Minton-Capehart Federal Building include: General Services Administration, Internal Revenue Service, Social Security Administration, U.S. Department of Veterans Affairs, Immigration and Customs Enforcement, and the Drug Enforcement Agency.

Figure 40: U.S. Courthouse-east view   Figure 41: U.S. Courthouse-southeastern view

Another federal building scoring high on the security zone criteria is the Birch Bayh Federal Building and U.S. Courthouse. The building had an above average setback and was surrounded by large marble walls. Several CCTV cameras were present on every side of the building. The building had numerous access restrictions and only allowed for public gatherings in front of the building which has several benches. The Birch Bayh Federal Building and U.S. Courthouse houses the U.S. District Court of Southern Indiana, U.S. Bankruptcy Court, U.S. Attorney office, U.S. Marshal Service, and the Occupational Safety and Health Administration.

Figure 42: One American Square   Figure 43: Foliage surrounding One America

One American Square (Figure 42 and 43) although scoring low on the security zone criteria, provides a great example of passive aggressive urban security design. Instead of using fixed bollards and crashed rated planters, the whole building is surrounded with a slope with strategically planted trees. The trees seemed varied, but it was noticeable that a car would not be able to drive past the tree barriers. The vegetation also acts as bollards and provides a noticeable setback from the sidewalk. Pleasant vegetation aside, One American Square did still have CCTVs and had no seating or congregating points for pedestrians. The perimeter appears to be designed to keep pedestrian traffic moving and prevent loitering. According to Boddy (2008), One American Square's passive aggressive security design will be the norm for future central business district buildings.

Figure 44: PNC Center

The Hyatt Regency Indianapolis/PNC Center, Figure 44, is another building exhibiting a low level security zone. However, there are some interesting features worth noting. The PNC center is a mixed use building which houses the 500 room Hyatt Regency as well as commercial offices. The building has defensive foliage and crash rated planters surrounding the building. The building has a large setback on its southern side. The PNC Center was the only hotel in this study to display a security zone.

Figure 45 is the IDW interpolation map of the central business for Indianapolis. The most noticeable results are the extreme values being generated by the Minton-Capehart federal building in the upper right corner of the map. The security zone is extending far beyond the perimeter of the building. A possible reason for this outlier is
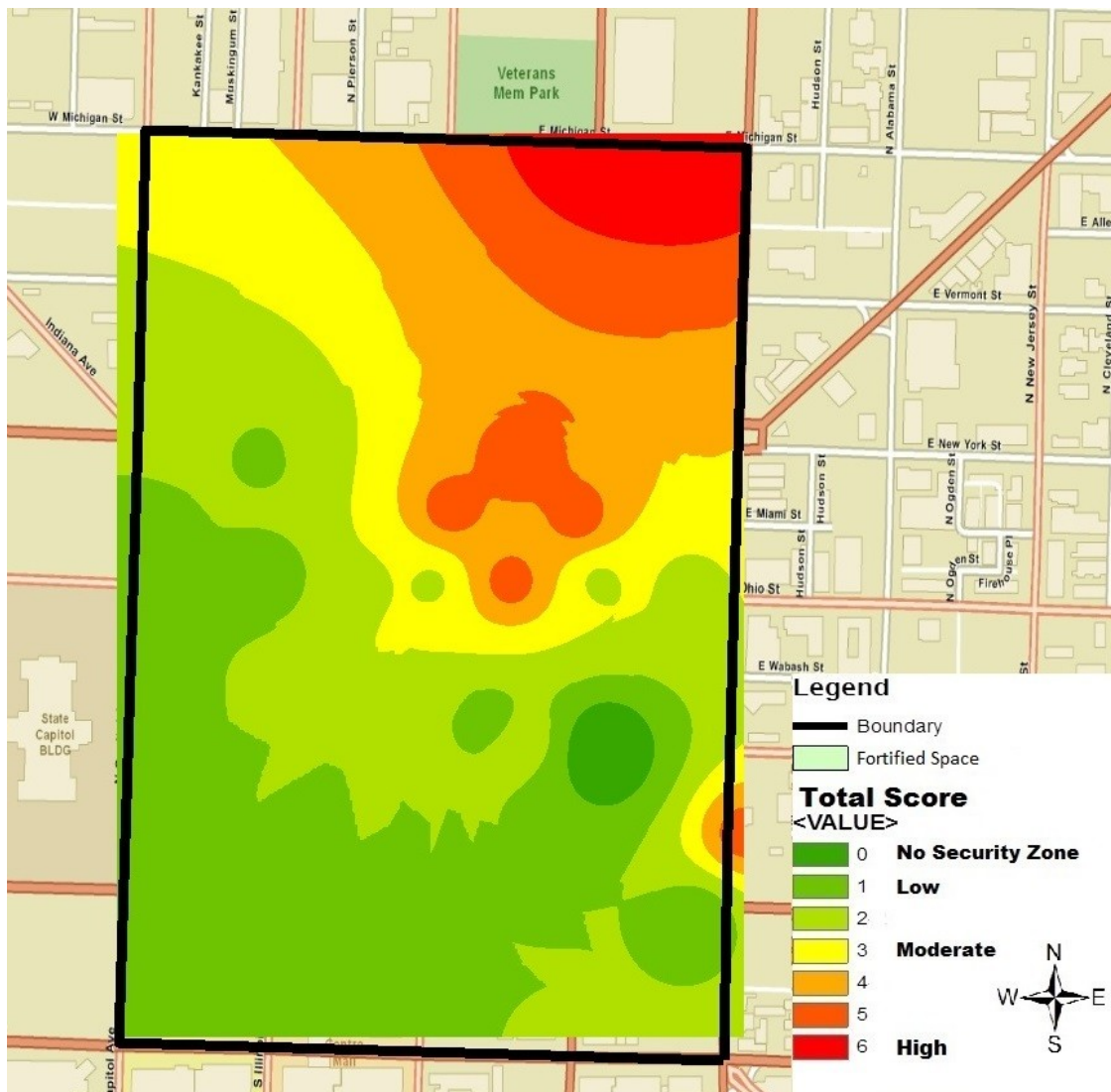
Figure 45: Variation of Security Scores in Downtown Indianapolis (interpolated by IDW method)

the lack of sampled data points that were used to interpolate the Minton-Capehart Federal Building's security surface. There may not be enough sampled points to accurately predict the extent of the security zone. Extending the sample area far beyond the central business district will provide a more accurate representation of the Minton-Capehart and confirm that the initial sample is an outlier. The U.S. District Courthouse also shares an

intense security zone which can be seen underneath the Minton-Capehart security zone.

The final security zone registering a high value was the Indianapolis City and County

Building located on the lower right side of the IDW interpolation map.
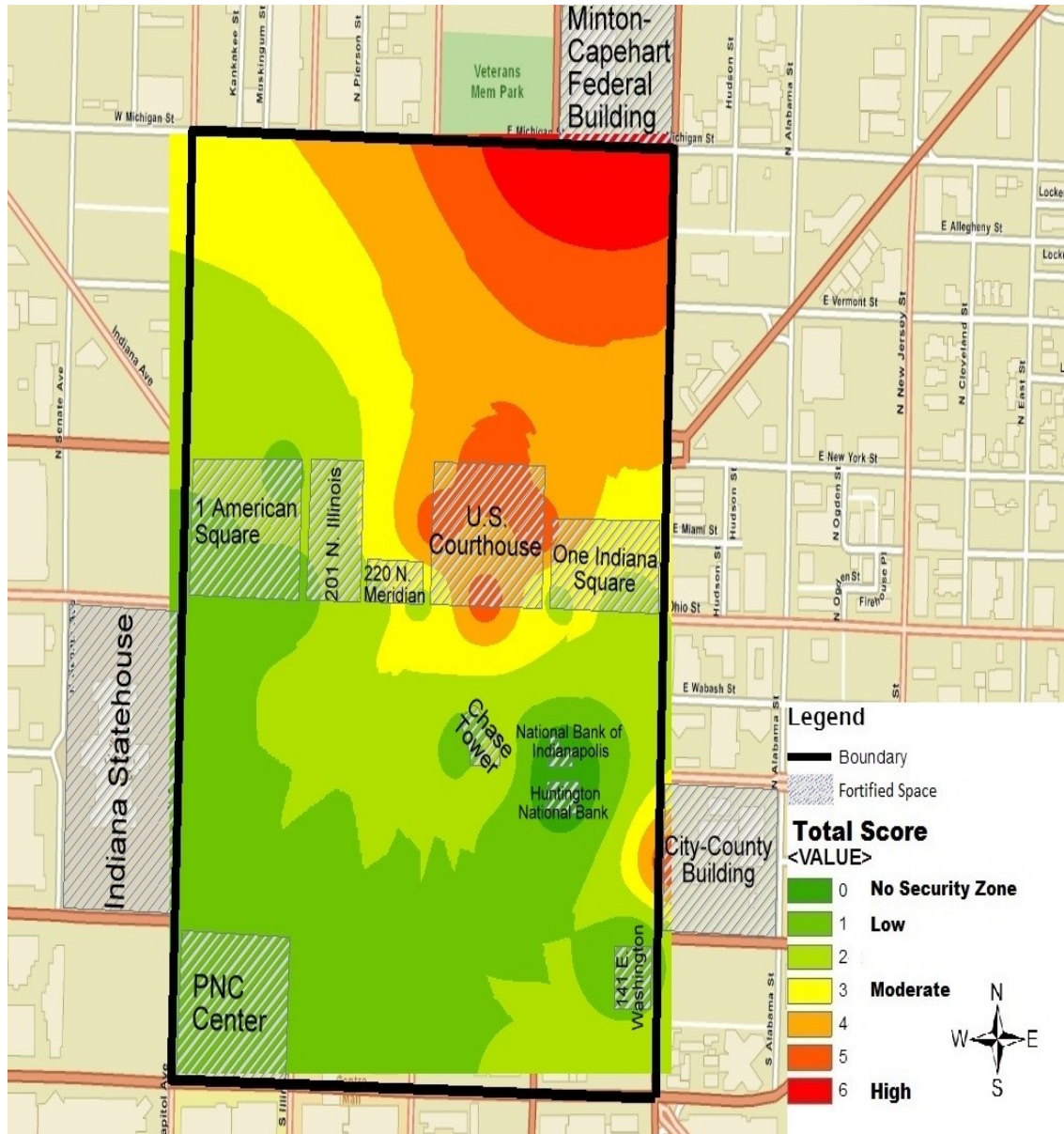
Figure 46: IDW interpolation map with fortified space for Indianapolis

Figure 46 provides the perimeter of the buildings with security zones in effect. Again the most significant finding in this IDW interpolation map is the Minton-Capehart security zone outlier extending far beyond the physical location of the building.
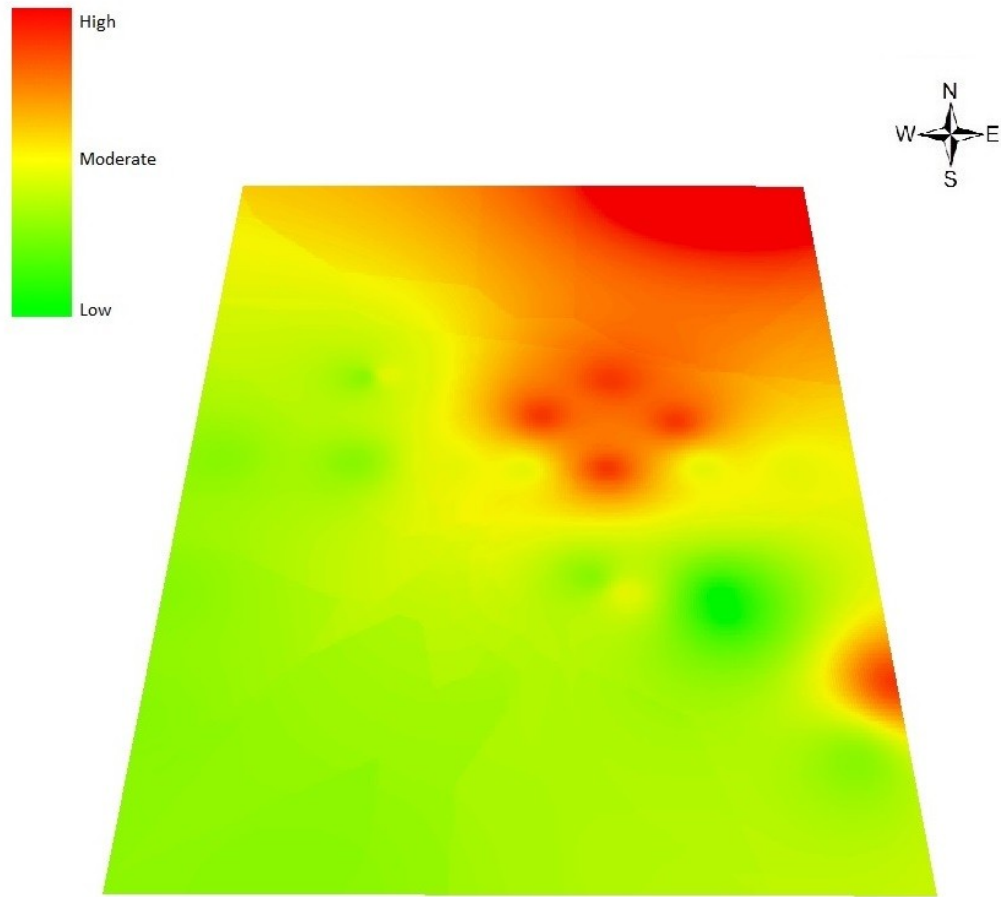
Figure 47: Security surface of Indianapolis

Figure 47 is a thematic map of security zones within Indianapolis' central business district. This security surface provides a better representation of the security zone being generated by the Minton-Capehart Federal Buildings as well as the Birch

Bayh Federal Building and U.S. Courthouse. The Minton-Capehart security zone extends several blocks from the buildings origination point. The map provides a sense of the severe intensity of the security zone. The majority of the central business district exhibited little to no security zones.
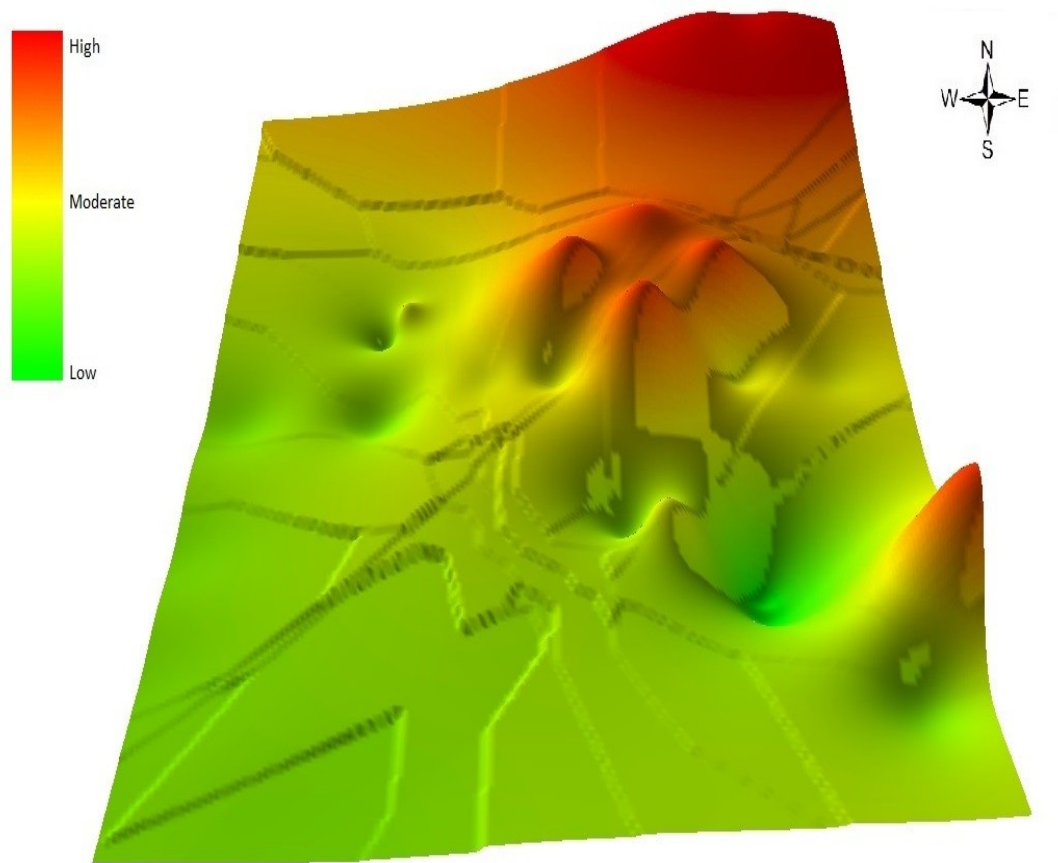
Figure 48: Topographical security surface of Indianapolis

Figure 48 presents a three dimensional security surface of the central business district of Indianapolis.   The more intense areas are displayed as a raised red mound.

The lower the security zone, the area descends and becomes green. The main buildings with intense security
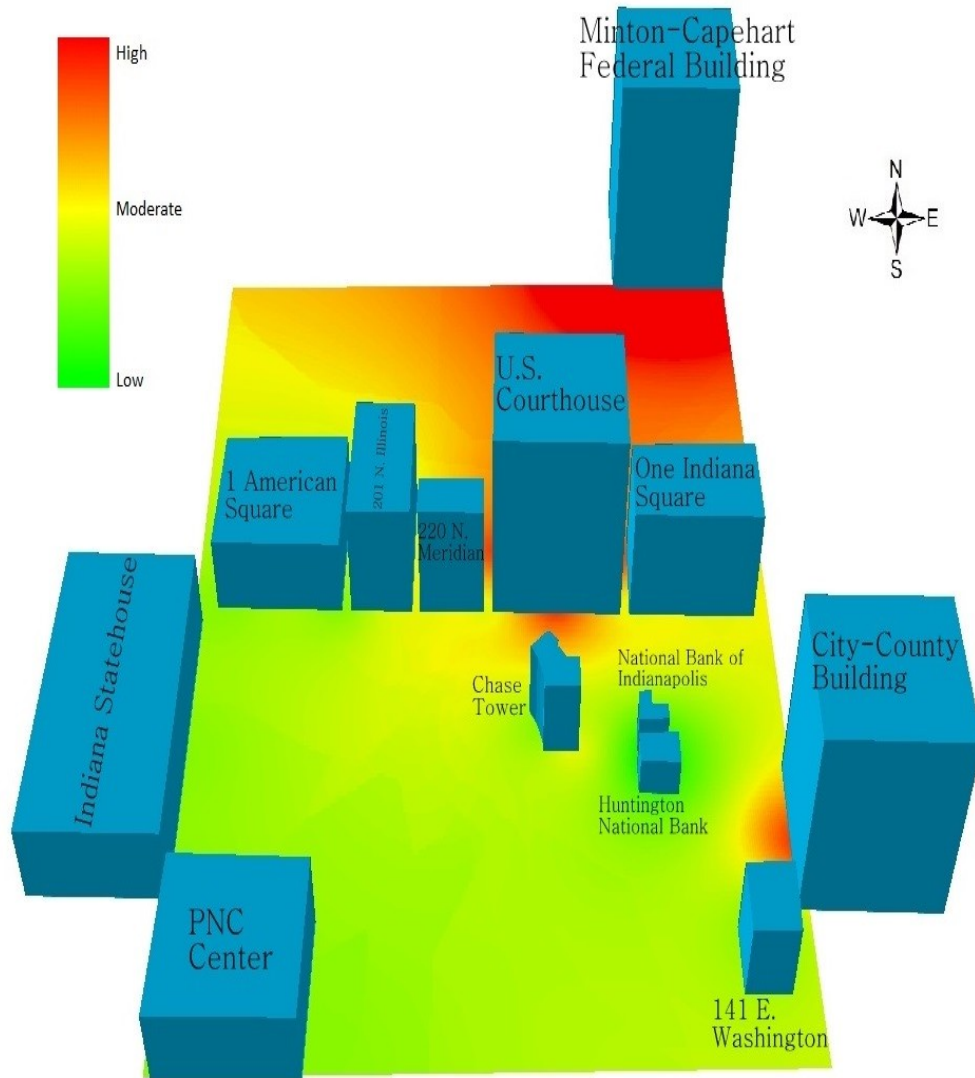
Figure 49: Indianapolis security surface with defensible space buildings

zones were the Minton-Capehart Federal Building, Birch Bayh U.S. Courthouse and the
Indianapolis City and County Building. For Indianapolis, the only buildings that have
very high security zones are government entities.
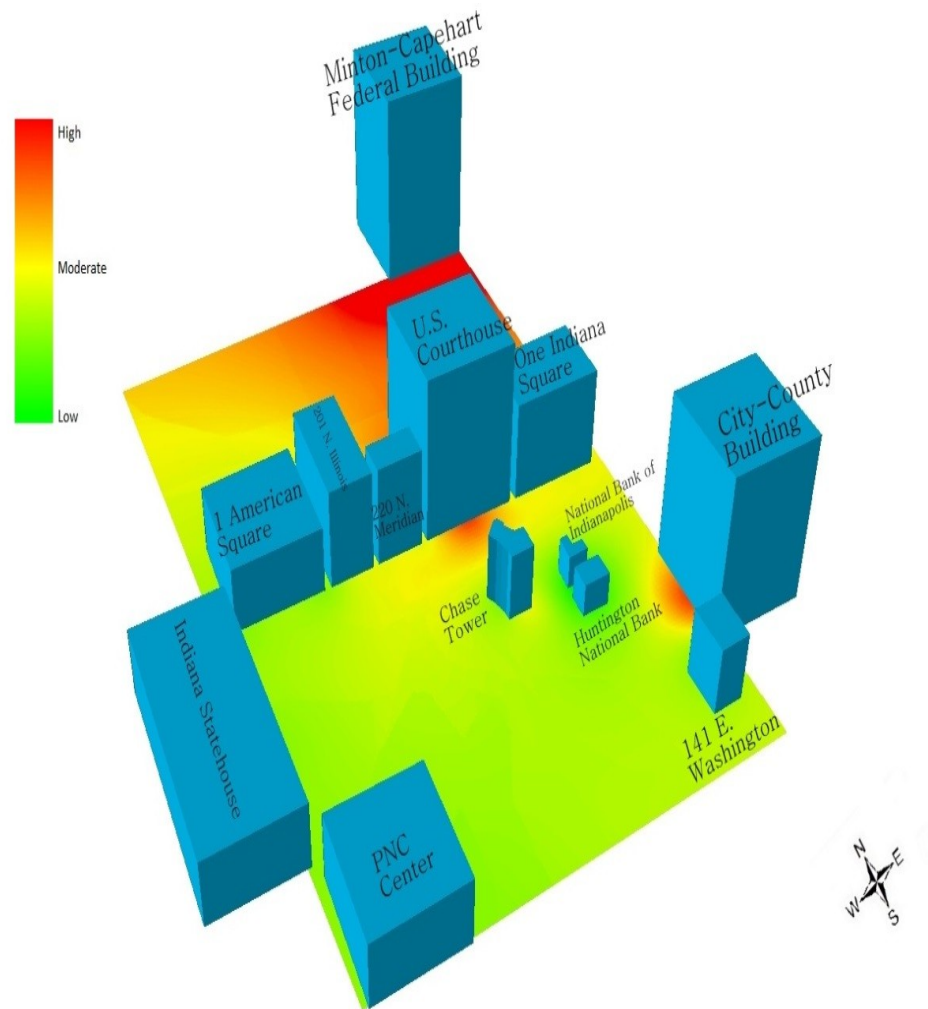
Figure 50: Indianapolis security surface with defensible space buildings-alternate image

Figure 49 has the thematic map superimposed with the intensity level that each building displayed for the observable security zone criteria. With the Minton-Capehart Federal Building

appearing on the thematic map its, security zone is so intense that it extends into other security zones several blocks away. Compare the Minton-Capehart security zone, which had a total value of six, to the security zone being generated by the Indianapolis City and County Building, with a total value of five. The City and County Building's security zone does not extend outward for several city blocks like the Minton-Capehart building. The thematic map being generated by ArcScene concludes the security features being used by the Minton-Capehart building are much more extreme than any other detectable security zone. Figure 50 provides a better comparison of security zones between the massive Minton-Capehart building and the City and County building.

Detroit

Detroit's economy is primarily based upon the automotive industry. With the decline of the automotive manufacturing, the city lost 39% of manufacturing jobs in the 1980s. The automotive supply industry is also a huge economic factor in Detroit. General Motors Corporation, Ford Motor Company, and Daimler AG (formerly Chrysler) are all headquartered in Detroit. Detroit is the 18th most populated city in the U.S. and the population has been steadily declining for over 60 years. The population of Detroit during 1950 was 1,849,569; in 1980 it is 1,203,339; 2000 was 951,270; to its 2011 population of 713,239. Detroit is currently operating on a $300 million budget deficit and is in the process of having the state of Michigan appoint a manager to manage Detroit's financial woes. In 2011, Detroit ranked third in murder only behind New York

and Chicago. The population of the sample area is 303 (MI - Wayne County - Census Tract 5172, Block Group 1 and Census Tract 5172, Block Group 1).

Detroit is considered a Tier II city by the Department of Homeland Security. The boundaries were defined from the National Register of Historic Places listing in Downtown and Midtown Detroit. The boundaries are Michigan Avenue and Monroe Street for north and Jefferson Avenue for south. Randolph Street and Washington Boulevard are the boundaries for east and west. The area for Downtown Detroit is 0.101 square miles; 65.062 acres; and 2,834,124.051 square feet.

Detroit was originally a trading post for Native American tribes. During the Civil War, Detroit was the final stop of the Underground Railroad. In 1896, Detroit became the Motor City of the world with Henry Ford's inception of the assembly line. Detroit's manufacturing success continued through post World War II. With the decline of the U.S. automotive industry Detroit has suffered the most with white flight and increased crime rates. However, the city is actively engaged in multiple revitalization projects.

BUILDING	X	Y	Behavior	Surveillance	Access	Total	Building Type
2 Woodward Avenue	-9244388.446	5210530.364	1	2	1	5	Coleman A. Young Municipal Center (City Hall)
600 Randolph Street	-9244323.358	5210825.64	2	1	1	4	Former Wayne County Building (Wayne Co. Courthouse)
611 Woodward Avenue	-9244663.428	5210597.092	1	1	1	3	The Qube (Formerly Chase Tower/Quickens Loans office building)
511 Woodward Avenue	-9244606.807	5210496.815	1	1	2	4	MFS Intelenet Inc. (Communication company)
1 Woodward Avenue	-9244558.706	5210343.568	1	2	1	5	Class A Office Center
535 Griswold Street	-9244714.228	5210487.555	0	2	0	2	Buhl Building (Class A Office Center)
719 Griswold Street	-9244842.657	5210672.075	0	1	0	1	Class A Office Center
231 West Lafayette Boulevard	-9245037.92	5210590.054	1	2	1	4	Theodore Levin U.S. Courthouse
160 W. Fort Street	-9244925.207	5210621.275	1	2	2	5	Office Space (Former Federal Reserve Bank of Chicago Detroit Branch Building)
625 Shelby Street	-9244908.549	5210465.996	0	1	1	2	Elysium Lounge (Night club)
205 West Congress	-9244870.661	5210404.19	0	1	2	3	Bankers Trust Company Building
2 Washington Blvd	-9244834.254	5210227.659	1	0	1	2	Detroit Riverside Hotel (Closed)
250 W. Larned Street	-9244898.812	5210272.321	1	1	2	4	City of Detroit Fire Department
211 West Fort Street	-9245017.346	5210489.703	1	2	1	4	Bankruptcy Court of the Eastern District of MI, U.S. Border Patrol HQ and US Attorneys office.
500 Griswold Street	-9244687.24	5210497.873	0	1	0	1	Guardian Building (Wayne County Government Center)

Table 5: Observed data for Detroit

Although Downtown Detroit is much smaller than the areas studied in Chicago and Indianapolis, there were still a number of buildings employing security zones and defensible space measures. The averages for buildings exhibiting security zone criteria score in Downtown Detroit were as follows: behavior 0.73; surveillance 1.33; and access 1.06. Unlike Chicago and Indianapolis, no buildings observed maxed out on the total security zone criteria. The former Federal Reserve Bank of Chicago Detroit Branch, 1 Woodward Avenue, and the Coleman A. Young Municipal Center scored the highest on the security zone criteria.

One interesting note about Downtown Detroit was the noticeable multiple signage indicating a central business district neighborhood watch program. Further research found that the Detroit Police Department and more than 30 businesses in Downtown

Detroit participate in a central business district neighborhood watch and patrol program
called "Project Lighthouse." The neighborhood watch program, created in August 2011,
is designed to provide a safe environment for residents, employees, and visitors in the
Downtown Detroit area.

Figure 51: Project Lighthouse: CBD neighborhood watch program

The program provides information, aid, shelter, and safety for citizens in need of
assistance. Every participant, known as a lighthouse, has security personnel available 24
hours a day, seven days a week to assist citizens in need. The overall mission of Project
Lighthouse is to promote the safety and security of Downtown Detroit while augmenting
the Detroit Police Department's presence in the central business district. Project

Lighthouse is a prime example of blending public and private entities and interests; and coordinating their efforts to provide urban security for Detroit's central business district. Three project lighthouse buildings fell within boundaries of this research project. Two of the three buildings, The Qube (611 Woodward Avenue) and The Dime Building (719 Griswold Street), exhibited measurable defensible space measures. The third building, First National Building (660 Woodward Avenue) had no detectable security zone features.
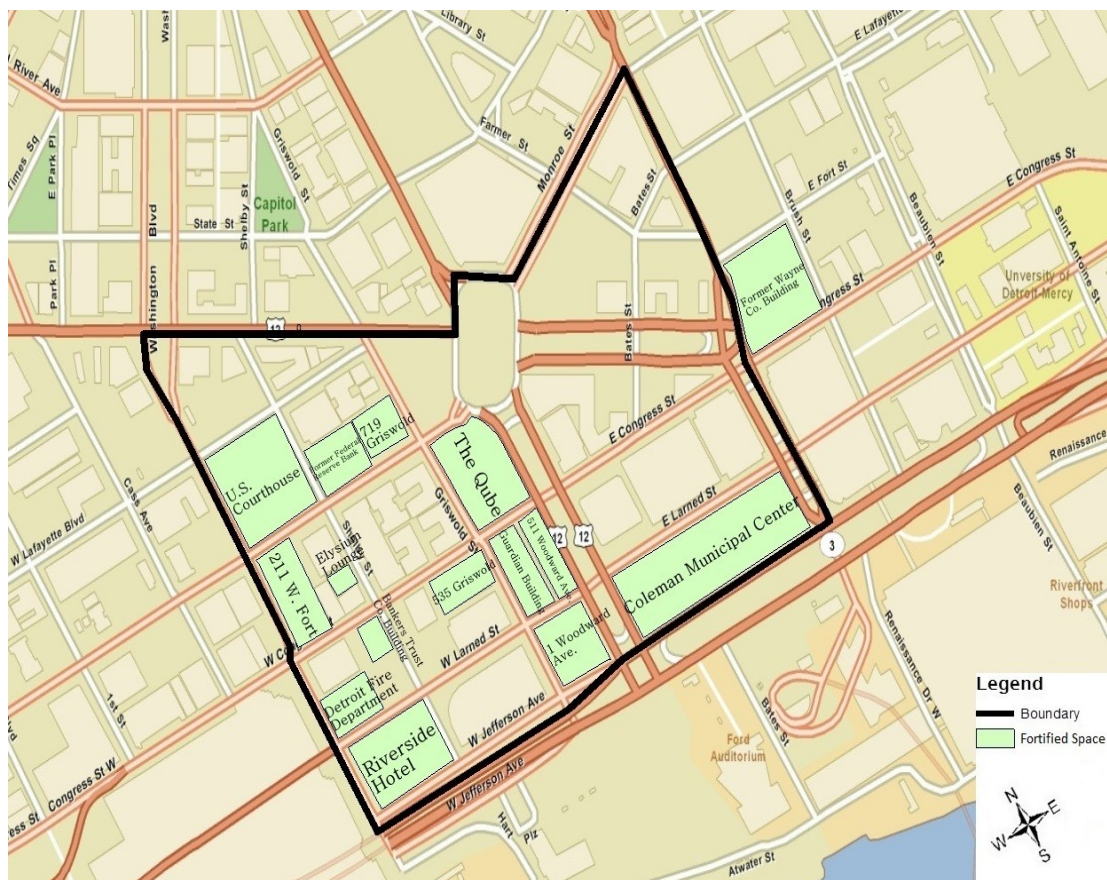

Figure 52: Fortified buildings in Downtown Detroit

Figure 52 displays the buildings identified in Downtown Detroit that exhibited some form of a security zone. One Building, the former Wayne County Building, did fall outside of the boundaries of Downtown Detroit. However, the building was included in

this study due to the close proximity of the border. The total square footage observed has

been adjusted from 2,834,124.051 square feet to 2,936,222.287 square feet to include the

additional building. An analysis of the square footage reveals that 26.7858% of

Downtown Detroit exhibits some form of security zone. The security zones that stood

out were the Coleman A. Young Municipal Center, 611 Woodward Avenue, 511

Woodward Avenue, and the former Federal Reserve Bank of Chicago Detroit Division.

The majority of buildings that had security zones were located on the western side of

Downtown Detroit.
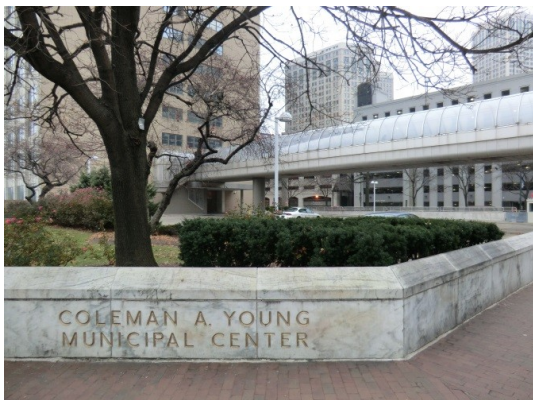
Figure 53: Municipal Center   Figure 54: Spirit of Detroit

The Coleman A. Young Municipal Center contains the primary governmental

offices for the city of Detroit. The building had a large setback and many crash rated

planters throughout the perimeter of the building. All of the trash receptacles for the

building were located as far from the building site as possible. This can be explained as a

mitigation measure to reduce the likelihood of a bomb being placed in the trash

receptacle (FEMA, 2007). The intensity of these security zones features were noticeably

less than other government buildings in Chicago and Indianapolis. The security design

layout seemed to employ many of Boddy's (2008) passive aggressive security design

features. Another passive aggressive feature is the statue "Spirit of Detroit," which is located on the eastern side of the municipal center. The statue provides additional setback and acts as a cleverly disguised barrier.

Figure 55: The Qube   Figure 56: Barrier free sign

The Qube, which is located at 611 Woodward Avenue, is a 14 floor office building located in the heart of Downtown Detroit. The Qube is currently the headquarters for Quicken Loans and was previously named Chase Tower. There were numerous access restrictions for the west, east and part of the south side of the building. The building appears to be built on a slope and the base of the building was lifted approximately eight feet high to be even with the northern side of the building. This build up of three-fourths of the building gives the building a fortress like appearance. The barrier free entrance on Fort Street had a significant setback from the street. The building also had a water drainage area on Fort Street, but was raised up two feet and acted as if it were a large bollard. The building had one CCTV camera and no patrolling security guards. Overall, the building was observed as having a moderate security zone.

Figure 57: Former Federal Reserve Bank

Figure 58: Planters in front building

The next building of interest was the former Federal Reserve Bank of Chicago-Detroit Branch building. The building was occupied by the Federal Reserve Bank until 2004. The building was vacant until 2011 when it was purchased by Quicken Loans for additional office space. The building is surrounded with crash rated planters and additional planters to provide further setback. CCTV cameras were also placed at the entrance of the building. This building received a five for the security zone criteria.

Figure 59: 511 Woodward Avenue

One other interesting building exhibiting a number of security zone features was 511 Woodward Avenue. The building has an above average setback and is completely surrounded by massive bollards. There was no place for public seating and only one entrance hidden away on the side of the building. There appeared to be an entrance in the

front of the building, but looks as if it had been barricaded shut. The building is

unmarked and CCTV cameras were also present around the building. 511 Woodward

Avenue's tenant is MFS Intelenet Inc., a provider of communications services for

businesses and government agencies.
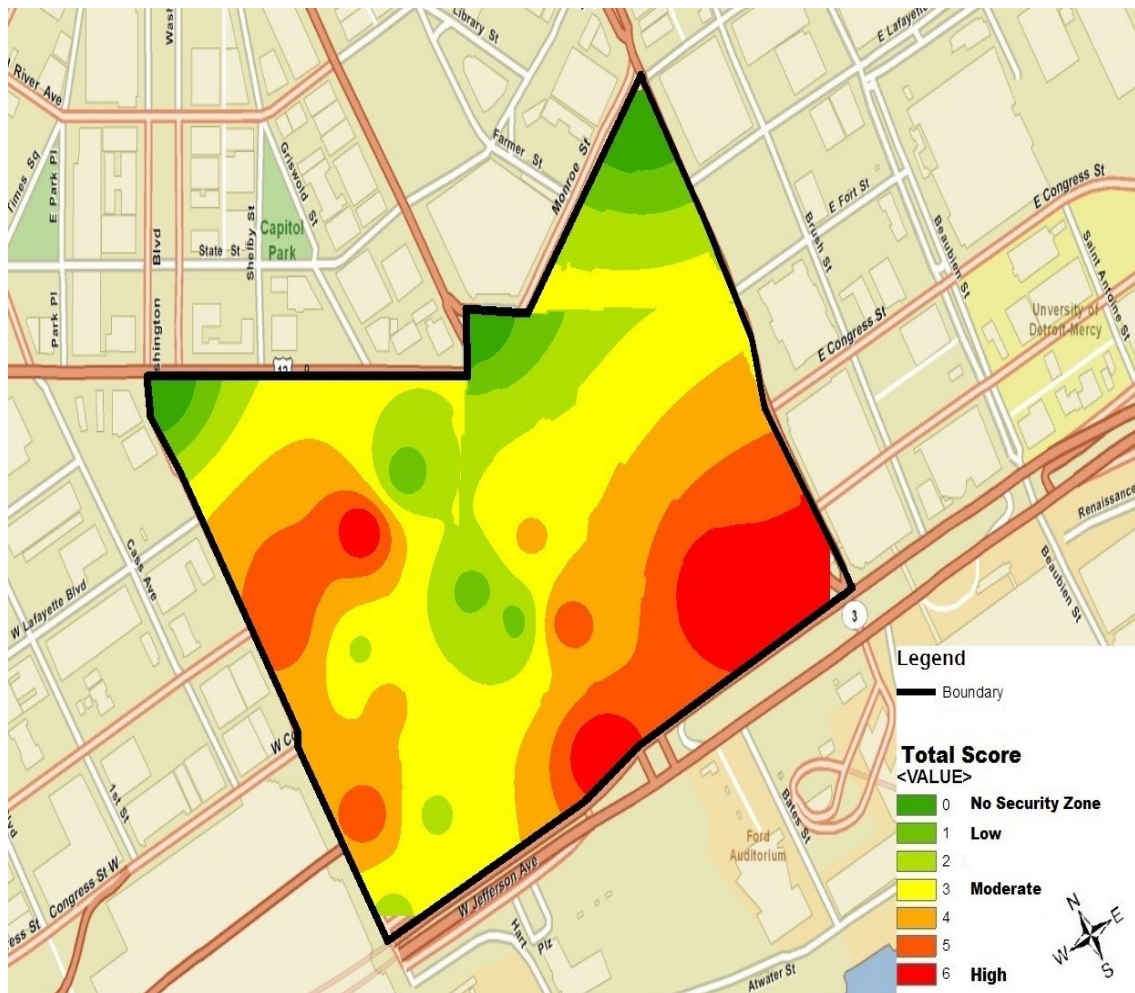
Figure 60: Variation of Security Scores in Downtown Detroit (interpolated by IDW

method)

Figure 60 display the IDW interpolation results for Downtown Detroit. The

buildings projecting intense security zones include the Coleman A. Young Municipal

Center, 160 W. Fort St. (former Federal Reserve Bank of Chicago-Detroit Branch), and

the 1 Woodward Ave. (Michigan Consolidated Gas Building).
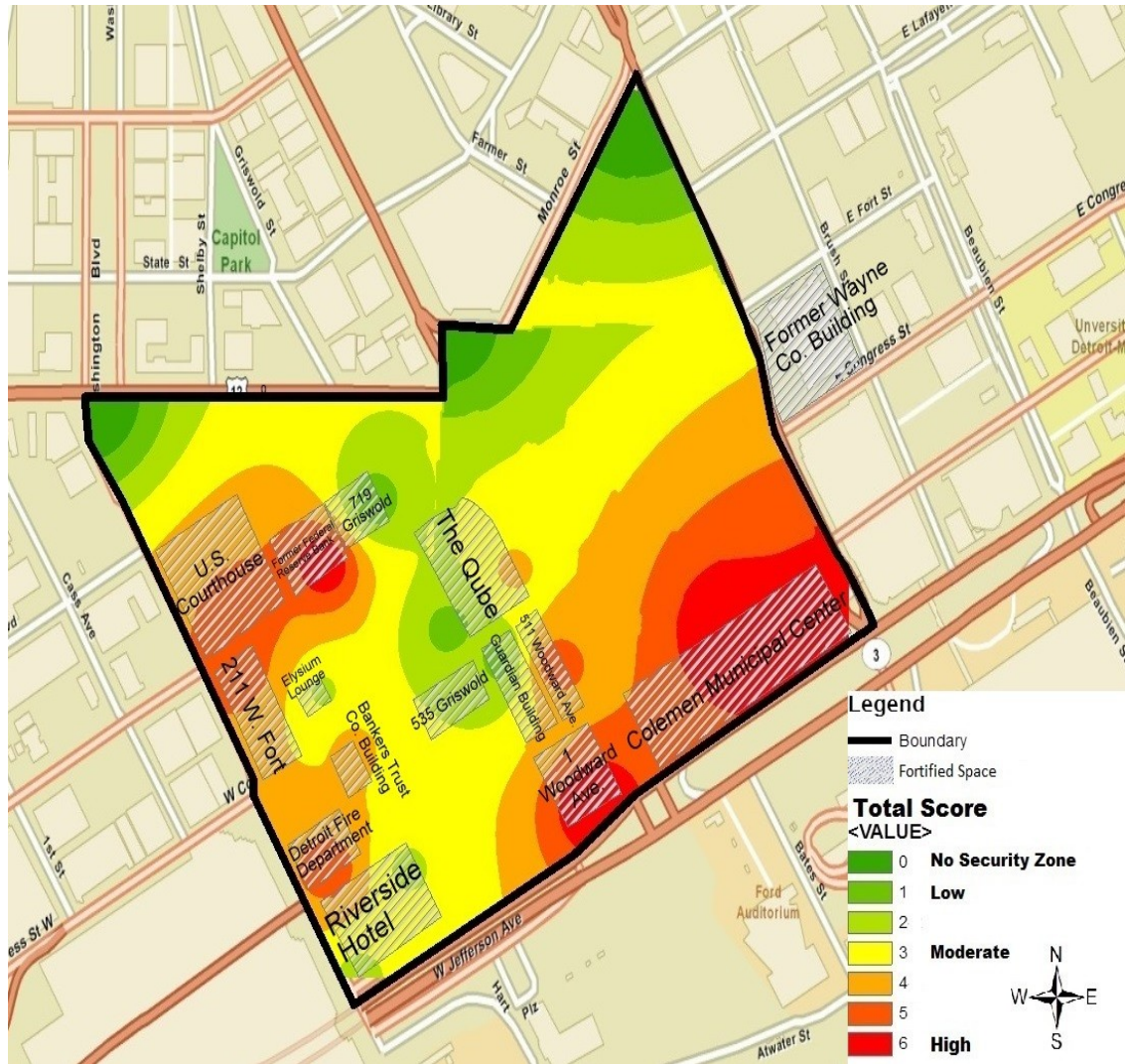
Figure 61: IDW interpolation map with buildings for Downtown Detroit

The Colman Center security zone, located on the lower right side in Figure 61,

does extend past its building perimeter. However, a portion of that area is considered

setback from the building. The remaining security zone overflow affects a public parking

garage across the street from the Coleman Center. The Michigan Consolidated Gas

Building, located in the lower middle portion of the map, had an intense security zone

which only surrounded the main entrances of the building. The former Federal Reserve

Bank also had an intense security zone which was only found at is main entrance.
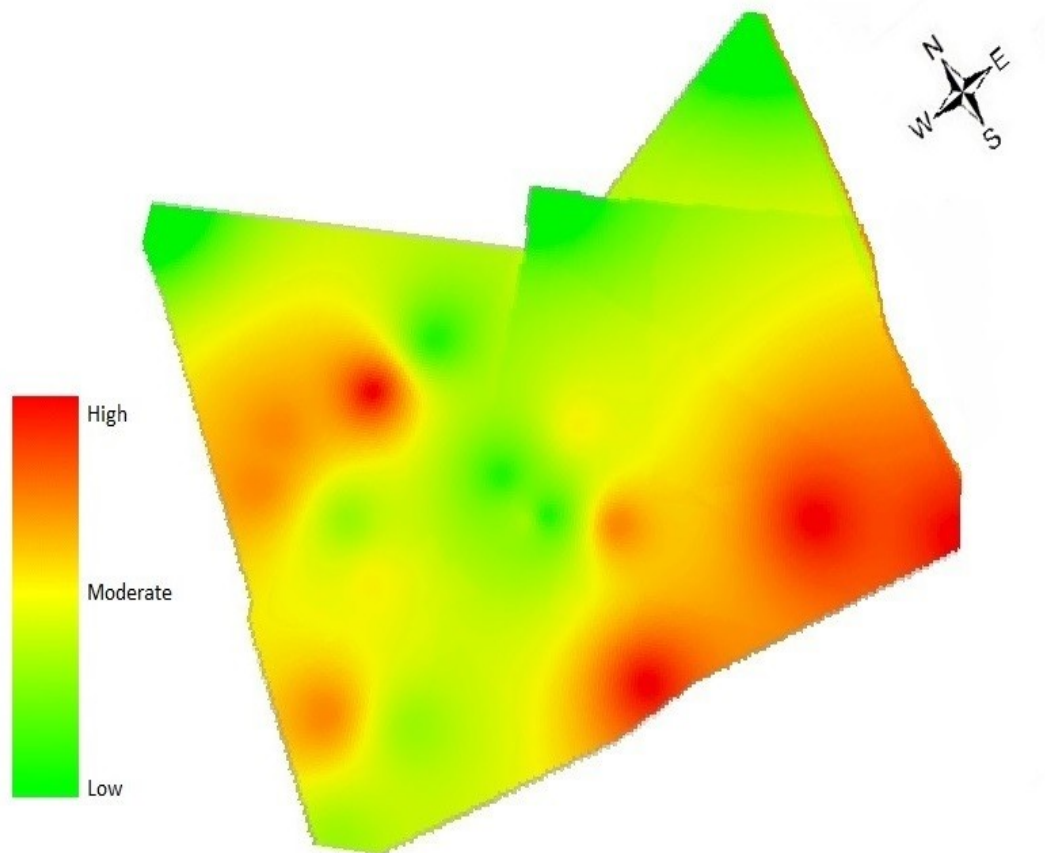
Figure 62: 3D prism map of Downtown Detroit

Figure 62 displays a 3D prism map of the security surface for Downtown Detroit.

The most intense security zones include: the Coleman municipal center can be seen in the

lower right side of the map; the Michigan Consolidated Gas Building security zone is

located in the lower middle section of the map; and the former Federal Reserve Bank

located in the left side of the map.
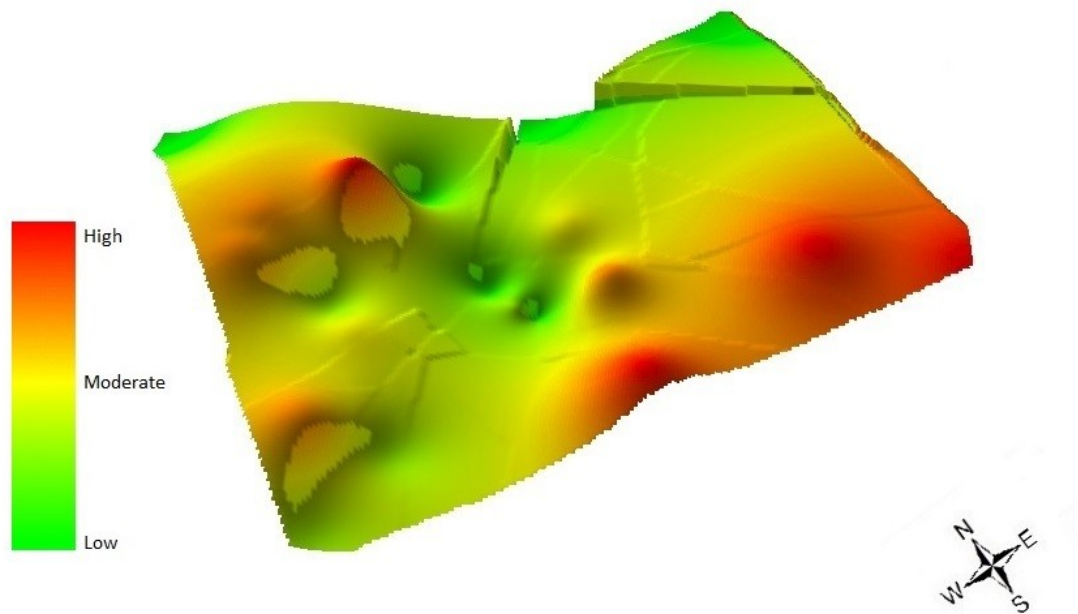
Figure 63: Topographical security surface of Detroit

Figure 63 provides a topographical map of Downtown Detroit's security surface.

Downtown Detroit did not present any buildings that had the maximum security zone

criteria. Therefore, the topography for Downtown Detroit is not as pronounced as

Chicago and Indianapolis.
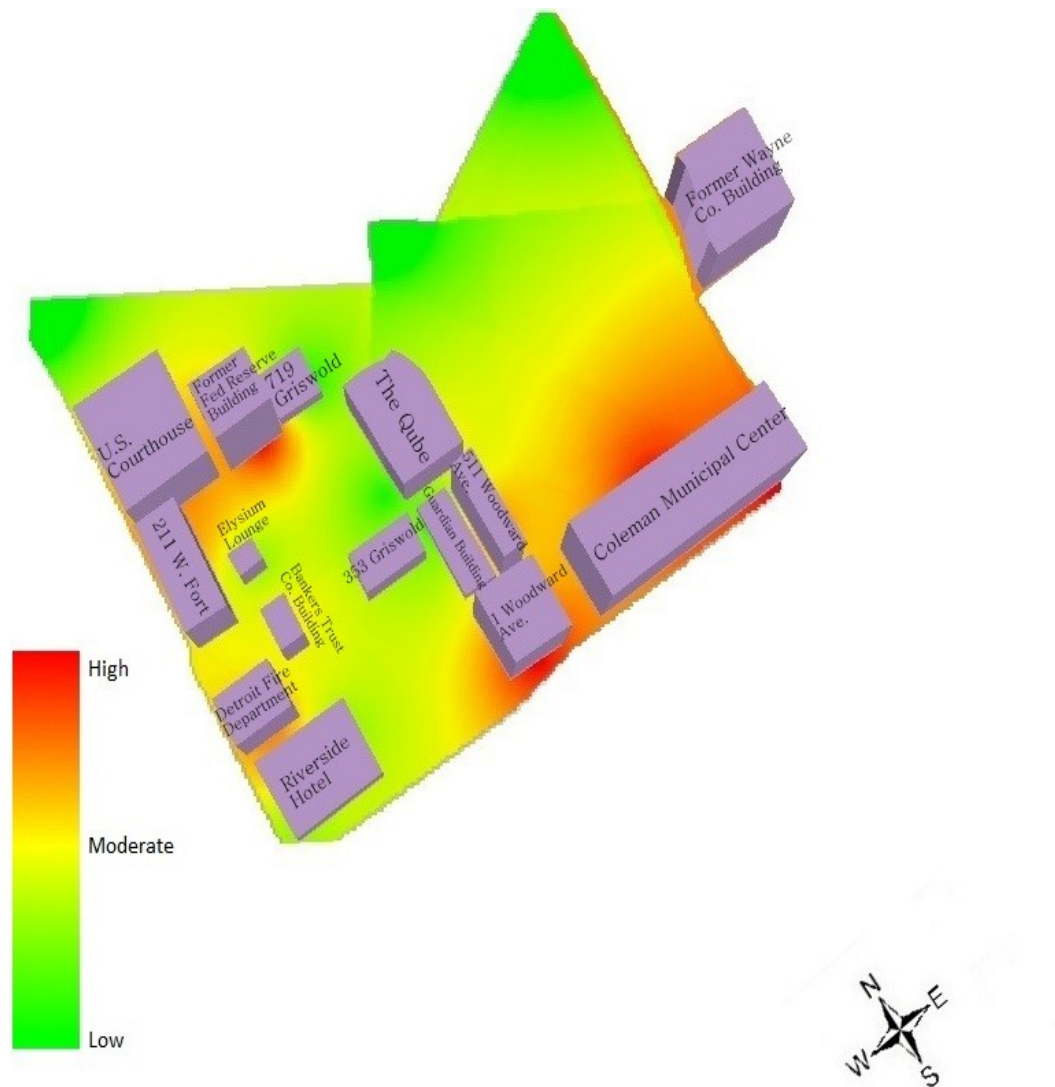
Figure 64: Detroit security surface with fortified buildings

The majority of buildings displaying security zone were located on the western side of the observed area. The largest security zone, the Colman Municipal Center, can be seen in the lower right corner of the map.
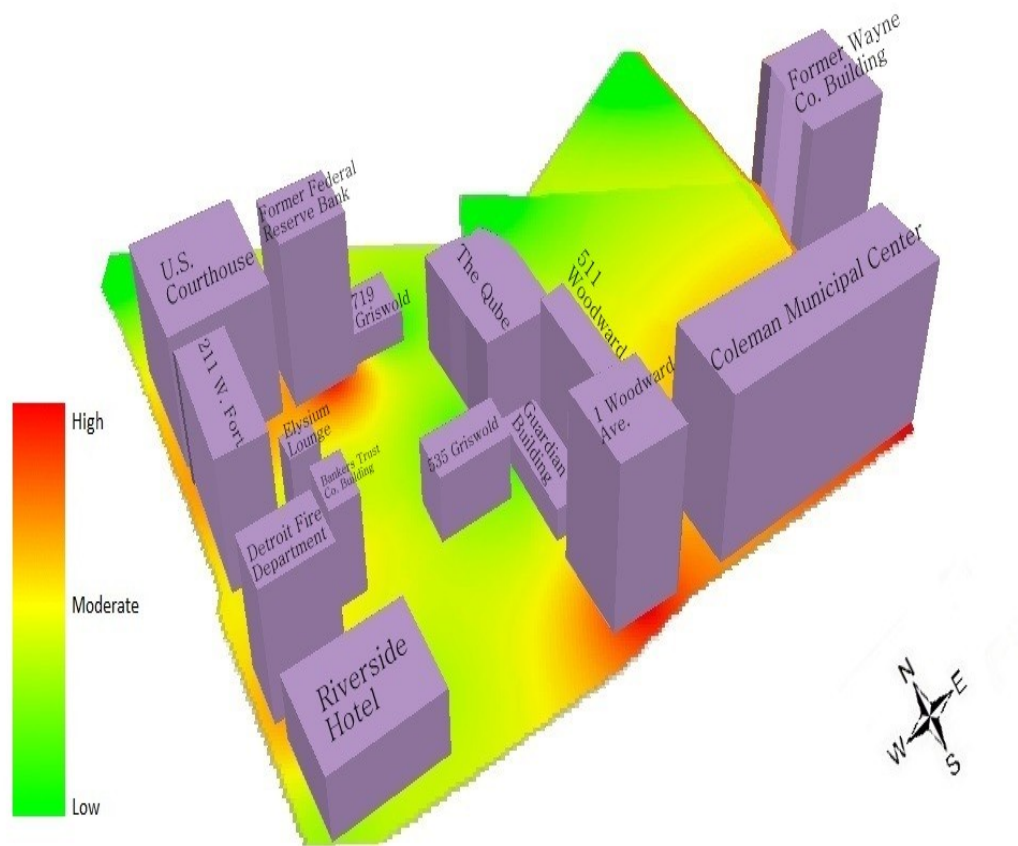
Figure 65: Downtown Detroit security surface - alternate image

Figure 65 provides an alternative angle of Downtown Detroit's security zones with the buildings superimposed onto the map.

Summary and Discussion

Of all the federal building observed in this study, the Minton-Capehart Federal Building had the most extreme security zone. As stated before, the Minton-Capehart security zone could could be an outlier and further data points would need to be sampled for a better approximation of the security field. The security zone extended much farther than the security zones of the similarly scored Kluczynski and Dirksen Federal Buildings

in Chicago. The Minton-Capehart building, originally constructed in 1976, has a

Brutalist architecture design which resembles a fortress like appearance. While the

Kluczynski, Dirksen, and Metcalfe Federal Buildings in Chicago have been retrofitted

with security zones in the wake of the September 11th attacks, the Minton-Capehart

building has been designed, intentionally or unintentionally, to restrict pedestrian

movement, limit access points for citizens, and provide maximum standoff distance in

case of a truck bomb.

The most frequently observed behavioral variable throughout this study was

prohibitive signage. These signs mainly prohibited public loitering in certain areas of the

building. For surveillance the CCTV camera was the most observed. FEMA (2011)

recommends the use of CCTV cameras as a low case and moderately effective means to

deter criminal activity. The bollard and crash rated planter were the most observed

access restriction. These defensive measures provide the greatest amount of protection to

the building and its inhabitants (FEMA, 2011).

Of the three districts observed, Chicago's central loop had the most security zones

present. Seventeen buildings in the central Loop exhibited a security zone. Detroit and

Indianapolis had fifteen and thirteen buildings, respectively. Although the sample area

was less than half that of Chicago and Indianapolis, Detroit had more buildings than

Indianapolis exhibiting security zones and two less than Chicago. Detroit and

Indianapolis both had significant areas that did not have a security zone present. Taking

into account the possible outlier of Indianapolis' Minton-Capehart Federal Building,

Indianapolis' central business district had the least amounts of security zones present.

Chicago's security surface, which frequently had more security zones present, did not have as many gaps as the other cities had present.

Even with the constant threat of another terrorist attack and U.S. cities adding urban fortifications, of the observed cities, roughly three quarters of urban public space appear to be free of security zones. Further research will be needed on other cities within the U.S., but the pervasiveness of security zones appears to be primarily focused on public buildings and private banks. The majority of security zone research has focused on major global cities like New York and London, both of which have experienced catastrophic terrorist attacks. In the case of London, they have been experiencing terrorist attacks since the 1970s. Future studies should include cities that have experienced a terrorist attack such as Oklahoma City and New York to compare the level of security zones with cities that have not experienced such attacks.

CHAPTER SIX

ANALYSIS AND COMPARISONS

<u>Introduction</u>

This spatial analysis looked at three uniquely different cities. By adapting the

observable security zone criteria and imputing the data into ArcGIS and ArcScene, this

study has been able to display a phenomenon of public and private fortification of space

that is present in Downtown Detroit, Indianapolis' central business district, and

Chicago's central Loop. Each city varied widely in population density, overall size, and

economy. Each city also received a wide variance of federal funding from the

Department of Homeland Security's Urban Areas Security Initiative. The averages of

behavior, surveillance, and access scores of Chicago, Indianapolis and Detroit are

presented in Table 6.

Table 6. Security Zone Averages (Tier I vs. Tier II)

City	Behavior Average	Surveillance Average	Access Average
Chicago (Tier I)	1.25	1.21	1.34
Indianapolis (Tier II)	0.95	0.50	0.50
Detroit (Tier II)	0.73	1.33	1.06
Tier II Averages	0.84	0.915	0.78
Tier I vs. Tier II Mean Differences	0.41	0.295	0.56

The behavior average score for Chicago was 1.25, however the average scores of

the Tier II cites (Indianapolis and Detroit) are only 0.84, a difference of 0.41. The

surveillance average of Chicago was 1.21 with the Tier II averages at 0.915 a difference

of 0.295. Access averages had an average of 1.34 for Chicago and 0.78 for the Tier II

cities a difference of 0.56. In other words, the Tier I classification by the Department of

Homeland Security for the city of Chicago is supported by the security zone averages

presented in Table 6.

To confirm the statistical significance of the averages in Table 6, a one-way

analysis of variance (ANOVA) statistical test was conducted. ANOVA allows for

determining the statistical

Table 7. ANOVA Results of Security Zone Averages

Variance Source	Sum of Squares	Degrees of Freedom	Mean Squares
Between Groups	0.5838	2	0.2919
Within Groups	0.3245	6	5.4078E-02
Total	0.9082	8	N/A

F-Value = 5.397
Critical F-Value = 4.46

significance of three or more sample means simultaneously (Vito and Latessa, 1989).

The null hypothesis for this test is that the mean is the same for all observed groups. The

alternate hypothesis is that the average is not the same for all groups. The F-

Value/Statistic for this sample is 5.397. The F-Value exceeds the minimum critical value

of 4.46 with two degrees of freedom at 0.05 significance; the null hypothesis is rejected.

With the null hypothesis rejected, these averages are statistically significant and at least

two groups averages are different from each other in this sample.

Detroit does have a higher surveillance average than the Tier I city of Chicago. A

feasible explanation to the higher surveillance scores are Detroit's high crime rates.

According to the Federal Bureau of Investigation's 2011 Uniform Crime Report, Detroit

does have the highest per capita violent crime rate of the three cities studied. Project Lighthouse was implemented to augment the Detroit Police Department in response to Detroit's crime rate. The majority of Detroit's surveillance score was generative from CCTV cameras. FEMA's Reference Manual to Mitigate Potential Terrorist Attacks Against Buildings lists CCTV cameras as a cost effective measure for general crime deterrence. Therefore, Detroit's high surveillance scores may be in response to an overall high violent and property crime rate which will be discussed later in this chapter.

The security zone building scores were also noticeably different from city to city. Of the three security zone criteria, Chicago's highest average ranked security zone variable was for access restriction, whereas Indianapolis was behavior and Detroit's was surveillance. According to FEMA's mitigation manual, the most expensive security measure to combat urban terrorism is access restrictions. Chicago has received the most funding from the Urban Areas Security Initiative therefore; Chicago is able to afford more costly anti-terrorism measures like access restrictions. Surveillance appears to be the chief concern of Downtown Detroit with its central business district neighborhood watch program, Project Lighthouse, and the afore mentioned cost effectiveness of CCTV cameras. Indianapolis, have the lowest funding and crime rates, appears to be using effective behavioral security measures in its central business district.

Table 8. Average Security Zone Building Scores
Public vs. Private Buildings
(Tier I vs. Tier II)

City	Average Public Building Security Score	Average Private Building Security Score
Chicago (Tier I)	4.6	2.83
Indianapolis (Tier II)	4.5	2.22
Detroit (Tier II)	3.6	3.1
Tier II Means	4.23	2.71
Tier I vs. Tier II Differences	0.55	0.17

As table 8 indicates, publicly owned buildings, which are either managed by city, county or federal officials, all had higher security zone building scores when compared to privately owned buildings, regardless of Tier level. The higher building score leads to a more intense security zone surrounding the building in question. While Chicago has the overall highest security zone for public spaces, followed closely by Indianapolis, Detroit did have the highest average building score for privately owned buildings, exceeding Chicago's score by 0.27. Private building owners in Detroit may be fortifying their businesses in response to high crime rates.

Table 9. Independent Group T-Test Analysis

Group	Observations	Mean	Standard Deviation
Average Public Building Security Score	3	4.233334	0.5507537
Average Private Building Security Score	3	2.1716666	0.4508144

T-Statistic = 3.690916
Degrees of Freedom = 4
Critical Value (One-Tail at 0.05) = 2.132
Critical Value (Two-Tail at 0.05) = 2.776

The result of a T-Test for statistically significant differences in mean building security scores is presented in Table 9. The findings indicate that there is a statistically significant mean difference in the average public building security scores and the average of private building security scores. The T-Statistic of 3.690916 is larger than the minimum critical value of 2.776. The null hypothesis is rejected and the alternative hypothesis is accepted. It can be stated that public building security score averages are higher than private building security scores sampled in this study. The difference in means shows that public building security scores, on average, score 1.5 more points than private buildings in this study. The chance that sampling error explains this difference in the averages is less than 5 in 100 chances.

However, it is interesting to note that of all the city districts studied in this analysis, approximately 25% of each area exhibited some form of security zone as seen in Table 10. The central Loop in Chicago was found to have 22.6% of its area with some type of security zone in place. Indianapolis and Detroit had 25.2% and 26.7%, respectively. The average area of the three central business districts to employ some type of security zone is 24.8%. These percentages were calculated from taking the total

square feet of the sample area and subtracting the square feet of observed fortified space and dividing the difference. These percentages are interesting when also comparing the amount of federal dollars spent per each city.

Table 10. Percentage of Security Zone Landscape in Observed Sample Area

City	Security Zone %
Chicago (Tier I)	22.6
Indianapolis (Tier II)	25.2
Detroit (Tier II)	26.7
Tier II Averages	26.0
Tier I vs. Tier II Differences	-3.3

Chicago, a Tier I city on the Department of Homeland Security's Urban Areas Security Initiative, was awarded $477,545,542 from 2002 to 2012 to specifically combat terrorist activities. The Tier II city of Detroit, secured $132,614,497, and had the highest percentage of security zones. Indianapolis, also a Tier II city, secured the lowest amount of federal funding of the three cities observed, at $50,774,706, which was the most economical. The overall area studied in Indianapolis was slightly larger than the central Loop, and 25.2% of Indianapolis' central business district had a detectable security zone compared to 22.6% for the central Loop.

Buildings housing government entities and financial institutions were the most likely to have a security zone in the surrounding area. Office buildings, universities, and businesses typically did not have security zones in their general vicinity. Security zones

of government entities, in all three cities, scored the highest for the security zone criteria.
The most common type of security zone criteria present for government entities are
surveillance and access restrictions.

<u>Changes in Demographic, Economic, and Social Activities in Security Zones</u>

In order to have a better understanding of demographic changes, as well as
changes in economic and social activity occurring within the Tier I and Tier II security
zones, population changes, crimes rates, and commercial office rental rates were
examined. All activity was examined over a ten year period, with a focus from pre-9/11
to present. Although it has been established security zones were present prior to
September 11th 2001, the terrorist attacks on that day amplified the presence of security
zones within U.S. cities (Coaffee, O'Hare and Hawkesworth, 2009). Therefore, this
paper focused on pre-9/11 to present day social and commercial activities occurring
within security zones.

	2000	**2010**	**Percent Change**
City of Chicago Population	2,896,046	2,695,598	-6.9%
Central Loop (Chicago) Population Rates	893	2,044	+128.8%
City of Indianapolis Population	781,870	820,445	+4.9%
Downtown Indianapolis Population Rates	342	581	+69.8%
City of Detroit Population	951,270	713,777	-24.9%
Downtown Detroit Population Rates	379	303	-20%

Table 11. Population Changes

(U.S. Census Data)

Population change within security zones was compared to the overall population change of the city examined. Both Chicago's and Indianapolis' central business districts have had an increase in population over the past ten years. The city of Chicago lost 200,418 residents from 2000 to 2010. However, Chicago's central Loop experienced an increase of 1,151 residents; up 128% from 2000 to 2010. The city of Indianapolis was the only city in the study that had an overall increase in total population. Indianapolis added 38,585 residents, an increase of 4.9%. Downtown Indianapolis experienced a 69.8% increase in residents from 2000 to 2010. The city of Detroit experienced an overall loss of 237,493 residents for a 24.9% decrease in total population from 2000 to 2010. The central business district in Detroit had a smaller population decrease of 20%.

While Detroit's downtown population decline aligns with U.S. census data for the entire city, Downtown Detroit did not experience as high as a population decline as the overall city. Therefore, the population data suggest that the security zones of all three cities experienced population changes that differed from the overall population patterns between 2000 and 2010, and these changes tended to be population increases for the areas inside security zones and decreases outside of the zones. This suggests that security zones may have had a positive impact on the residential patterns within them. However, further research must be conducted to exclude spurious relationships.

<div align="center">Social Activity</div>

Morenoff, Sampson, and Roudenbush (2001) conducted a neighborhood level study on homicide rates within the city of Chicago. They found that concentrated disadvantage and low levels of social control within neighborhoods were accurate predictors of homicide rates. However, they also noted that a neighborhoods' spatial proximity to homicide risk was also strongly associated with variations in homicide rates. This study compared crimes rates within and outside of the previously established security zones to further assess the affect of levels of social control on social activities. Crime data consisted of crimes against persons and crimes against property. Crimes against persons include: robbery, battery, assault, homicide, and criminal sexual assault. Crimes against property are comprised of: theft, burglary, motor vehicle theft, and arson.

Crimes against persons and property from 2001 through 2011 were compared within Chicago's Loop. The city of Chicago Police Department did not start to collect and archive specific spatial crime data until 2001. It was found that crimes against

persons increased by 7.8% through the ten year period. Crime against property

experienced a larger decrease of 42.9%.

Table 12. Central Loop and
Neighboring Community Areas Crime Rates

	2001	2011	Percent Change
Central Loop crimes against person	114	123	+7.8
Central Loop crimes against property	2,586	1,475	-42.9
Near West Side crimes against persons	487	237	-51.3%
Near West Side crimes against property	1,952	1,644	-15.7%
Near South Side crimes against persons	90	29	-67.7%
Near South Side crimes against property	475	316	-33.4%
Near North Side crimes against persons	367	237	-35.4%
Near North Side crimes against property	3,109	1,989	-36%

(City of Chicago Data Portal)

The Near West Side, which contains the University of Illinois-Chicago, United

Center, and several hospitals, is located directly west from the Loop. From 2001 to 2011,

the Near West Side saw a 51.3% decrease of crimes against persons. Crimes against

property decreased a modest 15.7%. The Near South Side is located just south the Loop.

The Near South Side contains Soldier Field, McCormick Place, and the Museum

Campus. This community area saw a 67.7% decrease of crimes against persons, and a

33.4% decrease in crimes against property. The Near North Side, located just north of

the Loop, is home to Navy Pier, the Magnificent Mile, and the Gold Coast. Located just

north of the Loop, the Near North Side is considered to be an affluent community. This

area saw a 35.4% decrease in crimes against persons, and a 36% decrease of crimes

against property.

In 2011, the Bureau of Justice Statistics National Crime Victimization Survey

reported that between 2001 and 2010, the U.S. experienced an average decrease in crimes

against persons of 33.5 percent. When comparing all three neighboring community areas

to the Loop, there was a 51.4% decrease in crimes against persons from 2001 to 2011,

while the Loop saw a 7.8% increase in crimes against persons for the same time period.

The National Crime Victimization Survey also found from 2001 to 2010, there was a

19.2% decrease in the national average for crimes against property. The three

neighboring community areas had a 28.3% decrease in crimes against property, while the

Loop saw a 43% decrease in crimes against property. Therefore, the increase in crimes

against persons for the Chicago security zone is surprising in light of the strong contrary

trends in the surrounding areas and the large decrease for property crimes in the security

zone.

The next set of data examined was Downtown Indianapolis crimes rates from

2000 to 2010 and comparing the crime incidents to neighboring communities. The

downtown crime rates for Indianapolis showed an 18.2% increase in crimes against

persons from 2000-2010, and crimes against property decreased by 5.3% in downtown

Indianapolis.

The West Indianapolis neighborhood and Near Eastside neighborhood crime rates

were also examined to compare to the downtown crime rates. West Indianapolis, located

directly west of the central business district, has the highest concentration of industrial

parks within the city. West Indianapolis experienced a 35% increase in crimes against

persons and a 78% increase in crimes against property from 2000 to 2010. West

Indianapolis has a general reputation as a high crime neighborhood and has one of the

highest crime rates in the Indianapolis Metropolitan

Table 13. Downtown Indianapolis and
Neighboring Community Areas Crime Rates

	2000	**2010**	**Percent Change**
Downtown Indianapolis crimes against persons	280	331	+18.2%
Downtown Indianapolis crimes against property	1,812	1,715	+5.3%
West Indianapolis crimes against persons	663	896	+35.1%
West Indianapolis crimes against property	754	1,347	+78.6%
Near Eastside Indianapolis crimes against persons	1,192	728	-38.9%
Near Eastside Indianapolis crimes against property	2,238	2,912	+30.1%

(Indianapolis Metropolitan Police Department Crime Analysis Section)

Police Department area. The Near Eastside has been a target of numerous urban renewal projects since the 1950s, and is more diverse than other neighborhoods in the Indianapolis metro area. The neighborhood experienced a 38.9% decrease in crimes against persons, which is consistent with national trends. However, the neighborhood had a 30% increase in property crimes from 2000-2010. When comparing crime rates in Downtown Indianapolis to the neighboring communities there are similarities as well as differences. Both neighboring areas show increases in property crimes while Downtown Indianapolis experienced a decrease, while for property crimes, Downtown Indianapolis had an increase, and there were increase and decrease in east and west side neighborhoods respectively.

Crime rates in the city of Detroit were examined next. Unfortunately, specific spatial crime data for Detroit were not available. The only crime data available for the year 2000 was the National Neighborhood Crime Study and only for census tract 5208, which encompasses half of the sampled area. Therefore the comparison was only conducted for that particular census tract. The city of Detroit had a 23.2% decrease in crimes against persons and a 35% decrease in crimes against property from 2000 to 2010.

Table 14. Detroit Crime Rates (City of Detroit vs. Census Tract 5208)

	2000	2012	Percent Change
Crimes against persons (Detroit)	22,112	16,973	-23.2%
Crimes against property (Detroit)	73,649	47,809	-35%
Crimes against persons (Census Tract 5208)	247	429	+73.6%
Crimes against property (Census Tract 5208)	2,783	2,328	-16.3%

(Uniform Crime Report 2000 & 2010, ESRI Community Analyst &
National Neighborhood Crime Study)

However, in tract 5208, crimes against persons increased by 73.6% while crimes against property had a 16.3% decrease. Detroit did have the highest surveillance average of all examined cities. Detroit also had an active central business district neighborhood watch program which encompasses the majority of Downtown Detroit.

Both Chicago and Detroit had high surveillance and access restriction scores and when compared to the large decrease in crimes against property in both cities, it could be argued that security zones exhibiting intense access restrictions and surveillance measures have affected property crime rates.

When comparing Tier I downtown Chicago to Tier II Downtown Indianapolis, the Loop had a 43% decrease in property crime compared to Indianapolis' decrease of 5.3%. In fact, the Chicago Loop exceeded the national average decrease in crimes against property by 23.8%. Given the significantly higher behavioral, surveillance, and access security zones scores in Chicago, it could be argued that property crime rates are affected

by these security measures. On the other hand, Indianapolis had an 18.2% increase for crimes against persons, while Chicago experienced a 7.8% increase for crimes against persons, which suggests that security zones appear more effective in reducing property crime compared to crimes against persons in both Tier 1 and II cities.

<div align="center">Economic Activity</div>

In order to assess changes in economic activity in the Tier I and Tier II security zones, Class A office space rental rates within the security zones were compared to those of neighboring community areas. Class A office space is defined as desirable investment grade properties and they command the highest rents or sale prices. Class A office buildings also tend to be architectural or historical landmarks and the focus of potential terrorist attacks.

Table 15. Chicago Office Space Rental Rates (per square foot)

	2000	**2012**	**Percent Change**
Central Loop	$31.11	$28.53	-8.2%
Near West Side	$33.85	$30.43	-10.1%
Near South Side	$36.33	$27.75	-23.6%
Near North Side	$30.01	$28.82	-3.9%

(Costar Property, NAI Hiffman, Julien J. Studley Inc. Crain Communications, & Cushman and Wakefield)

Chicago's central loop experienced an 8.2% decrease in rental rates from 2000 to 2012. The Near West Side, Near South Side, and Near North side saw decreases of 10.1%, 25.2%, and 3.9% respectively. The average decrease in rental rates of all three neighboring community areas was a 13%. Briggs (2005) argued that as security zones increase within the urban core, there is a corresponding decentralization of businesses

and agencies into outlying areas. Moreover, this phenomenon would lead to higher

vacancy rates and lower rental rates within the security zones in the central business

districts. However, with the exception of the near North Side, it appears rental rates have

declined less within the central business district of Chicago, where security zones are

focused, when compared to neighboring community areas. This also suggests that the

increased social control measures have affected the economic activity within the security

zones.

Turing to the Tier II cities, Downtown Indianapolis office rental space rates were

compared against suburban office rental space rates from 2000 to 2012. From 2000 to

2012, downtown Indianapolis saw a 3.9% increase in office space rental rates from 2000

Table 16. Indianapolis Office Space Rental Rates (psf)

	2000	**2012**	**Percent Change**
Downtown Indianapolis	$17.58	$18.27	+3.9%
Suburban Indianapolis	$17.90	$17.10	-4.4%

(Indianapolis Downtown, Inc., CBRE Group & Cassidy and Turley Commercial Real Estate Services)

through 2012. When looking at suburban Indianapolis office space rental rates from

2000 to 2010, there was a 4.4% decrease in rental rates.

Table 17. Downtown Detroit Office Space Rental Rates (per Square foot)

2000	2012	Percent Change
$23.59	$22.63	-4%

(CBRE Group)

Downtown Detroit's office space rental rates were obtained from 2000 to 2012.
Unfortunately, comparisons of surrounding areas for the year 2000 were not available.
Downtown Detroit's office space rental rates have decreased by 4% from 2000 to 2012.
When comparing Chicago's central business districts office rental rates to the Tier II rates
of Indianapolis and Detroit, the findings are mixed. Indianapolis rental rates increased,
while those of Chicago and Detroit decreased.

Given the crime prevention through environmental design and defensible space
aspects of security zones, it is interesting to note that where they are most concentrated,
they appear to be attracting residents and have stable commercial office space rental
rates. In fact, rental rates have increased in downtown Indianapolis, while suburban
office space rental rates have decreased. With the combination of Chicago and
Indianapolis' central businesses districts attracting residents and commercial office rental
rates are increasing, especially in the case of Downtown Indianapolis, it appears that the
central businesses districts may be undergoing gentrification. In fact, the security zones
may be providing a sense of safety and security, therefore negating Boddy's (2008)
architecture of dis-assurance argument and supporting the argument that security zones
are social mechanisms operating within behavior settings that can either restrict or
facilitate demographic, social, and economic activities.

CHAPTER SEVEN

DISCUSSION AND FUTURE WORK

Previous studies have illustrated anti-terror security present in major metropolitan cities like New York (Marcuse, 2006), London (Coaffee, 2009), Washington D.C. (Benton-Short, 2007) and Jerusalem (Savitch, 2008), however none have conveyed the spatial extent of security zones as was done in this study. Nemeth (2010) and Hollander and Whifield (2010) have identified the presence of security zones. However, they have not provided the spatial extent and intensity of security zones on public space as was done in this study. Nemeth (2010) and Hollander and Whifield (2010) did not use IDW interpolation or Sampson's ecometric methodology to study this phenomena. Nor did they evaluate demographic, social, and economic activity occurring within and around the sampled security zones. This dissertation contributes to empirical studies on security zones within public urban space by examining urban fortification and the spatial extent and intensity of security zones as well as their influence on public space. And although the idea of using some form of spatial arrangements as tools for crime control has a long established history, the presence of physical security zones within urban areas has increased since the September 11th terrorist attacks (Marcuse, 2006; Coaffee, 2009). When walking in a major U.S. city, it does not take long to notice blast-proof planters, bollards, or reinforced street lamps, while being monitored by countless CCTV cameras.

To better understand the emerging phenomena of security zones and fortification of urban public space, this dissertation analyzed security zones located in the central business districts of Chicago, Detroit, and Indianapolis. This study was able to identify the spatial extent and intensity of security zones located in the three cities. The intensity

of which thee cities utilized the security zone variables of behavior, surveillance, and access restrictions was also identified.

This analysis determined Chicago, Indianapolis, and Detroit, with substantially smaller populations and density levels than larger global cities such as New York and London, (both of have both experienced terrorist attacks), have fortified buildings, areas, and neighborhoods as well as restricted public space in their civic and financial districts. However, each city employed security zones in different forms. Chicago had many smaller security zones, but focused more on access restrictions and target hardening. Indianapolis had less security zones and employed cost effective behavioral controls. Detroit focused heavily on surveillance measures and had a vast network of CCTV cameras.

Moreover, buildings housing government entities and financial institutions were the most likely to have a security zone in the surrounding area. Office buildings, universities, and businesses typically did not have security zones in their general vicinity. It was found that publicly owned buildings, on average, had a higher security zone score when compared to privately owned buildings. More specifically, federal government entities, in all three cities, scored the highest for the security zone criteria. The most common type of security zone criteria present for government entities are surveillance and access restrictions.

The most frequently observed behavioral variable throughout this study was prohibitive signage. These signs mainly prohibited public loitering in certain areas of the building. For surveillance the CCTV camera was the most observed. FEMA (2011) recommends the use of CCTV cameras as a low case and moderately effective means to

deter criminal activity. The bollard and crash rated planter were the most observed

access restriction. These defensive measures provide the greatest amount of protection to

the building and its inhabitants (FEMA, 2011).

Seventeen buildings in the central Loop exhibited a security zone. Detroit and

Chicago had fifteen and thirteen buildings, respectively. Detroit and Indianapolis both

had significant areas that did not have a security zone present. Chicago's security surface

was more intense than the other cities. Adapting the observable security zone criteria and

imputing the data into ArcGIS and ArcScene, this study has been able to display a

phenomenon of public and private fortification of space that is present in Downtown

Detroit, Indianapolis' central business district, and Chicago's central Loop.

As previously noted, Sampson (2003) has posited that social mechanisms

operating within behavior settings can either restrict or facilitate demographic, social, and

economic activities. This dissertation has argued that security zones are in effect

empirical measures of Sampson's concept of social mechanisms and that it is important

to determine to what extent security zones identified in the three cities of interest in this

study have affected the demographic, social and economic activities within them. The

impact of enhanced social control measures on the demographic, social and economic

activities of a Tier I (Chicago) and two Tier II cities (Indianapolis and Detroit) were

assessed by examining population, crime and office rental rate changes from

approximately 2000 to 2010.

When comparing the population, crime rates, and office space rental rates of the

sample areas several findings stood out. The first was the population of the sample areas.

Even though overt anti-terrorism security measures are present, within the central

business districts of Chicago, Indianapolis, and Detroit, city dwellers are not deterred from residing within an area which has a high potential for a future terrorist strike. The city of Chicago had a total population loss of approximately 7%, yet the central Loop experienced a 128% increase in population from 2000 to 2010. Indianapolis had a population increase of about 5%; however Downtown Indianapolis experienced nearly a 70% increase of residents. Detroit had an overall population loss of 25%, but Downtown Detroit only experienced a 20% loss. Boddy's (2008) architecture of dis-assurance argument is questioned with these findings.

It is also important to note that social activities evidenced significant changes within the security zones of the three cities of interest in this study. Crimes against property decrease in all three sample areas. Chicago's Loop experienced nearly a 43% reduction of property crimes from 2001 to 2011, and the reduction in property crime was greater in the security zones than the surrounding communities in the Chicago metropolitan area. Property crime rates also differed by areas of Indianapolis. When examining the surrounding neighborhoods, property crimes increased dramatically, while Downtown Indianapolis experienced a decrease in property crimes. Downtown Detroit also experienced a decrease in crimes against property.

These findings suggest that the implementation of security zones may be a factor in the reduction of property crimes. Access restrictions, in particular, may be more effective in reducing property crimes as was observed in the city of Chicago with its significant decrease. Security zones appear to be manipulating behavior settings by imposing access restrictions, behavioral controls, and surveillance measures. This finding lends support to Routine Activities theory in that target hardening and increased

surveillance activities within these security zones may have had an effect on property crimes. Crime prevention through environmental design and defensible space measures, which are adapted into security zones, appear to be working to reduce property crimes in the sampled urban areas. These findings also support an extension of Sampson's (2003) argument that social mechanisms such as security zones may influence social activities occurring within them.

To better understand the effect of security zones on economic activities, commercial office space rental rates in Chicago, Indianapolis, and Detroit were compared. From 2000 to 2012, Chicago's central Loop only had an 8.2% decrease in rental rates. The average loss for the surrounding community areas was 12.5%. Downtown Indianapolis had an increase in rental rates in the same time period, while suburban Indianapolis had a 4.4% decrease of rental rates. Downtown Detroit had a 4% decrease in rental rates, an again there was a lack of available data to compare this finding. These downtown areas present a number of high value and high profile targets for potential terrorists. However, the comparisons show these downtown business districts are exhibiting population increases, a reduction in property crimes, and have a lower decline in Class A commercial office space rental rates when compared to surrounding neighborhoods. These findings again nullify Boddy's architecture of dis-assurance argument.

Each district studied had no more than 27% of urban space secured, demonstrating that the majority of urban space in these cities are still open and accessible to the public with limited restrictions in place. While this research shows that fortification is present, and has increased in response to terrorist threats around the world,

these cities have not reacted by becoming militarized zones where every action is under strict control. For the most part, individuals can still freely interact within public city space.

This study responded to Sampson's call to utilize ecometric research and the integration of GPS and GIS techniques into sociological research, and in doing so has identified the spatial extent and intensity of security zones in these three cities. However, further research is needed to better understand the long term impact of security zones and their effect on urban public and private space. With the installation of security measures in urban public space, questions are raised about the association between security measures and fear. More specifically, further research could be done to test Boddy's (2008) belief that anti-terrorism security measures are creating an aura of dis-assurance within the city. Now that the extent and intensity of security zones have been established, future researchers may want to examine if fear among city dwellers is heightened when entering or residing within areas exhibiting security zones. Using the research conducted in this study, the concept of fear could be examined by studying reactions of people within mapped security zones. This will help identify if people feel more or less safe with these visible security zones. This would be important data in maintaining a thriving economy in these areas that can attract local residents and tourists as well as maintain safety.

Researchers may also want to focus on the long term effects of security zones on people residing or working within security zones. Graham (2007) argues that a culture of fear is driving efforts to fortify U.S. cities and that the constant barrage of the 24/7 news cycle only fuels citizens paranoia. Therefore, assessing the effect of media exposure on

urban residents in these areas of high risk for terrorist attacks could be a possible addition to future studies on behavioral settings such as security zones.

Future research should also include in depth interviews to better determine other concerns that may be associated with security zones. Interviews with respondents might reveal additional causal factors of security zones that are not currently addressed in existing literature. A future study could assess which security methods are more or less acceptable to people within urban areas of varying degrees of risk to terrorist attacks and their proximity to security zones.

There are limitations of this study which must be noted. Future studies could improve upon these findings by increasing the number of sampled cities. Eventually, a database could be created for every city identified by the Department of Homeland Security's Urban Area Security Initiative List to be at risk for a potential terrorist attack. This database could also be comprised of more measures of demographic, social, and economic activities. Such measures could include: race, age, tourism and vacancy rates, and a more specific breakdown of crime rates. By identifying more measures and increasing the sample size, future research will be able to go beyond a descriptive analysis of the security zones of these three cities to account for the variation in levels of behavioral controls, access restrictions, and surveillance measures by within and between cities.

However, this study provides a starting point for future researchers to better quantify the existing phenomenon of security zones. This type of innovative methodology, incorporating the latest technological advances can be used as a baseline for longitudinal research for security zones existing within Chicago, Indianapolis, and

Detroit. Future studies will be able to detect if security zones are becoming more or less restrictive to surrounding urban space in these three cities, as well as other Tier I and Tier II cities across the United States.

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CURRICULUM VITAE

<u>Education</u>
University of Wisconsin-Milwaukee   Milwaukee, WI
PhD: Urban Studies (Currently ABD)   Graduated 2013
Dissertation: The Effect of Urban Fortification on Public Space

Western Illinois University   Macomb, IL
Master of Arts: Law Enforcement and Justice Administration   Graduated 2005
Thesis: A Statistical Analysis of Probation Recidivism in McHenry County, IL.

Viterbo University   La Crosse, WI
Bachelor of Science: Criminal Justice   Graduated 2002

<u>Professional Experience</u>
McHenry County Department of Court Services   Woodstock, IL
Adult Probation Officer   May 2003 - Present
Supervise a caseload of approximately 150 adult criminal offenders to ensure the
conditions of probation are met and file petitions of revocation if needed. Prepare pre-
sentence investigations by interviewing defendants, victims, and witnesses, while
providing the court with appropriate sentencing recommendations. Utilize criminal
information databases such as LEADS and NCIC to detect new criminal offenses. Act as
a liaison for judicial officials on probationer's progression through documentation,
memoranda, reports, regular court appearances, and testifying in court when necessary.
Coordinate law enforcement activities and information with local, state and federal law
enforcement agencies. Member of the policy standards committee and employee
recognition committee.

<u>Teaching Experience</u>
McHenry County College   Crystal Lake, IL
Adjunct Instructor – Criminal Justice Department   January 2012 - Present
Provide an overview and analysis of the U.S. correctional system which includes: the
history, evolution and philosophy of punishment, operational and administrative issues,
and problems in correctional law. These goals are accomplished through presentations,
cooperative learning, critical thinking exercises, tests, and writing assignments.
Classes taught:
CJS 106: Introduction to Corrections
CJS 206: Community Based Corrections

<u>Community Involvement</u>
Village of Union   Union, IL
Village Trustee   Elected 2009 – Reelected 2013
Chairman of the Improvements Committee: develop and manage a budget to allocate
expenses for waste disposal, pest control, subdivision design standards, and code
compliance. Review and accept bids and contracts for general village infrastructure
improvements and operations. Plan and coordinate Memorial Day parade.