

Published as: Cozens, P. and Tarca,, M. 2016. Exploring housing maintenance and vacancy in Western Australia: Perceptions of crime and crime prevention through environmental design (CPTED). *Property Management*. 34 (3): pp. 199-220.

Abstract

Purpose

The purpose of this paper is to investigate ‘image management’ as an important element within the concept to the Crime Prevention Through Environmental Design (CPTED). Globally, guidance tends to focus on promoting surveillance and few studies have explored how the image, maintenance and stigma of housing might affect perceptions of crime and CPTED.

Design/methodology/approach

This paper contrasts the perceptions of 168 members of the public and 12 built environment professionals with regards to a detached property in Perth, Western Australia. Using two photographs to elicit responses (one poorly-maintained and one well-maintained) respondents were asked about their perceptions of crime, and the extent to which CPTED features were perceived to be present. These results are contrasted with a site audit of the CPTED qualities visible in both images.

Findings

The CPTED Audit recorded significantly higher scores for the well-maintained property than for the poorly-maintained dwelling. Most respondents indicated they felt less safe, perceived more crime and lower levels of CPTED in relation to the poorly maintained house. The findings provide support that there is a link between poorly-maintained housing and the perceptions of CPTED, crime and the fear of crime.

Originality/value

This innovative study utilised two photographic images of the same property to probe ‘image management’, perceptions of crime and CPTED qualities. It highlights the need to consider these issues throughout the different stages of the development process and presents idea of the ‘cradle to the grave’ life-cycle of criminal opportunities.

Keywords

Crime Prevention Through Environmental Design (CPTED), vacant housing, image management, guardianship, development process, ‘cradle to the grave’.

Research paper

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Introduction

The costs of crime have been estimated at £124 billion in the UK (Institute for Economics and Peace, 2013) and AU\$47.6 billion in Australia (Smith *et al.*, 2014). Low levels of crime and fear of crime are consistently reported to be important components of a good place to live (Napier *et al.*, 1998; Office of the Deputy Prime Minister, 2004). In addition, crime is increasingly considered as a threat to sustainability and public health (Stafford *et al.*, 2007; Cozens, 2015a; 2015b) and a safe and secure environment is one of several human needs (Maslow, 1943).

It is now widely acknowledged that crime and the fear of crime are influenced by the built environment (Schneider and Kitchen, 2007; Ekblom, 2011; Cozens 2014). Crime Prevention Through Environmental Design (CPTED) is a crime prevention theory and strategy, which has been promoted by governments in North America, Europe, the United Kingdom, and Australia as well as in New Zealand, South Africa, and in parts of Asia and the Middle East (Ekblom, 2011; Cozens, 2014). An important component of this theory is how the management of the built form may influence crime and perceptions of crime. This was part of Newman's Defensible Space (Newman, 1973) and Wilson and Kelling's Broken Windows theories (1982). Both assert poorly-maintained urban spaces (e.g. those exhibiting vandalism, graffiti and dereliction) can affect perceptions of crime. These settings may nurture further anti-social and criminal behaviour, which is more likely go unchallenged. Broken Window's theory (Wilson and Kelling, 1982) has also been used by police forces to crack down on minor incivilities in order to prevent the escalation to more serious crimes, for example in New York (Corman and Mocan, 2005). However, few studies have explored how vacant buildings may affect perceptions of crime and the effectiveness of CPTED.

In 2014, there were around 610,000 vacant dwellings in England (Department for Communities and Local Government, 2015). In Australia, there were 934,500 unoccupied dwellings on census night (Australian Bureau of Statistics, 2015), although it is not known precisely how many were actually vacant. Following the global financial crisis, vacancy is a significant issue in the USA (Lind, 2015) and in the UK (Couch and Cocks, 2013). Vacant buildings have been associated with a range of crime types (Spelman, 1993; Kraut, 1999) and with perceptions of crime and CPTED in the UK (e.g. Cozens *et al.*, 2001a; 2002a; 2002b). However, this has not been investigated in relation to urban space in Australia.

Lind (2015) recently highlighted how home owners, investors, neighbours, debt collectors, local councils, courts, tax payers, speculators and criminals all have different perspectives on abandoned and vacant properties. This paper investigates and contrasts the perceptions of 168 members of the public and 12 built environment professionals with regards to a specific housing type in Perth, Western Australia (WA). This study used two photographs of the same detached house as the environmental stimuli to elicit responses. One was poorly-maintained and was taken in 2008 and the other was well-maintained and was photographed in 2014. Respondents were asked about their perceptions of crime, fear of crime and the extent to which CPTED features were perceived to be present and to potentially discourage / facilitate crime. They were also asked whether the potential for guardianship and resident intervention was likely or not.

This paper has four key aims. The first is to briefly discuss the origins, development and current status of CPTED highlighting 'image management' as a relatively under-researched component. The second objective is to provide a summary of some of the key research on the topic of crime and fear of crime as it relates to property maintenance, vacancy and abandoned buildings. Thirdly, the paper provides the background and policy context of the research.

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Finally, the research explores and tests two of the four mechanisms of Wilson and Kelling's Broken Windows theory (1982). One is the assertion that the deterioration of urban space can increase safety concerns of residents / users and the other is that it can undermine the capacity of the community to police itself.

Crime Prevention Through Environmental Design

Safety and security were identified as key elements of a well-functioning city by Jane Jacobs in *The Death and Life of Great American Cities* (1961). Jacobs (1961, p30) argued "the bedrock attribute of a successful city district is that a person must feel personally safe and secure on the street". The three main qualities of a safe street were identified;

1. There must be a clear demarcation between what is public space and what is private space.
2. There must be eyes upon the street, eyes belonging to those we might call the natural proprietors of the street. The buildings on a street equipped to handle strangers... must be oriented to the street...
3. The sidewalk must have users on it fairly continuously, both to add to the number of effective eyes on the street and to induce the people in buildings along the street to watch the sidewalks in sufficient numbers (Jacobs, 1961, p35).

'Defensible space' refined and operationalised Jacobs' work and was defined by Newman (1973, p3) as "...a surrogate term for the range of mechanisms - real and symbolic barriers, strongly defined areas of influence, and improved opportunities for surveillance - that combine to bring an environment under the control of its residents". The four elements to 'defensible space' include;

- the capacity of the physical environment to create *perceived* zones of territorial influence;
- the capacity of physical design to provide surveillance opportunities for residents and their agents;
- the capacity of design to influence the *perception* of a project's uniqueness, isolation, and stigma; and
- the influence of geographical juxtaposition with 'safe zones' on the security of adjacent areas" (Newman, 1973, p50).

An influential area that has become part of this design-affects-crime hypothesis is Wilson and Kelling's (1982) Broken Windows Theory. This argued the appearance and maintenance of the built environment was an indicator of social cohesion and informal social control. Poorly-maintained spaces (e.g. broken windows) suggest no-one cares, and this can encourage offending. The rapid repair of vandalism and removal of graffiti is posited to discourage criminal opportunities and prevent the escalation of existing problems. According to Wilson and Kelling (1982) levels of crime can increase as a result of the deterioration of the built environment via four mechanisms:

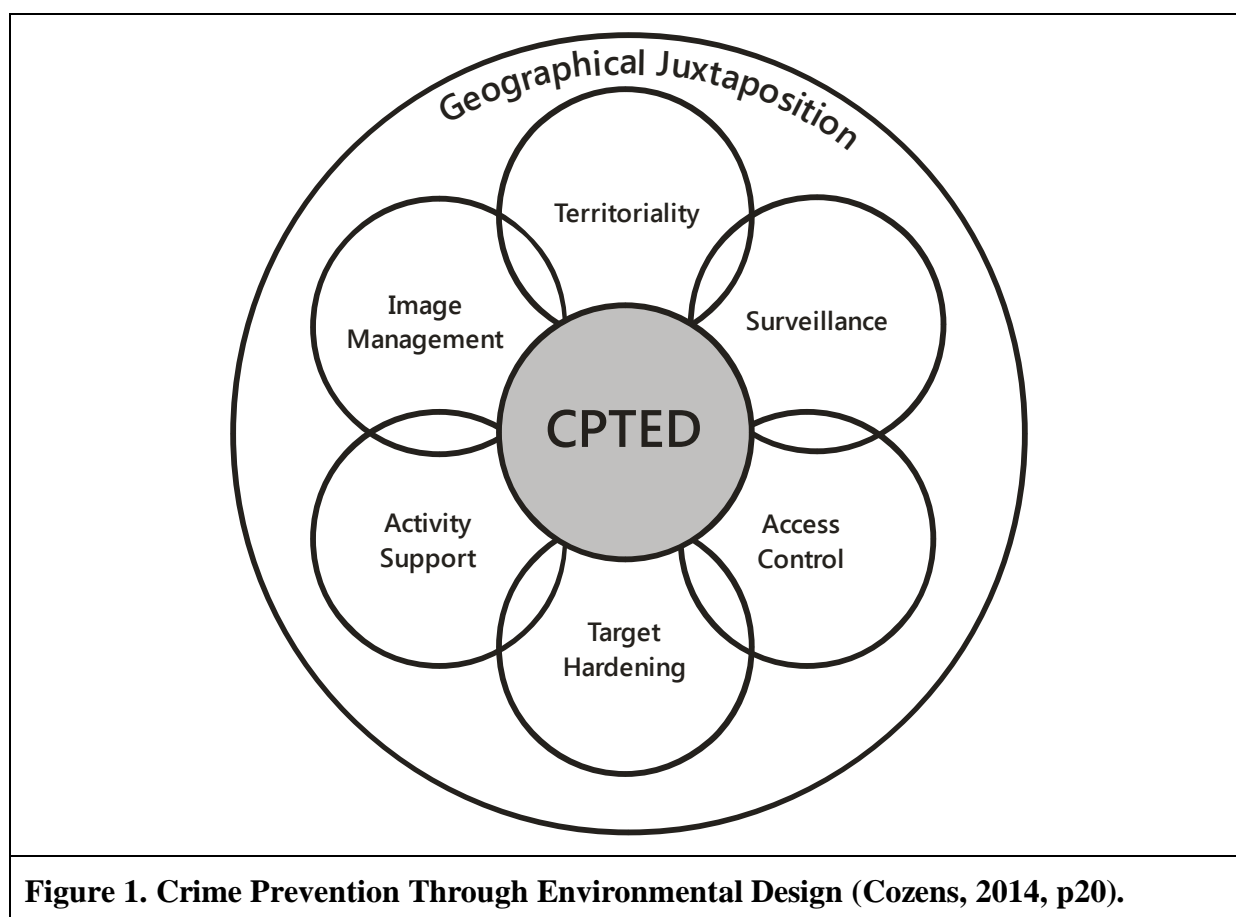
- The deterioration in the appearance of the built environment provides informal permission to commit vandalism, which increases the deterioration in the urban landscape.
- The deterioration of urban space increases safety concerns in residents and users and expectations of what is appropriate behaviour can change.
- The increased deterioration of the built form can undermine the capacity of the community to police itself.

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- This reduced capacity for self-policing can create ‘undefended space’ and attract potential offenders from outside, who perceive that the neighbourhood is vulnerable.

These ideas link to Newman’s (1973) concept of image and milieu (also referred to as image management) and are considered to be an important element within CPTED. It also highlights the need to design the built form so that it can be more easily and efficiently managed and maintained (Coleman, 1985).

Crime prevention through environmental design (CPTED) was “based upon Newman’s concepts” (Jeffery, 1999, p1), although the term was originally coined by Jeffery (Crowe, 2000). It is contends that “the proper design and effective use of the built environment can lead to a reduction in the fear and incidence of crime, and an improvement in the quality of life” (Crowe, 2000, p46). This has been discussed in detail in previous editions of *Property Management* (e.g. see Cozens *et al.*, 2001b; 2005) and Figure 1 illustrates the key dimensions to CPTED.



CPTED is a process undergoing continual refinement and interested readers are encouraged to explore developments in conceptual definitions, theory and scope (e.g. see Ekblom, 2011; Armitage, 2013; Gibson and Johnson, 2013; Cozens, 2014; Cozens and Love, 2015). However, the relevance of image management continues to represent an important dimension to CPTED theory and practice. Generally speaking, there has been a relative dearth of research on Newman’s concept of image management and stigma in terms of how it may reduce the effectiveness of CPTED and undermine the liveability of the city (Garnett, 2004). This is particularly the case in Australia.

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Maintenance, Abandonment and Vacancy – A Summary of Key Findings

People and communities prefer orderly and well-maintained environments (Hagerhall, 2000; Kaplan and Kaplan, 1989; Nasar, 1994). They want them to be safe, clean and stable (Greenberg, 1999). The analysis and mapping of the location of offences and offenders began in the early nineteenth century (Guerry *et al.*, 1833; Quetelet, 1842) and crime has been observed to flourish in a variety of ‘dangerous places’ (Mayhew, 1862) known variously as ‘rookeries’, ‘slums’ and ‘dreadful enclosures’ (e.g. Damer, 1974). The idea that urban decay, abandonment and poor maintenance could affect crime and the health of the community is not new. Indeed, Walter (1977, p154) has argued “the idea of dreadful space is probably as old as settled societies”.

For example, Burgess (1916) highlighted ‘bad housing’ and the ‘low grade home environment’ as a contributing cause of juvenile delinquency. Researchers at the Chicago School of Sociology provided some support for the notion that social disorganisation occurred in specific parts of cities and that there was a physical dimension to these patterns (e.g. Shaw *et al.*, 1929). Felson (2006) observes how studies by Shaw and Mckay in the 1930s that highlighted areas with high crime rates contained many abandoned properties.

Kraut (1999) reports that the developer Samuel Rappaport began building his real-estate empire in the USA in the 1950s. He was well-known for purchasing many buildings, allowing them to become vacant and providing minimal maintenance. He then waited years and often decades before selling the properties at the right time – usually for a significant profit. Around this time, Lynch (1960), among others, asserted that well-maintained settings could promote a sense of safety in the community. This was consolidated by the work of Jacobs (1961) who asserted that a successful city must be safe and secure.

Research by the Nachbaur, (1971), the US Department of Housing and Urban Development (1973) and Hughes and Bleakly (1975) all reported on the negative affects of abandoned housing, such as crime, which could drive current homeowners out of the neighbourhood.

Stinchcombe *et al.*, (1980) argued that the incidence of crime was identified with environmental cues called ‘signs of crime’. Skogan (1990, p48) has since asserted how “their presence is taken by many as an early warning of impending danger”. Merry’s (1981) concept of ‘undefended space’ refers to physical space, which should be ‘defensible’ but is not. This can be due to a variety of factors including fear of crime, fear of victimization or cultural differences in the propensity to act as a guardian in the neighbourhood.

In a relatively uncommon study of public housing in Australia, Perglut (1983a; 1983b) linked incivilities including vacancy, to crime and perceptions of crime. He proposed the phrase ‘manageable space’, in preference over ‘defensible space’ to allude to the need for involving local residents in any crime prevention activities in order to foster territoriality and concern in the local environment.

Eck and Spelman (1987) highlighted how vacant buildings could be staging grounds for gangs and vacancy and could attract illegal users. In an empirical test using the national crime survey in the UK, Hope and Hough (1988) demonstrated a link between incivilities (dilapidated buildings), crime victimisation, fear of crime and perceptions of crime.

Skogan (1990, p40) highlights how different types of physical decay can spark fear of crime (e.g. vandalism, dilapidation and abandonment, rubbish) but states “the presence of abandoned buildings may be the most dramatic indicator of a neighbourhood’s unhealthy condition”

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Several studies (e.g. Spelman, 1993; Ross and Mirowsky, 1999; Kraut, 1999) report how a range of physical incivilities may be linked to crime and perceptions of crime. These include abandoned cars, litter, graffiti, vandalism, vacant lots, poorly-maintained buildings and grounds, and negligent landlords. This evidence is also supported by ‘signs of incivility’ theory (Lewis and Salem, 1986; Skogan and Maxfield, 1980). Skogan (1990) also reports that when vacant properties are used illegally, by gangs for example, they can also discourage surrounding residents from acting as guardians and ‘eyes on the street’ since they avoid sitting on their own porches. In an empirical study in the USA, using a randomized experiment, crime and drug dealing were reduced by making a variety of improvements in place management (Eck and Wartell, 1996). Significantly, Ross and Mirowsky (1999, p418) have argued “dilapidated housing is considered to be the purest physical incivility.”

Researchers have investigated the perceptions of different stakeholders (e.g. burglars, police, planners and the elderly) in relation to the image / maintenance of residential properties and CPTED concepts in the UK (e.g. see Cozens *et al.* 2001a; 2002a; 2002b). In these studies photographs of well-maintained and poorly-maintained examples of low and high-rise flats, terraced, semi-detached and detached housing were used to probe perceptions of CPTED and crime risks. The poorly-maintained version of each housing design was perceived to be associated with higher levels of crime risks and lower levels of CPTED than the well-maintained example. More recently, a study by Hur and Nasar (2014) indicated, that as actual levels of upkeep improved, so did perception of safety.

Nasar *et al.*, (2015) demonstrate how the presence of abandoned and run-down houses reduced the levels of children and parents walking in a neighbourhood. Furthermore, Van Holle *et al.*, (2014) reported similar findings regarding the reduction of cycling in settings with abandoned properties and disorder.

More recently, it has been argued that since development includes demolition and change of uses, crime risks in the built environment should be considered across the lifecycle of buildings (Cozens, 2014). Figure 2 illustrates the ‘Cradle to the Grave’ Life-cycle of Criminal Opportunities’. There are clearly different different types of crime associated with different phases of the development process (Cozens, 2014).

At the planning and design stage, criminal opportunities for vacant lots include the dumping of rubbish, illegal trespass, hooning, illegal drinking and drug-taking, drug-dealing and squatting (e.g. Kraut, 1999). The site could also provide access to adjacent properties (Cohen and Felson, 1979).

At the construction stage, criminal opportunities include theft of construction materials, tools and machinery, theft of white goods, fixtures and fittings, dumping of rubbish / fly tipping, trespass, hooning, illegal drinking, drug-taking, drug- dealing, arson and squatting (e.g. in caravans), assaults and murder (Brantingham and Brantingham, 1998). For large scale sites, access routes may change and entrapments spots could be created (Cohen and Felson, 1979). Theft and vandalism are particular problems for construction sites (Berg and Hinze, 2005).

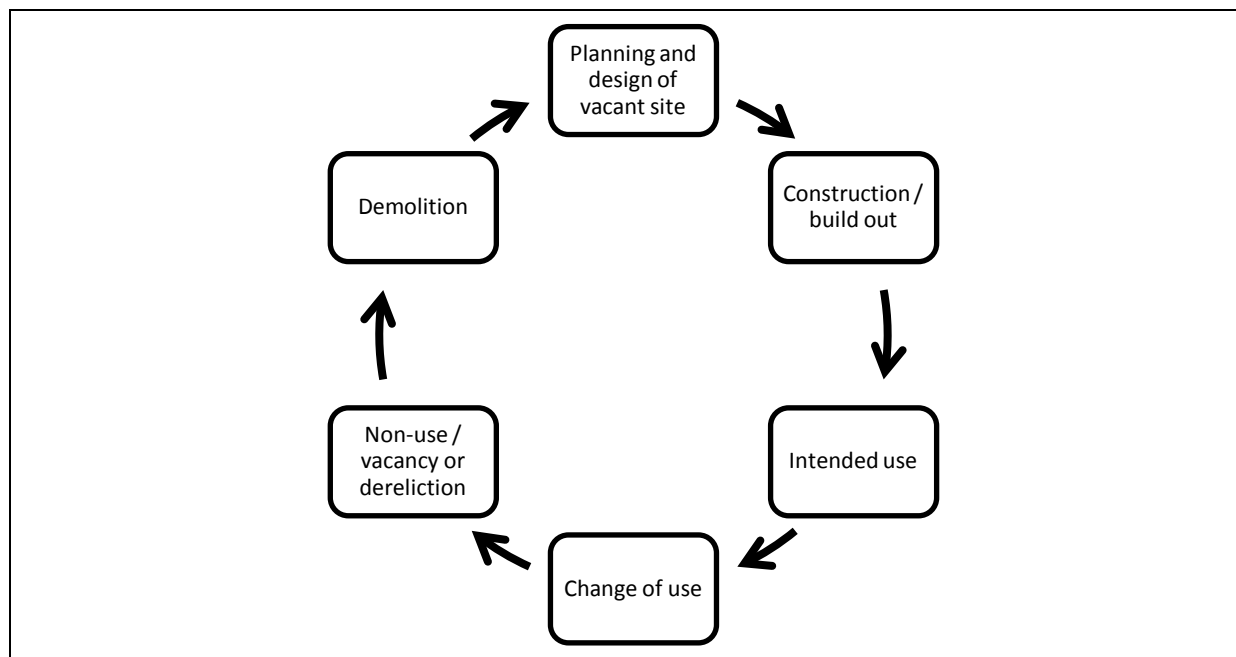


Figure 2. The ‘Cradle to the Grave’ Life-cycle of Criminal Opportunities (Cozens, 2014)

Depending on the specific land-use, criminal opportunities could include burglary, retail theft, assault, alcohol-related violence, drug-dealing, drug-taking, selling of stolen goods, domestic assault, sexual-assault and murder. When there is a change of use, criminal opportunities will also change to reflect this (Cohen and Felson, 1979; Brantingham and Brantingham, 1998).

When a site becomes vacant or derelict, different opportunities for crime also present themselves (Cohen and Felson, 1979; Brantingham and Brantingham, 1998). These include arson, theft of any materials / goods on site, dumping of rubbish / fly tipping, trespass, hooning, illegal drinking, drug- taking, drug-dealing (Greenberg *et al.*, 1999), storage / sale of stolen goods, squatting (Kraut, 1999), use of the site for kidnapping (Spelman, 1993), violent assault (Branas *et al.*, 2012), sexual-assault, rape and murder. The site could also be used as a specific centre / focus for criminal activity (Spelman, 1993). Finally, the demolition stage poses similar risks. Importantly, in addition to changes in opportunities for crime, perceptions of crime and fear of crime may also change throughout the development process. These are likely to be most pronounced when buildings / sites are in the vacant or abandoned stage.

Although the terms ‘vacant’ and ‘abandoned’ buildings are often used interchangeably, they differ in a subtle way – relating to the availability of the owner. A ‘vacant’ building is empty or unoccupied where the owner is interested in the building and is contactable. ‘Abandoned’ buildings are empty and vacant, with no viable owner or absentee landlord (The International Association of Arson Investigators, Inc., n.d.). Secured unoccupied buildings represent less of a threat to public safety than unoccupied properties which are unsecured and open to illegal entry. However, they may still attract crime, influence perceptions of crime and pose public health risks. For example, the ‘eyes on the street’ guardianship which might have been provided by residents living in the property is obviously lacking. Kraut (1999) highlights a subtle difference, in that short-term vacancy is a healthy and normal component of the real estate life cycle. It is longer-term vacancy, which can be problematic by “blighting the landscape, lowering surrounding property values, increasing crime and the risk of fire, and posing hazards to children” (Kraut, 1999, p1139).

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Research by Spelman (1993) indicated that residential blocks with unsecured vacant buildings had twice the crime rates of areas without vacant structures. Furthermore, research reveals that when the tipping point of between 3 and 6% of properties are vacant, out-migration begins to occur (Kraut, 1999). Derelict and abandoned buildings have therefore been referred to as a contagion (Skogan, 1990) and Kraut (1999, p1139) suggests run-down housing can “despoil a community as an open sewer may ruin a river”. Indeed, blight and vacant housing has been observed to have a ‘multiplier’ effect where a lack of maintenance in one building can reduce the incentive for neighbors to continue management of their properties (Spelman, 1993; Garnett, 2004).

Reynald and others (2009; Reynald and Efflers, 2009; Hollis-Peel et al., 2011) have explored how levels of guardianship can be influenced by territoriality, surveillance and image. This research was based on observations and interviews and supports the hypothesis that environmental settings with CPTED / Defensible Space qualities, exhibit increased levels of residential guardianship. Hollis-Peel *et al.*, (2011) highlight four categories of guardianship;

- Invisibility - where there are no guardians visible or available.
- Availability - where guardians are visible and / or available, but are not actively monitoring.
- Capability - where guardians are visible / available and are actively monitoring.
- Intervening - where guardians are visible / available, are actively monitoring, and intervene.

Clearly, for vacant, derelict or abandoned properties, there is no evidence that residents are monitoring / observing the street, and boarded up windows obscure opportunities for surveillance. Reynald (2011) and others introduced the idea that routine activity theory (Cohen and Felson, 1979) was important for understanding how CPTED may or may not work. This significant and highly relevant theory asserts that for a crime to take place, there must be a convergence in space and time, of a motivated offender, a suitable target / victim (e.g. a person / place) and the absence of a capable guardian (Cohen and Felson, 1979). The latter is defined as “any spatio-temporally specific supervision of people or property by other people, which may prevent criminal violations from occurring” (Felson and Cohen, 1980, cited in Reynald, 2011, p5). Crucially, Reynald (2011, p4) observes the link between RAT, guardianship and the image maintenance element to CPTED, stating “civic engagement goes hand in hand with that of guardianship from routine activities theory”. The lack of guardianship associated with a vacant property is therefore posited to affect perceptions of crime, fear of crime and the perceived effectiveness of CPTED.

From the brief overview of the literature, physical disorder, and specifically vacancy and abandonment, can potentially have ten key impacts on the community, these include;

1. Encouraging more disorder and incivilities (Wilson and Kelling, 1982; Spelman, 1993; Ross and Jang, 2000).
2. Promoting fear of crime in local residents and users (Skogan, 1990; Kraut, 1999; Sampson and Raudenbush, 2004).
3. Reducing surveillance opportunities and ‘eyes on the street’ since there are no residents in vacant properties (Kraut, 1999; Ross and Mirowsky, 1999).
4. Hindering the surrounding community’s capacity for social cohesion and interaction (Cohen and Felson, 1979; Skogan, 1990; Perkins and Taylor, 2002).
5. Reducing the perceived effectiveness of CPTED (Cozens, 2001a; 2002a; 2002b; 2002c).

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6. Decreasing the actual effectiveness of CPTED in terms of guardianship (Cohen and Felson, Reynald, 2009; 2010,a; 2010b; 2011).
7. Discouraging levels of walking and cycling (Nasar *et al.*, 2015; Van Holle *et al.*, 2014).
8. Reducing neighbourhood satisfaction (Herbert, 1993).
9. Decreasing property prices and investment in the neighbourhood (Skogan, 1990; Kraut, 1999).
10. Escalating public health and safety issues for the community (e.g. children playing in or near them) and firefighters who are often injured when combating incidents of arson at vacant buildings (Kraut, 1999).

The literature discussed above clearly reveals there is a complexity associated with poor maintenance and housing. Within this continuum there are poorly-maintained occupied properties and those experiencing short-term vacancy. There are also poorly-maintained properties which have been left vacant for long periods and others have been abandoned. Finally, properties can be left derelict. The level of responsibility of any tenants / squatters also complicates this continuum. There are subtle differences between each category and a detailed discussion of this complexity is outside of the scope of this paper. This research focuses on a property which appears to be vacant and is poorly maintained and contrasts this with the same property in an occupied well-maintained condition. In Australia, few studies have investigated how poorly-maintained vacant housing might impact on the community in terms of perceptions of personal safety and the capacity of the community to self-police.

The Research – Background

Perth is the capital city of Western Australia, with an estimated population of 2.52 million people, where 1.97 million reside in the Greater Perth (ABS, 2015). The research focuses on one house in a relatively old, established suburb three kilometres north of Perth's central business district (see Figure 3).

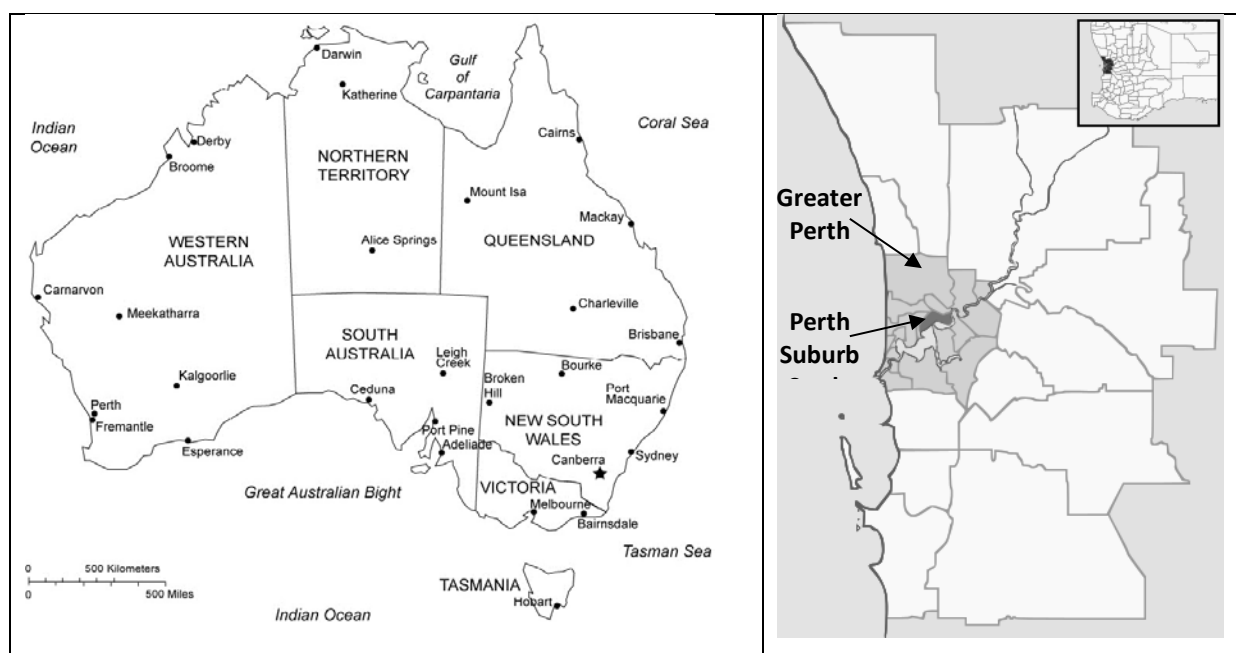


Figure 3. Maps of Australia, Greater Perth and the Suburb Location

Source: http://commons.wikimedia.org/wiki/File:Metropolitan_Perth.svg#/media/File:Metropolitan_Perth.svg

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Reference to the 2006 and 2011 census reveals that the population of the suburb increased from 7,828 to 8,544 but has not significantly changed in its demographic profile.

In terms of recorded crime statistics from 2008 to 2013, data from the West Australia Police Service (2014) reveals no significant changes for the suburb for assault, burglary (dwelling / non-dwelling), graffiti, robbery and motor vehicle theft. Given the population increase from 2008-2013, the crime rate per 1,000 population has decreased, in line with trends in most Western cities (Mayhew and Van Dijk, 2014).

In WA, CPTED policy is underpinned by the State's Designing Out Crime Strategy (Office of Crime Prevention, 2004), the Designing Out Crime Planning Guidelines (Western Australian Planning Commission, 2006a) and a planning bulleting (Western Australian Planning Commission, 2006b). The Designing Out Crime Strategy has been discussed at length in a previous paper published in *Property Management* (see Cozens *et al.*, 2008), and briefly, has five key goals:

1. To embed Designing Out Crime principles within all relevant State and local planning policies.
2. To manage the built and landscaped environment to reduce crime.
3. To increase understanding of Designing Out Crime.
4. To apply Designing Out Crime principles in a multi-agency approach.
5. To use product design and appropriate technologies to reduce crime.

Of particular relevance to this paper is Goal 2, "to manage the built and landscaped environment to reduce crime". Numerous actions are listed to achieve this goal, but of specific pertinence are;

- To encourage property owners to refurbish run-down properties with heritage and cultural significance by developing incentives and to explore options to ensure property owners effectively manage and maintain their properties and reduce the number of vacant and derelict buildings.
- To provide advice and training to local government and other agencies on measures to improve safety through the management and maintenance of the built and landscaped environment (Office of Crime Prevention, 2004).

In addition to policy support at the State level, some local governments have policies and processes or mechanisms to report, record, monitor or respond to issues associated with abandoned, vacant or derelict dwellings. Legally, the Health Act (1911) and the Building Act (2011) give local governments authority to exercise controls and enforce legislation. For example, if health and safety or fire hazards are reported, building inspectors and / or environmental health officers will visit the site and potentially order the repair / demolition of poorly-maintained buildings, particularly if they are deemed unfit for human habitation. The Department of Fire and Emergency Services provide advice on their website about how to manage such properties to avoid arson / illegal entry (see <http://www.dfes.wa.gov.au>) and one local government's policy is to refer illegal activities such as vandalism and antisocial behavior to the WA Police Service. Although there appears to be some policy support at State and local level, the extent of vacancy in WA is not known. Furthermore, it is unclear precisely if / how different local authorities respond to the issue. Further research could usefully explore this gap in the knowledge.

Earlier, it was highlighted that secured, unoccupied buildings are less of a public safety risk than unsecured, unoccupied properties. However, it is suggested that they provide

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opportunities for crime, affect local perceptions of crime and interfere with the community's capacity for guardianship at the street level. This research tests this assertion.

The Research – Methodology

Two methodologies were used to investigate vacant housing, perceptions of crime and CPTED and facilitated the collection of both qualitative and quantitative data. Firstly, a simple quantitative CPTED audit was conducted using the photographic images of the poorly-maintained 'House A' (see Figure 4) and the well-maintained 'House B' (see Figure 5). These were single detached houses which represent 70% of all housing types in the Perth metropolitan region (ABS, 2011)

The CPTED audit recorded the presence or absence of CPTED features, drawn from the literature and provided a simple quantitative score of the CPTED features visible in each of the housing images in terms of surveillance, territoriality, image management and access control / target hardening. Activity support was excluded from the survey since the scale of analysis was one residential property. The use of photographs to elicit perceptual data from visual stimuli is a commonly used approach (see e.g. Groat, 1982; Brown and Altman, 1983; Brown, and Bentley, 1993. Stamps and Nasar, 1997; Cozens *et al.*, 2001a; 2002a; 2002b).

Secondly, a survey questionnaire collected quantitative data and probed perceptions of crime, fear of crime, the likelihood of resident intervention, levels of territoriality and responsibility for maintaining the houses. In the first part of the survey, four questions probed perceptions of different crimes / disorder and 'broken windows' *before* the photographic images were viewed. The second part of the survey asked respondent's questions based on two contrasting photographic images of the same house. 168 surveys of the general public were conducted online, using survey monkey software. The survey was advertised on various social networking forums prior to completion. Given that studies have commonly reported differences between the perceptions of the public and of professionals (e.g. Groat, 1982, Stamps and Nasar, 1997) the survey was administered to the public and to twelve built environment professionals. These were selected using a snowball sampling method and included three urban planners, two developers, two architects, two environmental health / compliance experts, a sustainability professional, a landscape maintenance specialist and a real estate agent. Most of this cohort were employed by local government and they completed the same survey as the general public. Furthermore, Hanyu (1997) has argued that evaluations of the physical environment have traditionally been associated with built environment professionals. Therefore, the perspectives of the general public are important to consider.

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Figure 4. Vacant / poorly-maintained ‘House A’ (Anonymous, 2008)



Figure 5. Well-maintained ‘House B’ (Authors, 2014)

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The Research – Findings

A CPTED audit was undertaken for both images of the same house. The photos of this house were taken 6 years apart and show the house in its previous state (2008) and its more recent refurbished state (2014). The categories measured for each house were surveillance, territoriality, image management and access control / target hardening. Figure 6 details the audit categories and CPTED scores for House A and House B (a score of ‘1’ is positive, while a ‘0’ is a negative score).

CPTED Feature	House A	House B
Surveillance		
Windows provide passive surveillance of the street	0	1
Lack of places of concealment	0	1
Front entrance is visible from the street	1	1
There are no features obscuring visibility	0	1
Signs of occupancy	0	1
Image management		
Well-maintained landscaping	0	1
Well-maintained built structure	0	1
No evidence of graffiti or vandalism	0	1
No evidence of litter / rubbish	0	1
No evidence of boarded up windows	0	1
Territoriality		
Clearly defined space (public / private)	1	1
Symbolic barriers	1	1
Entrance / address clearly defined	0	1
Evidence of a sense of ownership / pride	0	1
Evidence of proprietary concern	0	1
Access control / target hardening		
Secure doors / windows	0	1
Access to property entrance is clearly defined	0	1
Actual barriers (wall / fencing / gate)	0	0
Access to rear of property is secure (fencing at sides of property)	0	1
No evidence of illegal access	0	1
CPTED Score / 20	3	19
CPTED % Index	15%	95%
Figure 6. CPTED Audit of House A (poorly-maintained) and House B (well-maintained)		

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House A (Figure 4) was vacant and poorly-maintained and exhibits evidence of incivilities, including graffiti and some vandalism. The garden appears a little overgrown and the boarded-up windows seem to have been vandalised. Access to the rear of the property along the left-hand side of the building appears not to have been controlled by any fencing. There were few signs of any occupancy. As might be expected, in the CPTED Audit, House A scored three out of a possible twenty, representing a low CPTED Index of 15%.

House B (Figure 5) was occupied and well-maintained and appeared to have been recently renovated. Chairs on the front veranda and two rubbish bins indicate signs of occupancy. It appears that access to the rear of the property is restricted via fencing and the garden is well-kempt. There appears to be little, if any, evidence of incivility. As might be anticipated, House B scored nineteen out of twenty, representing a high CPTED Index of 95%.

In the CPTED Audit, House B (well-maintained) was rated significantly higher than House A (poorly-maintained) in terms of CPTED overall, and in terms of the concepts of surveillance, territoriality, image management, and access control / target hardening.

Clearly, as expected, the CPTED Audit rated much higher for the well-maintained property (House B) than for House A. However, although these audit findings have limited relevance by themselves, analysis of the surveys of the 168 members of the public and the twelve built environment professionals (BEPs) provides some interesting insights. According to the literature, House B (well-maintained) should evoke more positive perceptions of safety, lower levels of fear of crime and higher perceived levels of guardianship / resident intervention than House A (Newman, 1973; Wilson and Kelliing, 1982; Greenberg 1999; Cozens et al., 2002c). The survey results are now discussed to explore if these assumptions have any relevance.

The 168 members of the public were asked a series of general questions *before* they viewed either of the photographic images. The first two questions are set out in Figure 7.

	% of General Public who agreed	% of Built Environment Professionals who agreed
Do you think that a well-maintained house enhances the streetscape?	99% (n=167)	100% (n=12)
Do you think that a poorly-maintenance house is associated with crime?	46% (n=77)	34% (n=4)

Figure 7. Perceptions of the Impact of Maintenance

Clearly, there was agreement that generally, a well-maintained house enhances the streetscape, while the majority of the general public (54%, n=91) and the built environment professionals (66%, n=8) felt that a poorly-maintained house was not associated with crime generally. This is interesting to contrast to their perceptions after viewing the photographs.

Before viewing the photographs, the respondents were also asked to what extent specific examples of signs of incivilities attracted crime. Their choices were ‘none’ (scored zero), ‘a little’ (scored as 1) or ‘a lot’ (scored as 2) and the responses are expressed as a group, as an overall rating out of 2. Figure 8 illustrates and compares the responses.

Signs of Incivilities	General Public	Built Environment Professionals
How much crime does graffiti attract?	1.08	1.09
How much crime does rubbish / litter attract?	0.71	0.63
How much crime does vandalism attract?	1.7	1.63
How much crime do poorly-maintained gardens attract?	0.59	0.18
How much crime does a vacant lot attract?	0.87	0.55
How much crime does a property with boarded up windows attract?	1.45	1.54

Figure 8. Perceptions of Specific Crimes Associated with Incivilities

Several of the signs of incivilities scored below 1, indicating they were not perceived to attract crime and include rubbish / litter, poorly-maintained gardens and vacant lots. Graffiti scored just over 1 and was perceived to attract ‘a little’ crime. Significantly, Figure 8 indicates that vandalism was considered to be most likely to attract crime, along with boarded up windows across both groups. Interestingly, a much higher proportion of the general public, perceived poorly-maintained gardens to attract crime. However, both groups considered this to be unlikely.

Following these initial general questions, all the respondents were shown photographs of the two images and asked a series of questions. The first, asked how likely it was that a range of illegal behaviours occurred at the property. These included squatting, vandalism, graffiti, burglary, drug-dealing, and kidnapping and are set out in Figure 9 below.

Type of Crime or Incivility	Poorly-Maintained House (A) Perceived Probability		Well-Maintained House (B) Perceived Probability	
	General Public	BEPs	General Public	BEPs
Squatting	1.47- Very likely	1.63 - Very likely	0.09 - Not likely	0.00 - Not likely
Vandalism	1.56 - Very likely	1.72 - Very likely	0.23 - Not likely	0.18 - Not Likely
Graffiti	1.6 - Very likely	1.63 - Very likely	0.28 - Not likely	0.18 - Not Likely
Burglary	0.97 - Likely	0.63 - Not likely	0.63 - Not likely	0.63 - Not Likely
Drug-Dealing	1.21 - Likely	1.18 - Likely	0.27 - Not likely	0.18 - Not Likely
Kidnapping	0.53 - Not likely	0.36 – Not likely	0.11 - Not likely	0.18 - Not Likely
Total Probability (/12)	7.34 High (61%)	7.15 High (60%)	1.66 Low (13%)	1.17 Low (10%)

Figure 9. Perceived Crime Probability for House A and House B

Note: Given the possible responses were 0 (not likely), 1 (likely) or 2 (very likely), the average scores are categorised in three broadly similar scales. Scores of 0-0.67 are categorised as ‘unlikely’, 0.68-1.34 is ‘likely’ and 1.35-2 is ‘very likely’.

Overall, the poorly-maintained House A was perceived to be associated with a higher probability of crime / incivilities across all categories. For both groups, vandalism, graffiti and squatting were perceived to be most likely in House A (poorly-maintained). For both groups, burglary was not perceived to be likely in either of the images. This may be partially explained by the fact that House A showed no sign of occupancy – and therefore no potential rewards / valuables. House B’s perceived low risk of burglary may be related to its high CPTED rating and perception that residents may be more likely to intervene. However, burglary was nonetheless perceived to be the most likely of all the crimes / incivilities to

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occur in the well-maintained House B. Figure 10, below, discusses the remaining responses related to the CPTED concept of territoriality and the perceptions of guardianship / resident intervention and ‘eyes on the street’.

Statement	Poorly-Maintained House (A)		Well-Maintained House (B)	
	General Public % agreement	BEPs % agreement	General Public % agreement	BEPs % agreement
Owners are proud of their property	3	0	95	100
Owners are able to notice strangers	29	17	81	100
Residents would intervene if they noticed a crime / incident	16	18	51	92
Public / private space is clearly defined	86	82	96	100
You would not avoid walking passed this house	13	33	88	100
Average Territoriality % Score	29	30	82	98

Figure 10. Territoriality and Guardianship

As expected, the general public and the BEPs strongly agreed that the owners were proud of their property for House B, but not so for House A. Noticing strangers and intervention from residents was also perceived by both groups to be more likely in the well-maintained House B, rather than in House A. It is interesting that 51% of the general public compared to 92% of the BEPs felt that the residents in House B would intervene if they noticed a crime / incident in the street. This finding is not easily explained and further research appears to be necessary to explore this in more detail.

Figure 10 reveals that in terms of the definition of public and private space, House B was considered to be more clearly defined than House A, but the difference was marginal. This is potentially explained by the similar and relatively constant physical built form of the house, veranda, garden and the front wall.

Additionally, both groups expressed that they would be more comfortable walking past House B (well-maintained) than they would walking past House A. Indeed, a significant number (87% of the general public and 67% of the BEPs) indicated they would avoid walking past the poorly-maintained House A.

In the final section of the survey, respondents were asked questions concerning what should be done, who should carry out the work and bear the cost and when the work should be completed. Although the focus of this research was not to research different approaches to managing the issue of vacant buildings, it is interesting to reflect the respondents’ perceptions about responsibility, outcomes and timelines in relation to the poorly-maintained House A. Figure 11 summarises the most popular responses.

	General Public % agreement	BEPs % agreement
Who is responsible for maintaining House B?		
Owner(s)	91 (n=133)	92 (n=11)
Council	7 (n=10)	8 (n=1)
What actions should be done to rectify the situation?		
Refurbish or bulldoze it	56 (n=86)	58 (n=7)
Council to take appropriate measures based on health / risk assessment	30 (n=46)	42 (n=5)
Owners should be given incentive to take action	9.0 (n=14)	0
How quickly should action be taken?		
Immediately (e.g. within the year)	65 (n=99)	46 (n=6)
Relative to the risk / number of complaints	16 (n=24)	31 (n=4)
After adequate notice/warnings has been given to the owner over a specific time	10 (n=15)	31 (n=4)
Who should pay for it?		
Owners	36 (n=55)	92 (n=11)
Local council	33 (n=49)	8 (n=1)
State government	12 (n=18)	0
Figure 11. Territoriality and Guardianship		

Note: more than one response was possible, so the total do not necessarily add up to 100.

Clearly, most respondents across both groups felt that the owners had responsibility for maintaining House B (poorly-maintained). Most of both groups (56% and 58%) believed the property should be bulldozed or renovated, with a lesser number suggesting the council should take appropriate measures based on health / risk assessment (30% and 42%). Most of the general public (65%) and the BEPs (46%) felt this should be carried out immediately (within a year), while some felt that action should be relative to risk and complaints made (BEPs, 31%) and after adequate warnings had been given to the owners (BEPs, 31%). However, there was some difference in terms of who should pay for demolition / renovation. Most of the BEPs (92% n=11), but less than half of the general public (36%, n=55) felt that owners should pay, while 33% (n=49) and 12% (n=18) suggested the local and State government should pay respectively.

Discussion and Conclusions

If we consider the findings of the CPTED Audit and the surveys, House A (poorly-maintained) received a much lower CPTED score (15%) than the well-maintained House B (with a score of 95%) and was perceived to attract more crime / incivilities. Furthermore, the surveys indicated that respondents perceived that CPTED qualities were much higher in the well-maintained property (House B). Importantly, guardianship was perceived to be significantly more likely in the well-maintained house. This underpins the work of Reynald and colleagues (e.g. Reynald and Efflers, 2009 Reynald, 2010a; 2010b; 2011; 2014), as well as supporting the Broken Windows theory (Wilson and Kelling, 1982). Generally speaking, the owner was considered to be responsible for the poorly-maintained House A and refurbishment / demolition within a year was recommended.

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Clearly, blighted landscapes and buildings can affect perceptions of CPTED. These findings support two of the hypotheses put forward by Wilson and Kelling (1982). Firstly, the research demonstrates vacant and abandoned buildings can increase safety concerns in residents and users and it can undermine the capacity of the community to police itself.

Given these findings, local governments should consider formalizing procedures for monitoring the number and extent of vacancy in their jurisdictions and developing both policy-based and practical responses. This study has also highlighted the fact that CPTED is not a one-off, outcome-based design solution. Rather, CPTED is a process where risks need to be monitored and managed throughout the development process, from the 'cradle to the grave' (Cozens, 2014).

This paper has provided some insights into how vacant, poorly-maintained properties are perceived and it also highlights important areas for future study. More research is certainly required to better understand the extent of vacancy / abandonment in Australia. Furthermore, a review of international 'best practice' approaches to vacant / abandoned housing also represents a potential avenue of further work. It would also be intriguing to investigate locations where the tipping point may have been reached and the spiral of decline has set in. In particular, research might ask if the 3-6% threshold is relevant in the Australian context? Finally, research into the perceptions of offenders would potentially provide further insights into this field of study.

Given the ten impacts that vacant housing could potentially have on the community (discussed earlier), forewarned is forearmed, particularly if economic fortunes change in Australia and vacancy becomes as much of a problem as it is in the USA or the UK.

Finally, we might reflect upon Jane Jacobs' (1961) ideas, and conclude that the findings from this research indicate that vacant and abandoned properties do not contribute any 'natural proprietors of the street' to take part in the 'ballet of the good city sidewalk'. Turning this around is arguably a priority in terms of enhancing personal and public safety and urban sustainability as well as for promoting healthier and more liveable communities.

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Published as: Cozens, P. and Tarca,, M. 2016. Exploring housing maintenance and vacancy in Western Australia: Perceptions of crime and crime prevention through environmental design (CPTED). *Property Management*. 34 (3): pp. 199-220.

Transportation Research Part A: Policy and Practice, Volume 69, November 2014, Pages 432-446.

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