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**Sustaining the Crime Reduction Impact of Designing out Crime: Re-evaluating
the Secured by Design Scheme Ten Years On.**

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Secured by Design (SBD) is an award scheme which aims to encourage housing developers to design out crime at the planning or concept stage. The scheme is managed by the Association of Chief Police Officers Crime Reduction Initiatives (ACPO CPI) whilst the day-to-day delivery of the scheme is conducted by Architectural Liaison Officers (ALOs) or Crime Prevention Design Advisors (CPDAs) working for individual police forces throughout the United Kingdom. The scheme sets standards for compliance which developments must meet to be awarded SBD status. This paper presents the findings of research conducted over a ten-year period (1999-2009) into the effectiveness of the SBD scheme as a crime reduction measure. Utilising a variety of methods, the research aims to establish whether residents living within SBD developments experience less crime and fear of crime than their non-SBD counterparts; whether SBD developments show less visual signs of crime and disorder than their non-SBD counterparts, and finally, whether properties built to the SBD standard are able to sustain any crime reduction benefits over a ten-year period.

Key words: Crime, burglary, Secured by Design (SBD), Architectural Liaison Officer (ALO), Crime Prevention Design Advisor (CPDA), sustainability.

INTRODUCTION

This paper presents the findings of a re-evaluation of Secured by Design (SBD) housing within West Yorkshire, England which was conducted in 2009. The research was jointly funded by the University of Huddersfield, West Yorkshire Police and ACPO CPI and built upon an evaluation of SBD housing within West Yorkshire which was conducted in 1999 (Armitage, 2000). Although this paper presents the findings of a mixed-methods study, designed to ascertain the extent to which SBD status impacts upon levels of crime and levels of fear of crime, the reader is asked to keep in mind that this was a very small study, with total funding of approximately £12,000. The limited costs placed a restriction on the collection of data for the residents' survey, restricting the methods available and, therefore, the sample size achieved. However, although caution is urged when interpreting some of the findings, it is hoped that the results present an indication of the performance of the Secured by Design scheme, and also highlight the need to monitor the life-cycle of crime reduction measures.

The rationale for conducting the re-evaluation was threefold. The first was that in June 2008 (shortly before the research was commissioned), a property on Quaver Lane in Bradford became the 10,000th SBD dwelling to be built in West Yorkshire. The associated publicity and meeting of this milestone led West Yorkshire Police to reassess their performance as an Architectural Liaison Unit and to question the progress made since SBD was launched. The second rationale for the re-evaluation was that 2009 marked the ten-year anniversary of the original evaluation of SBD in West Yorkshire, which had received considerable attention because of its encouraging findings. The final and central rationale was the need to update the findings of the

original evaluation to include a more recently developed sample of properties and one which would reflect the standard of SBD in 2009 as opposed to that utilised in 1999.

Updating the Sample

The review of literature outlines the findings of the original evaluation in some detail; however, a brief summary of those methods should assist the reader in appreciating the importance of replicating the original study, but with a more recently developed sample of properties. The analysis within the original evaluation included three major strands. The first looked at police recorded crime and compared 25 matched pairs (25 SBD and 25 non-SBD developments) to establish whether there was a significant difference between the crime rates within these matched pairs. The second method utilised the same sample of 25 SBD and 25 non-SBD developments, but instead of looking at police recorded crime, this utilised a survey of residents who were personally asked about their experiences, fears and perceptions of crime and disorder (through face-to-face interviews). The final strand of the original evaluation looked at whether SBD was improving as a standard – were estates built more recently performing better than older estates?

Although the findings were extremely positive, one of the major weaknesses of the study (as time has progressed) is that the sample of estates were all built between 1994 and 1998. The study began in 1999 and for developments to be included within the sample, residents had to have been living within the developments for at least one-year to ensure that there was sufficient crime data to validate the analysis. Therefore, developments built post 1998 were excluded from the sample. Unfortunately, many changes in the SBD standard were introduced in 1999 and thus not accounted for

within the evaluation. Although it is beyond the scope of this paper to provide a detailed review of specific SBD standards, a brief summary of the major changes which took place between 1989 (when the scheme was launched) and 1999 (when the original evaluation began) is outlined in the table below¹.

Table 1: Changes in Physical Security Standards for SBD (1989-1999)

Time Period	Physical Security Standards
1989	SBD was launched in 1989 with window and door requirements based upon 'specification' as there were no specific standards for such products at this time. The windows section of SBD was very basic, with a requirement only for windows to be lockable (with a key). Requirements for doors mirrored those within the National House Building Council security section.
1992	In 1992, A National Technical Committee for SBD was formed. Window and door standards were still specification led at this stage.
Early 1990s	The first true 'performance' based standards (GGF 6.6: Specification for Improved Security, Part 1 Casement and Tilt and Turn Windows) was introduced in the early 1990s, however, this was not formally referenced as a SBD standard and only promoted to window manufacturers by a small number of ALOs.
1994	PAS 011: 1994 was adopted as a 'test' standard for SBD windows by the majority of police forces, however, it was never formally written into SBD requirements.
1997	GGF 6.6.2: Specification for Improved Security – Single Handed Residential Doorsets, was published in 1997, however, again this never became a national SBD requirement, although it was utilised by some ALOs.
1999	The first major revision to SBD took place in 1999. This was the most significant change in terms of physical security as it signalled the end of specification led door and window requirements and the introduction of performance led requirements - PAS 24: 1999 and BS 7950: 1997. The introduction of these standards removed any subjectivity and ensured that a consistent level of security was being offered by manufacturers.

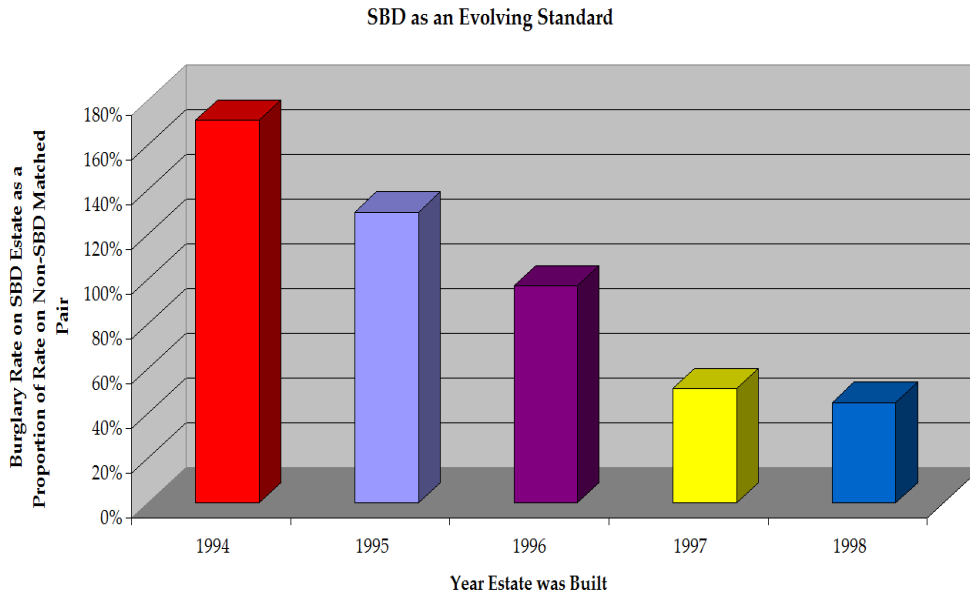
The period post 1998 also saw many changes in the way that SBD was managed and implemented both within West Yorkshire and nationally. These changes included an increase in the number of ALO/CPDAs working within each police forceⁱⁱ, improvements in local and national planning policy to incentivise the SBD standard and (supported by these changes) a move towards pre-planning consultation as opposed to involvement at the planning application (or post-application) stage. This meant that even though the findings were extremely positive, they were not an accurate reflection of the current standard and were likely to be presenting a less favourable picture than a more recent sample might provide.

SBD as an Evolving Standard

The findings from the original evaluation also revealed an interesting pattern which suggested that the performance of SBD had also been improving over the previous five-year period. As a means of measuring any improvements in the effectiveness of the scheme, the original evaluation compared the burglary rates of SBD estates built in 1994 through to 1998 with their non-SBD matched pairs. The results revealed a year on year improvement in the performance of SBD. The mean burglary rate for SBD estates built in 1994 was 171% of the burglary rate for non-SBD estates built in 1994. The mean burglary rate for SBD estates built in 1995 was 130% of the burglary rate for non-SBD estates built in 1995. For estates built in 1996 the figure was 97%, for 1997 the figure was 51% and for SBD estates built in 1998, the mean burglary rate was 45% of the burglary rate for the non-SBD matched pairs. These results suggest that until 1996, the SBD estates were actually experiencing more burglary than their matched pairs - in the case of estates built in 1994, almost twice as much. However, SBD estates built in 1998 were experiencing less than half of the burglary of their

non-SBD counterparts – a vast improvement. Although there were major changes to the standards of physical security introduced in 1999 (see table one) – suggesting that between 1994 and 1998 the general standard of the scheme was relatively uniform, it is clear that the performance of SBD within West Yorkshire was improving over this five year period. Without further detailed research to investigate the procedures implemented over that period, it is difficult to give a specific explanation for these improvements. However, the author suspects that the improvement in the performance of the scheme is likely to be linked to a combination of the following changes: An increase in ALO numbers – thereby allowing a more detailed assessment of schemes prior to awarding SBD status; an increasing recognition of the status of the award and, therefore, a pressure to ensure that standards were met; a greater understanding of the principles of the scheme amongst ALOs (even without the physical security changes) and, therefore, an improvement in their ability to ensure that the basic CPTED principles were met; and finally, the introduction of minor changes to the standard over that five-year period.

Figure One: Burglary Rate on SBD Estates as a Proportion of Non-SBD Matched Pairs (1994-1998).



Given that the SBD scheme had improved so dramatically within that five-year period, there was a likelihood that (post-1999) this pattern would continue, or more likely, (given the introduction of new standards to the physical security requirements in 1999), that the scheme would improve at a greater rate. Although there is no certainty that this pattern would continue, the risk that the findings reported in the original evaluation did not reflect the current standard of the scheme, warranted a re-investigation of its performance.

REVIEW OF THE LITERATURE

The Secured by Design Scheme

SBD is an award scheme, managed by ACPO CPI which aims to encourage the building industry to design out crime at the planning stage. SBD was devised in 1989 by police forces based within the South East of England, with the aim of countering

the rise in household burglary (Pascoe and Topping, 1997). Although the scheme is owned and managed by ACPO CPI, it is run on a day-to-day basis by local police ALOs or CPDAs whose role it is to ensure that developments are designed and built to certain specifications. In an attempt to establish how far the SBD scheme was theoretically and empirically supported at the time of its inception, Pascoe and Topping (1997) conducted a review of the available documentation as well as interviews with 15 police officers. They suggest that the scheme was influenced by both environmental criminology (including situational crime prevention and defensible space) as well as theories which focused upon offenders as decision makers (including rational choice theory). A recent national evaluation of ALO and CPDA services (Wootton *et al*, 2009) revealed that in August 2009 there were 305 ALO/CPDAs in England and Wales. The number of ALO/CPDAs within individual forces varied considerably from one in Bedfordshire and Dorset Police Forces to 52 within the Metropolitan Police, 16 within West Midlands Police and 13 within Avon and Somerset and Kent Policeⁱⁱⁱ. Numbers of SBD applications also varies considerably, with forces such as the Metropolitan Police processing 775 within the one year period March 2008 - February 2009, Thames Valley processing 287, Hampshire 237 and Greater Manchester Police 212, yet within that one year period, Cheshire Police only processed four, North Wales Police eight and Humberside 15.

The principles of SBD fall largely into the following categories:

- *Physical Security*: SBD sets standards of physical security for each property and its boundaries.
- *Surveillance*: SBD estates are designed to achieve maximum natural surveillance without compromising the need for privacy.

- *Access/Egress*: SBD estates are designed to include a minimum number of access/egress points in an attempt to avoid unnecessary entry onto the estate by non-residents and potential offenders.
- *Territoriality*: In an attempt to achieve maximum informal social control, SBD draws upon Newman's principles of Defensible Space (1973). If space has a clearly defined ownership, purpose and role, it is evident to residents within the neighbourhood who should, and more importantly who should not be in a given area.
- *Management and Maintenance*: SBD estates should have a programmed management system in place to maintain the area. This includes the removal of litter and graffiti.

Evaluating the Effectiveness of SBD

There have been four published evaluations of the effectiveness of the SBD scheme (Brown, 1999; Pascoe, 1999; Armitage, 2000, Teedon and Reid, 2009) each concluding that SBD confers a crime reduction advantage.

Using police recorded crime data, residents' surveys and focus groups with local residents, Pascoe (1999) found that both the residents' perceived levels of crime and the actual levels of crime had been reduced following modernisation to SBD standards on ten estates within the UK.

A second evaluation of Secured by Design Housing revealed positive results in terms of crime reduction and prevention. This evaluation was carried out in Gwent, South Wales (Brown, 1999) and involved an analysis of police recorded crime data

alongside structured interviews with police officers, housing association managers, architects and tenants. The results revealed that SBD properties experienced at least 40% less burglaries and vehicle related crime, and 25% less criminal damage than the non-SBD properties. There was no evidence of crime switch; however, there was evidence of temporal displacement from daylight to night time, where surveillance was limited. The results from qualitative interviews reflected the findings from the quantitative analysis with fear of crime lower and quality of life higher on SBD as opposed to non-SBD estates.

Teedon and Reid (2009) conducted an evaluation of SBD in Glasgow, Scotland. The results revealed that total housebreaking crime reduced by 61% following the introduction of SBD. This is compared to a reduction of just 17% in the comparison area.

Armitage (2000) used a mixed methodology to establish whether residents living on SBD estates were experiencing less crime than their non-SBD counterparts; whether residents living on SBD estates were experiencing less fear of crime than their non-SBD counterparts; whether SBD was simply displacing crime and whether the SBD scheme was improving.

Estates which had been refurbished to the SBD standard (there were two within the sample) were analysed on a before and after basis. Analysis of recorded crime levels (pre and post certification to SBD) revealed that for both estates total crime fell by 55% relative to the pre-SBD period. For the analysis of new-build properties, 25 SBD estates (660 dwellings) were each assigned to a matched pair which was selected

according to age, location, housing tenure and physical/environmental characteristics. The results revealed that the mean crime rate within the SBD sample was 0.70. This was compared to a non-SBD rate of 0.94. Statistical analysis (Wilcoxon) revealed that the difference between the crime rate within the SBD sample and Non-SBD sample was not statistically significant at a probability of 0.05. When excluding all crimes other than burglary in a dwelling, the results revealed that the mean burglary rate within the SBD sample was 0.17; this was compared to a rate of 0.29 within the non-SBD sample. As with total crime, statistical analysis (Wilcoxon) revealed that the difference between the burglary rate on SBD and Non-SBD estates was not significant at the level of 0.05.

Of the 36 crime categories that were analysed as part of the evaluation, the only crimes which were higher within the SBD sample were damage related offences, ABH and GBH. Although ABH and GBH were slightly higher within the SBD sample, further analysis of the *modus operandi* revealed that this could not be a result of escalation (whereby an offender increases their use of violence during burglary offences due to the frustration at being unable to overcome security measures), as both the threat of and use of violence in burglary offences were much lower within the SBD sample^{iv}. The higher levels of damage related offences may be explained by the fact that attempted burglaries were often categorised as damage offences, even though the motive was clearly an attempt to break in. An increase in attempted burglaries (even though these appear to have been categorised as damage offences) could be seen as a positive for SBD as the offender has failed to enter the property.

As well as the analysis of police recorded crime, a residents' survey took place as a means of measuring residents' actual (as opposed to reported) experiences of crime as well as their fears, perceptions and concerns regarding crime and disorder within their neighbourhood. Two hundred and fifty SBD and 250 non-SBD addresses were visited as part of the residents' survey, with a response rate of 47%. The results revealed that 2.9% of SBD respondents had been burgled within the previous year; this was compared to 8.4% of non-SBD respondents and 4.3% of British Crime Survey (BCS) respondents^v (Mirlees-Black *et al.*, 1998). In terms of fear of crime, when asked how safe they felt when walking alone after dark, 11.4% of SBD respondents felt very unsafe compared to 19.1% of non-SBD respondents and 11% of BCS respondents. 3.8% of SBD respondents felt very unsafe at home alone at night compared to 7.6% of non-SBD respondents and 2% of BCS respondents. 57.1% of SBD respondents felt safer in their present home than the previous house in which they lived compared to only 49.6% of non-SBD respondents.

In addition to evaluating the effectiveness of the scheme as a crime reduction measure, several studies have concluded that the SBD scheme is cost-effective, or at least cost-neutral (Armitage, 2000; Association of British Insurers, 2006; Teedon and Reid, 2009). Armitage (unpublished) concluded that, taking the average additional cost of building to the SBD standard to be £795^{vi}, calculating the additional crimes taking at a sample of SBD properties in the one year period January to December 1999 (Armitage, 2000), and the costs of these additional crimes as estimated by Brand and Price (2000), that the total saving per property of building to the SBD standard was £5.97 per year^{vii}. A recent report (Davis Langdon, 2010) suggests that the additional cost of building a property to the SBD standard may be much lower than

the £795 suggested by Armitage (unpublished) or the £630 reported by the ABI in 2006. The figure suggested by Davis Langdon (2010) suggests that the over-costs of building to the SBD standard are £200 for a four-bedroom detached house, £170 for a three or two-bedroom detached house, £240 for a ground floor apartment and £70 for an upper floor apartment.

As well as evaluations of the SBD scheme as a whole, there has been an abundance of studies which have revealed that the principles upon which SBD is based each work to reduce crime, disorder and the fear of crime. These include: *increasing physical security* (Cromwell and Olson, 1991; Budd, 2001; Armitage, 2006). *Minimising access, through movement and connectivity* (Bevis and Nutter, 1977; Rubenstein *et al.*, 1980; Taylor and Gottfredson, 1987; Van der Voordt and Van Wegen, 1990; White, 1990; Poyner and Webb, 1991; Matthews, 1992; Atlas and LeBlanc, 1994; Beavon *et al.*, 1994; Newman, 1995, 1996; Lasley, 1998; Mirlees-Black *et al.*, 1998; Rengert and Hakim, 1998; Zavoski *et al.*, 1999; Hakim *et al.*, 2001; Taylor, 2002; Nubani and Wineman, 2005; Armitage, 2006; Yang, 2006; Johnson and Bowers, 2010). *Increasing surveillance* (Repetto, 1974; Winchester and Jackson, 1982; Brown and Altman, 1983; Coleman, 1986; Taylor and Gottfredson, 1987; Van der Voordt and Van Wegen, 1990; Cromwell and Olson, 1991; Brown and Bentley, 1993; Groff and LaVigne, 2001); and *managing and maintaining* developments (Zimbardo, 1970; Finnie, 1973; Wilson and Kelling, 1982; Taylor and Gottfredson, 1987; Skogan, 1990; Cozens *et al.*, 2001a, 2001b, 2002a, 2002b, 2002c and Armitage, 2006).

Which Elements of SBD are working to Reduce Crime?

Although this study did not investigate the impact of the specific elements of SBD upon levels of crime (such as physical security, surveillance, territoriality), much has been written regarding the impact of these environmental factors upon levels of crime and disorder. Key findings from the literature are summarised in the tables below.

Table 2: Summary of Research Relating to the Impact of Surveillance and Visibility on Levels of Crime

Design Feature	Author(s)	Impact on Crime
Property with poor visual access to neighbouring properties, public area, local amenities.	Repetto (1974); Winchester and Jackson (1982); Brown and Altman (1983); Van der Voordt and Van Wegen (1990)	More attractive to offenders and/or more likely to have experienced a burglary.
Flats where entrance faces inside of estate and/or is set back from the road.	Coleman (1986)	More likely to experience social and physical decay.
Property is isolated; Property is located in an area with less than five houses in sight; Property is set at a distance from the road on which it stands. Property is set at a distance from the nearest house.	Winchester and Jackson (1982)	More likely to experience burglary.
Property is not overlooked at the front or on either side by other houses.	Winchester and Jackson (1982); Armitage (2006)	More likely to experience burglary.
Property is located on the nearest main road.	Winchester and Jackson (1982); Armitage (2006); Groff and La Vigne (2001) ^{viii}	More likely to experience burglary.
Property adjoins a four-lane road.	Taylor and Gottfredson (1987)	More likely to experience burglary.
Property is close to an exit from a major thoroughfare.	Taylor and Gottfredson (1987)	More likely to experience burglary.
Property located within close proximity to a stop sign, traffic lights, commercial business establishment, park, church or four-lane street.	Cromwell and Olson; Armitage (2006) ^{ix}	More attractive to offenders.

Property in dark (as opposed to illuminated) area.	Groff and La Vigne (2001); Van der Voordt and Van Wegen (1990)	More likely to experience burglary.
Property is visible from nearby footpath	Armitage (2006)	More likely to have experienced prior victimisation.

Table 3: Summary of Research Relating to the Impact of Territoriality on Levels of Crime

Design Feature	Author(s)	Impact on Crime
Properties showing signs of territorial concern	Brown and Bentley (1983)	Perceived by burglars to be less vulnerable to burglary
Properties with real or symbolic barriers	Brown and Altman (1983); Armitage (2006)	Less likely to have experienced a burglary
Properties considered to be architecturally defensible	Merry (1981)	Just as vulnerable to crime than those considered not architecturally defensible

Table 4: Summary of Research Relating to the Impact of Management and Maintenance on Crime

Design Feature	Author(s)	Impact on Crime
Well-maintained option of five housing designs - detached, semi-detached, terraced, low-rise flats and high rise flats.	Cozens <i>et a</i> (2001a; 2001b; 2002a; 2002b; 2002c)	Perceived by elderly residents, convicted burglars, planning professionals, police and young adults to be less vulnerable to burglary.
Properties showing brief and long term desertion, heavy litter/graffiti and some or many signs of disrepair.	Armitage (2006)	More likely to have experienced prior victimisation.
Presence of physical incivilities.	Taylor and Gottfredson (1987)	Offender perceives residents as less likely to intervene if an offence takes place.

Table 5: Summary of Research Relating to the Impact of the Design of Parking on Levels of Crime

Design Feature	Author(s)	Impact on Crime
Property without garage or with open carport	Brown and Altman (1983); Cromwell and Olson (1991)	Perceived by offenders to be more vulnerable to burglary

Table 6: Summary of Research Relating to the Impact of Security Measures on Levels of Crime

Design Feature	Author(s)	Impact on Crime
Property with alarm system or sticker warning of alarm system	Cromwell and Olson (1991)	Perceived by offenders to be more vulnerable to burglary
Properties with security measures	Budd (1991; 2001)	Experienced lower levels of burglary than those without
Property in Neighbourhood Watch area	Armitage (2006)	Less likely to be a victim of burglary

Table 7: Summary of Research Relating to the Impact of Road Layout on Levels of Crime

Design Feature	Author(s)	Impact on Crime
Property located on a development with high levels of through-movement	Bevis and Nutter (1977); Rubenstein <i>et al</i> (1980); Taylor and Gottfredson (1987); Van der Voordt and Van Wegen (1990); White (1990); Poyner and Webb (1991); Beavon <i>et al</i> (1994); Mirlees Black <i>et al</i> (1998); Rengert and Hakim (1998); Hakim <i>et al</i> (2001); Taylor (2002) Nubani and Wineman (2005); Yang (2006); Armitage (2006)	Experienced higher levels of burglary than properties on developments with low levels of through-movement.
Closing off streets	Matthews (1992); Atlas and LeBlanc (1994); Newman (1995, 1996); Lasley (1998); Zavoski <i>et al</i> (1999); Eck (2002)	Reduces crime
Property located in a travel path	Letkemann (1973); Brantingham and Brantingham (1984); Feeney (1986); Gabor <i>et al</i> (1987); Poyner and Webb (1991); Wiles and Costello (2000); Rengert and Wasilchick (2000)	Experienced higher levels of burglary than those not on travel paths.

Property located on a true cul-de-sac	Bevis and Nutter (1977); Armitage (2006); Johnson and Bowers (2010)	Experienced lowest levels of burglary
Property located on a leaky cul-de-sac	Hillier (2004); Armitage (2006)	Experienced highest levels of burglary
Property located on a development with high levels of through-movement	Hillier and Shu (1998); Shu (2000); Hillier (2004); Hillier and Sahbaz (2009)	Experienced lowest levels of crime.

An interesting finding of a previous investigation into the impact of environmental factors on levels of crime (Armitage, 2005) revealed that, although the factors presented above (such as minimising through movement, maximising natural surveillance, minimising litter, graffiti and vandalism) each confer a crime reduction advantage, properties built to the SBD standard between 1994 and 1998 did not necessarily adhere to these principles. The study awarded a Burgess Score based upon the number of environmental factors possessed by a property - a high score was positively associated with higher levels of crime (see Armitage, 2006 for a detailed discussion). However, a detailed analysis of the sample of 1058 properties showed that, although non-burgled properties (SBD or non-SBD) had lower Burgess Scores (than burgled properties), SBD properties had higher Burgess Scores (burgled and non-burgled) than the non-SBD sample. This findings suggests that the crime reduction benefits achieved by the SBD sample were achieved in spite of, not because of the environmental factors which the properties possessed, and that the value of SBD derives from variables other than those measured by this checklist (such as physical security).

METHODOLOGY

In an attempt to replicate the 1999 evaluation using an up to date sample, and to assess the long-term sustainability of any crime reduction impacts, the 2009 re-

evaluation utilised a variety of different methods and datasets. These included police recorded crime, self-reported crime (through a residents' survey) and visual audits (as assessed by the authors). It should be highlighted at this stage, that although the methodology included a mix of methods and datasets, the results of the self-reported crime section must be treated with some caution due to the limited number of responses, and therefore the small sample size.

Analysis of Police Recorded Crime

SBD Versus West Yorkshire

The analysis of police recorded crime data included three separate samples. The first sample compared crime rates on the 16 SBD developments which had been built in West Yorkshire in 2006/2007 (342 properties) with crime rates for the whole of West Yorkshire. The rationale for selecting the 16 SBD developments built in this period was that these were the most recent SBD developments built within West Yorkshire - still allowing one complete year of crime data for the analysis. The analysis included the crime categories: Assault, criminal damage, theft, burglary other, theft of a vehicle, theft from vehicle, burglary dwelling and 'other^x', and the period of analysis was August 2007 to July 2008. Crime totals were converted into rates per 1000 properties for both the SBD and non-SBD samples. Crime rates were compared for the SBD and non-SBD sample with further analysis of statistical significance presented.

SBD against Non-SBD: Same Street Analysis

The second level of analysis included SBD and non-SBD properties which were located on the same street. Where this occurred, this was often a large non-SBD

development that included a small proportion of SBD properties. In other cases, the SBD section of the sample was a block of apartments located on (or just off) a street of non-SBD properties. Eleven streets (of the 16) were included within this analysis - this included 455 properties (101 SBD and 354 non-SBD). Crime rates were analysed for all crime categories for the SBD and non-SBD sample, with the statistical significance of any differences presented. The time period of analysis was again August 2007 to July 2008.

SBD Versus Non-SBD: Matched Pairs Analysis

The third level of analysis involved creating 16 matched pairs. This included the 16 SBD developments built in West Yorkshire during 2006/2007 as well as 16 non-SBD matched pairs. The comparison developments were selected based upon location only – that is, they were the nearest non-SBD development to each of the 16 SBD developments. Although the methodology aimed to replicate the creation of matched pairs (as seen in the 1999 evaluation), changes in housing policy meant that this was no longer possible in 2009. The original evaluation created matched pairs which were as similar as possible in terms of age, housing tenure and other environmental features. However, policy incentives and planning requirements meant that the vast majority of social housing built in the 2006/2007 was built to SBD standards. Therefore, the selection of same tenure non-SBD housing could not be achieved. Again, all crime categories were analysed for the time period August 2007 to July 2008. The analysis compared crime rates per 1000 dwellings with any statistical significance in differences presented.

The analysis of crime within the matched pairs sample also considered levels of repeat victimisation, comparing both SBD versus non-SBD and levels in 1999 as compared to 2009. Repeat victimisation is the recurrence of crime in the same places or against the same people. The Home Office definition states that repeat victimisation occurs “...when the same person or place suffers from more than one incident over a specified period of time” (Bridgeman and Hobbs, 1997, cited in Pease, 1998 p. 1). Repeat victimisation measures the concentration of crime – this being the average number of victimisations per victim (incidence divided by prevalence), as opposed to incidence (the more common measure of crime) which measures the average number of victimisations per population at risk of victimisation.

Assessing the Sustainability of Crime Reduction Impacts

In an attempt to establish the extent to which developments analysed within the original evaluation had improved, deteriorated or remained the same over the ten-year period of 1999 to 2009, two of the original 25 matched pairs were randomly selected and crime rates were compared between 1999 and 2009.

Analysis of Self-Reported Crime

As a means of gathering data on residents’ experiences and perceptions of crime and disorder within their area, all residents living at the 16 SBD and 16 non-SBD matched pairs (342 SBD and 253 non-SBD residents) were invited to complete a survey (available from the authors). The survey was based upon both the British Crime Survey and the survey utilised within the 1999 evaluation to ensure that comparisons could be made. Unfortunately, although the survey was sent to 595 properties, only 68 residents returned the survey, giving a response rate of 11%^{xi}. Although the figures

presented are too small to identify whether relationships were statistically significant, the authors felt it worthwhile to present the results, but these should be treated as indicative only.

Visual Audits

Visual audits took place at the 16 SBD and 16 non-SBD matched pair developments. These were designed to measure visual signs of crime and disorder such as graffiti, broken glass, damaged street furniture and litter (the visual audit schedule is available from the authors). The visual audits took place over a three-day period, with each matched pair visited on the same day and at approximately the same time. Two researchers each independently completed the visual audit schedule for each of the 16 SBD and 16 non-SBD developments with the scores allocated to each development representing the mean score awarded by the two researchers. Although the researchers completed the visual audit schedule independently, discussions took place before leaving the site to ascertain whether scores differed. Where scores differed, the researchers discussed their independent views to establish whether this was a genuine difference of opinion or whether the assessment was incorrect. In terms of inter-rater reliability, of the 32 developments, the two researchers differed in their scoring at twelve sites. Of a total of 896 scores (28 factors multiplied by 32 developments), different scores were awarded on 20 occasions. At each of these, the difference between scores differed by no more than one (on a scale of zero to five).

Visual audit scores were compared both for each individual matched pair and for the SBD and non-SBD total samples. Scores were assigned on the basis of low being a positive and high being a negative, for example, vandalism to buildings would be

scored as zero for no evidence of vandalism and five as a high level of vandalism. Therefore, a high overall score would represent a negative finding and a low score a positive finding.

KEY FINDINGS

Police Recorded Crime Data

SBD Versus West Yorkshire

As was highlighted within the methodology section, the first section of the analysis of police recorded crime data involved comparing crimes within the SBD sample (SBD properties built in 2006/2007) with crimes across West Yorkshire as a whole. A total of 19,701 domestic burglaries were reported in West Yorkshire between August 2007 and July 2008, however, only two burglary dwellings were committed against the SBD sample within this time period. This represents a rate of 5.8 burglaries per 1000 properties within the SBD sample and 22.7 (per 1000 properties) within West Yorkshire as a whole. The difference between burglary rates within the SBD and non-SBD samples were found to be statistically significant (Wilcoxon Signed Ranks Test $p < 0.01$).

Same Street Analysis

The second strand of analysis looked at crime rates on streets/developments that contained both SBD and non-SBD properties. A total of 105 crimes were committed within the same street sample between August 2007 and July 2008. Of these 105 offences, 93 were committed against non-SBD properties and 12 were committed against SBD properties. This equates to a rate of 262.7 crimes per 1000 households within the non-SBD sample and 118.8 crimes per 1000 households within the SBD

sample. This difference in rates was statistically significant (Wilcoxon Signed Ranks Test $p < 0.05$). No burglary dwellings were recorded against the SBD properties within this sample; however, five were recorded against the non-SBD sample. With the exception of criminal damage, rates for all crime categories analysed were higher within the non-SBD sample. These findings are summarised in table eight.

Table 8: Crime Categories recorded within the Same Street sample (August 2007-July 2008)

Crime Type	Non SBD		SBD		Significant Difference
	No.	Rate	No.	Rate	
Assault	24	67.8	0	0.00	$p < 0.05$
Criminal Damage	12	33.9	4	39.6	ns
Burglary Other	7	19.8	2	19.8	ns
Burglary Dwelling	5	14.1	0	0.00	$p < 0.05$
Theft from vehicle	7	19.8	0	0.00	$p < 0.05$
Theft of vehicle + TWOC	3	8.5	0	0.00	ns
Other	35	93.2	6	59.4	-
Total	93	262.7	12	118.8	$p < 0.05$

A strong, statistically significant correlation was identified between the proportion of SBD houses on a street and the rate of crimes recorded there (Spearman's rho -0.529 $p < 0.05$). This correlation was negative, suggesting that the lower the proportion of SBD homes on a street the higher the rate of crime. Similar correlations were identified between the proportion of SBD housing and the rate of burglary dwelling (-0.506), assault (-0.444) and criminal damage (-0.748), each of these correlations was statistically significant ($p < 0.01$).

Matched Pairs Analysis

The final strand of the analysis of police recorded crime involved creating 16 matched pairs of SBD and non-SBD developments. All crime categories were analysed for the time period August 2007 to July 2008. A total of 44 crimes were committed within the SBD sample during the time period analysed, this produced a rate of 128.7 per 1000 properties. This compares to 42 crimes committed on non-SBD developments, a higher rate of 166.0 per 1000 properties. The findings from this section of the analysis are less positive, and although the crime rate is slightly lower within the SBD sample (128.7 crimes per 1000 properties) as compared to the non-SBD sample (166 crimes per 1000 properties), this difference was not statistically significant (Wilcoxon signed ranks test = 0.570). When analysing the individual crime categories, although total crime, burglary dwelling and criminal damage were lower within the SBD sample, assault, burglary other and theft of and from vehicle were higher within the SBD sample, although none of these differences were statistically significant. Without further research using a larger sample of properties, it is not possible to say with any certainty why the results of the *matched pairs analysis* were less positive than those shown in the *same street analysis*. One possible explanation was discussed within the methodology section, this being that whilst the *same street analysis* compared SBD and non-SBD properties on the same street or part of the same development, the *matched pairs analysis* compared two separate developments – the SBD sample being social housing and the non-SBD being owner-occupied^{xii}.

**Table 9: Number and Rate of crimes Recorded in the Matched Pairs sample
(August 2007-July 2008)**

Crime Type	Non SBD		SBD		Significant Difference
	No.	Rate (per 1000 properties)	No.	Rate (per 1000 properties)	
Assault	7	27.7	17.0	49.7	ns
Criminal Damage	12	47.5	8.0	23.4	ns
Burglary Other	1	4.0	2.0	5.9	ns
Burglary Dwelling	2	7.9	2.0	5.9	ns
Theft from vehicle	1	4.0	2.0	5.9	ns
Theft of vehicle + twoc	0	0.0	3.0	8.8	ns
Other	19	75.1	9.0	26.3	ns
Total	42	166.0	44.0	128.7	ns

The findings from the *same street analysis* were positive, with those from the *matched pairs analysis* less so. Although burglary dwelling was lower within the SBD sample, the difference was not statistically significant and SBD status did not appear to be protecting against all crime categories. However, further analysis of the matched pairs sample revealed that levels of crime within the SBD (and non-SBD) sample do appear to have fallen in the ten year period between 1999 and 2009. In this 2009 study, the burglary dwelling rate per 1000 dwellings for the one-year period 2006/2007 was 5.9 for the SBD sample and 7.9 for the non-SBD sample. However, for the one-year period April 1999 to March 2000 the burglary rate for the SBD sample was 22.7 and for the non-SBD sample was 38.3. The figures for total crime were also positive. The 1999 evaluation showed that for the one-year period April 1999 to March 2000, the SBD sample experienced 187.9 offences per 1000 dwellings, compared to the 203.1

experienced by the non-SBD sample. In the 2009 study, the rate of total crime for the SBD sample was just 128.7, with 166 per 1000 dwellings for the non-SBD sample^{xiii}.

As well as crime incidence, the evaluation also looked at levels of repeat victimisation to establish whether SBD was protecting against crime repeats. Although the original evaluation of SBD in West Yorkshire (Armitage, 2000) had shown positive findings regarding the performance of SBD as a crime reduction measure, the impact of the scheme on repeat victimisation appeared to be less straightforward with levels of repeat burglary higher within the SBD sample. This finding suggested that, although SBD is more likely to prevent crime taking place, once the offender has found a weakness, either within the design of a property or the resident residing within that property, they were exploiting that weakness and committing repeat burglaries at a rate higher than that experienced by the non-SBD matched pairs. At first glance these findings appear contradictory; however, once considered in more detail, they make intuitive sense and are supported by other criminological research (Ellingworth *et al.*, 1997, Ashton *et al.*, 1998). Offenders often select a target based upon external cues such as the ease of access and perceptions of risk and reward. However, once the offender has burgled the property, they can base their decision to re-offend upon internal cues such as lifestyle and wealth – supporting the Event Dependency explanation for repeat victimisation^{xiv}.

Bearing this in mind, it was important for this re-evaluation of SBD within West Yorkshire to re-visit the issue of repeat victimisation and to attempt to establish whether this finding was still valid or whether SBD had improved as a protective factor against repeat victimisation. Utilising the matched pairs sample, levels of repeat

victimisation were analysed. The results revealed that repeat victimisation was again higher within the SBD sample, with 35.7% of crimes against the SBD sample representing a repeat offence, as compared to 27.3% of the crimes against the non-SBD sample. As was discussed within the earlier section, although the SBD sample experienced lower overall levels of crime, some crime types were higher within the SBD sample – these included assault, theft of and from vehicle and burglary other (see table nine). A closer scrutiny of the repeat victimisation data for the 2009 sample revealed that the main crime type impacting upon this increased level of repeat victimisation was assault. Further analysis of total crime data, removing assault offences, revealed that, whilst the percentage of crimes experienced which were repeat offences remained at 27.3% for the non-SBD sample, the proportion of repeat victimisations within the SBD sample reduced from 35.7% to 11.9%. It was not within the scope of this study to conduct a detailed analysis of offender *modus operandi* to establish whether these offences were linked to an escalation of violence (due to the offender's frustration at being unable to break into the property). However, a detailed analysis of the *modus operandi* of assaults within the original study (Armitage, 2000) concluded that the higher rate of assaults could not be linked to escalation as there was no use of violence in burglary offences against the SBD sample, however, violence was used in 1% of the burglaries against the non-SBD sample. Although it is unlikely that the requirements of SBD are heightening the levels of assault, the recurrence of this finding suggests that additional interventions - focused upon offences against the person, should be implemented to supplement the situational measures incorporated within SBD.

Assessing the Sustainability of Crime Reduction Impacts

In an attempt to assess the sustainability of any crime reduction impacts of the SBD scheme, the analysis also included a comparison of crime rates on two randomly selected matched pairs that had been included in the original 1999 evaluation. This involved comparing the crime rates for the one-year period April 1999 to March 2000 with the one-year period August 2007 to July 2008. The extraction of data included all crime categories that took place on these developments within those one-year periods. It should be highlighted that the two matched pairs were selected without prior knowledge of crime levels and subsequent inspection of crime data revealed that both of the developments experienced very low levels of crime (for both time periods). The small numbers preclude analysis of statistical significance, however, the authors felt that the findings should be presented as an indication of the performance of SBD, but also as an example of how further research within this field should consider the lifecycle of crime prevention measures (albeit, ideally, on a larger scale).

Table 10: Crime Rates on Matched Pair One

Development	Number of Properties	Number of Crimes 1999/2000	Crime Rate per 1000 in 1999/2000	Number of Crimes 2007/2008	Crime Rate in 2007/2008
SBD Street	14	1	71.43	1	71.43
Non-SBD Street	14	1	71.43	8	571.43

The analysis revealed that for matched pair one the crime rate for the SBD and non-SBD matched pair in 1999/2000 was 71.43 crimes per 1000 properties. This represents just one crime on each development and an identical crime rate (see table ten). The crime on the SBD development was a Taking Without Owners' Consent

(TWOC), the crime on the non-SBD development was a theft of pedal cycle. Analysing the crime rates in 2007/2008 for the same matched pair revealed that, although the crime rate on the SBD development had remained exactly the same – 71.43 crimes per 1000 properties (one crime), the crime rate on the matched pair had increased to eight crimes (571.43 per 1000 offences). The one crime which took place on the SBD development in 2007/2008 was again a TWOC (the same crime as the 1999/2000 analysis). The crimes which took place on the non-SBD development were: Three criminal damage to dwelling offences, one criminal damage to motor vehicle, one interference with motor vehicle, one TWOC, one assault and one theft non specific. The reader is reminded to treat these findings as indicative as the crime numbers for both samples, and for both time periods, are very small.

Table eleven displays the number and rate of crimes on matched pair two. The analysis revealed that the crime rate for the SBD development in 1999/2000 was 45.45 per 1000 properties (just one crime offence). On the non-SBD development, the crime rate was 178.57 per 1000 properties (with five crimes taking place within that one-year period). The crime on the SBD development was a damage to motor vehicle offence; the five crimes on the non-SBD development were: One burglary dwelling, one common assault, one TWOC and two damage to a dwelling offences. Analysing the crime rates in 2007/2008 for the same matched pair revealed that the crime rate on the SBD development increased, with three offences within the one-year period (a crime rate of 136.36 offences per 1000 properties). The crime rate on the non-SBD development also increased to six offences (a crime rate of 214.29). The three offences on the SBD development were assault, criminal damage to a dwelling and other. The six offences on the non-SBD development were: One burglary dwelling,

one theft of vehicle, one TWOC, one assault and two criminal damage to a dwelling offences^{xv}.

Table 11: Crime Rates on Matched Pair Two

Development	Number of Properties	Number of Crimes 1999/2000	Crime Rate per 1000 in 1999/2000	Number of Crimes 2007/2008	Crime Rate per 1000 Properties in 2007/2008
SBD Street	22	1	45.45	3	136.36
Non-SBD Street	28	5	178.57	6	214.29

The results of this section of the analysis should be treated with caution due to the small sample of two matched pairs, and the small number of offences taking place at the four developments. The findings are an indication of the performance of SBD over a ten-year period, but do not account for other societal or environmental factors which could have played a part in the changes in crime levels.

Table 12: Crime Rates on SBD Developments 1999-2009

Development	Number of Crimes 1999/2000	Crime Rate per 1000 in 1999/2000	Number of Crimes 2007/2008	Crime Rate in 2007/2008
SBD Street One	1	71.43	1	71.43
Non-SBD Street One	1	71.43	8	571.43
SBD Street Two	1	45.45	3	136.36
Non SBD Street Two	5	178.57	6	214.29

Self Reported Crime

In addition to the analysis of police recorded crime, the research also involved the analysis of self-reported crime as measured by a residents' survey. The survey asked residents whether they had been a victim of certain crimes within the previous 12-month period, and if so, how many times. As with the *matched pairs analysis* and the *sustainability* sections, the results should be treated with some caution – in this case, due to the low response rate of just 11% (68 respondents)^{xvi}. With such small numbers, the reader is asked to consider the figures as an indication of the responses provided by a small sample of 68 respondents.

The results of the survey revealed that one SBD respondent had been a victim of domestic burglary within the previous year. This is compared to two respondents from the non-SBD sample. The proportion of SBD residents falling victim to this offence remained the same (three per cent) between 1999 and 2009, whilst the proportion of non-SBD respondents experiencing a burglary fell from 8% in 1999 to 6% in 2009. Although the burglary rate was lower within the SBD as opposed to non-SBD sample, it should be highlighted that the 3% rate was still higher than the average BCS burglary rate of 2.4%.

Theft of vehicle revealed a similar pattern, with one participant experiencing this crime within the SBD sample, compared to two within the non-SBD sample. When comparing this finding with the responses from the 1999 evaluation, the results suggest that fewer SBD respondents had been a victim of theft of vehicle in 2009 (three per cent) as compared to 1999 (five per cent) – even though the proportion of non-SBD victims remained the same (six per cent). Theft from vehicle offences were

experienced at a slightly higher rate, but again with a similar pattern. Two SBD respondents had been a victim of this crime within the previous year, as compared to six respondents from the non-SBD sample. Again, the percentage of SBD victims was higher in the 1999 evaluation (eight per cent) than the 2009 evaluation (six per cent).

Table 13: Self-Reported Crime 1999-2009

Crime Category	Percentage of SBD respondents - 1999	Percentage of non-SBD respondents - 1999	Percentage of SBD respondents - 2009	Percentage of non-SBD respondents - 2009	Percentage of British Crime Survey Respondents (07/08)
Theft of Vehicle	5%	6%	3% (1)	6% (2)	0.6%
Theft from Vehicle	8%	6%	6% (2)	17% (6)	3.4%
Theft of Bicycle	10%	7%	3% (1)	6% (2)	1.6%
Burglary Dwelling	3%	8%	3% (1)	6% (2)	2.4%
Theft of Property from Outside Dwelling	16%	24%	9% (3)	17% (6)	-

Visual Audits

The final strand of analysis involved conducting visual audits on the 32 developments included within the *matched pair analysis* (16 SBD and 16 non-SBD). The first level of analysis involved presenting the total score for the whole SBD sample against the total score for the whole non-SBD sample. The audit measured 28 factors and each factor scored between zero and five – zero being the most positive score and five the least. The maximum (and most negative) score for each sample (SBD and non-SBD) was 2240 (140 multiplied by 16 developments). The minimum score was zero.

The total score for the SBD sample was 317; the total score for the non-SBD development was 388. This is a positive finding for SBD and suggests that, in relation to the ‘disorder’ factors measured by the visual audit, SBD performs better than non-SBD.

When analysing the scores for each matched pair the results revealed that, in general, the best performing estates were SBD developments, and the worst performing estates were non-SBD developments. Of the 16 matched pairs, three pairs revealed SBD to be performing worse than the non-SBD counterpart, one matched pair showed that both the SBD and non-SBD developments scored the same, however, in 12 of the 16 SBD performed better than the non-SBD matched pair.

Table 14: Total Scores for each of the 32 Developments

Matched Pair	SBD Score	Non-SBD Score
Pair One	23.5	23
Pair Two	22	20.5
Pair Three	17.5	24.5
Pair Four	28	18
Pair Five	24	38
Pair Six	21.5	21.5
Pair Seven	19	24.5
Pair Eight	15	19
Pair Nine	20	39
Pair Ten	22	26
Pair Eleven	24	25
Pair Twelve	15	25
Pair Thirteen	12	18
Pair Fourteen	23	25
Pair Fifteen	11	19
Pair Sixteen	19.5	22

DISCUSSION AND CONCLUSIONS

This paper presents the findings of an evaluation of SBD housing within West Yorkshire. The study aimed to replicate, where possible, the original evaluation of SBD conducted in West Yorkshire ten years ago (Armitage, 2000) and to establish whether SBD has improved, maintained its performance or reduced its effectiveness as a crime reduction measure. The study was restricted by limited funding, and this is reflected in the sample sizes – particularly within the self-reported crime section. The findings are presented alongside caveats regarding sample size and in many cases, the reader is urged to treat the findings as indicative. It is hoped, that limitations aside, the findings of the study can be used to support the continued use of the SBD scheme and to highlight areas for improvement.

The first strand of the evaluation included an analysis of police recorded crime, comparing a sample of SBD developments built in 2006/2007 (16 developments) with a) the rest of West Yorkshire, b) non-SBD properties on the same street and c) non-SBD matched pairs which were developments located as close as possible to the SBD development. The results were mixed, with the *West Yorkshire* and *same street analysis* revealing positive findings, yet the *matched pairs analysis* showed no statistically significant differences between the SBD and non-SBD samples.

When comparing these findings with the results of 1999 evaluation, the results were positive with the burglary dwelling rate for the SBD sample almost four times higher in the 1999 study than that revealed in 2009. Total crime rates were also much lower in the 2009 SBD sample (128.7 per 1000 properties) than that shown in 1999 (187.9 per 1000 properties).

Re-visiting the crime data for two of the matched pairs utilised within the 1999 study revealed mixed findings. Although for both matched pairs the SBD development was performing either the same or better than the non-SBD development for the two time periods 1999/2000 and 2007/2008, there was some concern regarding the sustainability of crime reduction within one of the match pairs. Whilst for matched pair one, the SBD sample sustained its crime reduction performance over the ten-year period (whilst the non-SBD development saw its crime rate increase), matched pair two did not perform as well. Although the crime rate was still lower within the SBD development, crime did increase within the SBD development at a greater rate than in the non-SBD development, raising some concern regarding the scheme's life cycle.

The original evaluation of SBD within West Yorkshire revealed positive findings, and many felt that there was little point re-assessing the effectiveness of SBD, given that the research had shown SBD to be effective. However, to be complacent about the merits of SBD, or any crime prevention measure, would be to ignore the evolving nature of crime and those who take part in it. As Ekblom (2002) suggests: *"Knowledge of what works becomes a wasting asset that needs constant replenishment"* (p.38). To ensure that SBD continues to evolve faster than criminals' abilities to overcome it, research with an improvement orientation is essential. The re-evaluation of SBD has shown that SBD has continued to reduce crime and the fear of crime, SBD developments have sustained their crime reduction benefits and continue to experience less crime than their non-SBD counterparts. Furthermore, the effectiveness of SBD developments built more recently has exceeded that shown in the original evaluation, with SBD developments outperforming their non-SBD

counterparts in terms of crime reduction, visual signs of disorder and levels of fear amongst residents.

In terms of practical implications, there are several key recommendations which emerged from this study, these relate to repeat victimisation, management and maintenance and police recording practices. In the original evaluation, the benefits of SBD appeared to be restricted to preventing initial and not repeat victimisation. In this re-evaluation, SBD appeared to be protecting against repeat burglary – but not repeat assault. If SBD is to provide a complete crime reduction package, it must address this deficit by introducing measures to reduce repeat victimisation which extend beyond the limits of design of the environment. Two suggestions for addressing these weaknesses include ensuring that SBD estates are prioritised in the delivery of repeat victimisation packages (which are already delivered by many police forces including West Yorkshire Police). The second (directed at ACPO CPI) would be to incorporate repeat victimisation packages into SBD standards at a national level. The second recommendation relates to police recording practices – in particular the need to ensure that police forces keep up to date records of SBD applications (and progress beyond application) to allow such evaluations to be repeated (in West Yorkshire) or replicated (throughout England and Wales). The final recommendation relates to management and maintenance and is an issue that was also raised within the original evaluation. Although the vast majority of the 16 SBD developments showed little or no visual signs of disorder, for several, there were many signs of vandalism, graffiti and litter – and in some cases, more so than the non-SBD matched pair. It is suggested that West Yorkshire Police revisit the SBD estates shown to be performing poorly to establish whether the issues are simply related to management and maintenance (in which case

housing associations should be involved) or whether retrospective design improvements would benefit the development.

References

Armitage, R. (2000) *An Evaluation of Secured by Design Housing within West Yorkshire – Briefing Note 7/00*. London: Home Office.

Armitage, R. (2004) *Secured by Design refined: environmental risk factors, offenders' modus operandi and costs and incentives*. Unpublished Report submitted to the Home Office. London: Home Office.

Armitage, R. (2005) *Secured By Design – An Investigation Of Its History, Development And Future Role In Crime Reduction*. Unpublished PhD Thesis, University of Huddersfield, Huddersfield.

Armitage, R. (2006) Predicting and Preventing: Developing a Risk Assessment Mechanism for Residential Housing. *Crime Prevention and Community Safety: An International Journal*. 8 (3), 137-149.

Ashton, J. *et al.* (1998) Repeat Victimization: Offender Accounts. *International Journal of Risk, Security and Crime Prevention*, 3 (4), 269-279.

Association of British Insurers (2006) *Securing the Nation*, London: Association of British Insurers.

Atlas, R. LeBlanc, W. G. (1994) The Impact On Crime Of Street Closures And Barricades: A Florida Case Study. *Security Journal*. 5, 140 – 145

Beavon, D.J.K. *et al.* (1994) The Influence of Street Networks on the Patterning of Property Offences. In: R.V.Clarke (ed.) *Crime Prevention Studies, Volume 2*. Monsey NY, Criminal Justice Press. 115-148.

Bevis, C. and Nutter, J.B. (1997) *Changing Street Layouts to Reduce Residential Burglary: Paper presented to the American Society of Criminology*. Atlanta.

Brand, S. and Price, R. (2000) *The Economic and Social Costs of Crime, Home Office Research Study 217*. London, Home Office.

Brantingham, P.L. and Brantingham, P.J. (1984) Burglar Mobility and Preventive Planning. In: R.V. Clarke and T. Hope (eds.) *Coping with Burglary: Research Perspectives on Policy*. Boston, Kluwer-Nijhoff. P. 77-96.

Brown, B.B. and Altman, I. (1983) Territoriality, Defensible Space and Residential Burglary: An Environmental Analysis. *Journal of Environmental Psychology*, 3, pp. 203-220.

Brown, B. and Bentley, D. (1993) Residential Burglars Judge Risk: The Role of Territoriality. *Journal of Environmental Psychology*, 13, pp. 51-61.

Brown, J. (1999) *An Evaluation of the Secured by Design Initiative in Gwent, South Wales*. Unpublished MSc. dissertation, Scarman Centre for the Study of Public Order, Leicester.

Budd, T. (1999) *Burglary of Domestic Dwellings. Findings from the British Crime Survey*. Issue 4/1999, London, Home Office.

Budd, T. (2001) *Burglary: Practice Messages from the British Crime Survey*. London, Home Office.

Coleman, A. (1986) *Utopia on Trail: Vision and Reality in Planned Housing*. London, Hilary Shipman.

Cozens, P., Hillier, D. and Prescott, G. (2001a) Crime and the Design of Residential Property – Exploring the Perceptions of Planning Professionals, Burglars and Other Users, part 2. *Property Management*, 19 (4), 222-248.

Cozens, P., Hillier, D. and Prescott, G. (2001b) Defensible Space: Burglars and Police Evaluate Urban Residential Design. *Security Journal*, 14, 43-62.

Cozens, P., Hillier, D. and Prescott, G. (2002a) Gerontological Perspectives on Crime and Nuisance: The Elderly Critically Evaluate Housing Designs in the British City. *Journal of Aging and Social Policy* 14(2), 63-83.

Cozens, P., Hillier, D. and Prescott, G. (2002b) Defensible Space, Community Safety, The British City and the ‘Active Citizen’: Penetrating the Criminal Mind. *Crime Prevention and Community Safety: An International Journal*, 4(4), 7-21.

Cozens, P., Hillier, D. and Prescott, G. (2002c) Criminogenic Associations and Characteristic British Housing Designs. *International Planning Studies* 7(2), 119-136.

Cromwell, P.F and Olson, J.N. (1991) *Breaking and Entering: An Ethnographic Analysis of Burglary*. Newbury Park, California: Sage.

Davis Langdon (2010) *ACPO Crime Prevention Initiatives Limited – Capital Costs of Secured by Design Accreditation*. Unpublished report for ACPO SBD.

Eck, J, E. (2002) Preventing Crime at Places. *In: L. W. Sherman, D, P. Farrington, B, C. Welsh, D. Layton MacKenzie (eds.) Evidence Based Crime Prevention*. New York, Routledge.

Eckblom, P. (2002) Future Imperfect: Preparing for the Crimes to Come. *Criminal Justice Matters*, 46, 38-40.

Ellingworth, D. *et al.* (1997) Prior Victimization and Crime Risk. *International Journal of Risk, Security and Crime Prevention*, 2 (3), 201-214.

Feeney, F. (1986) Robbers as Decision Makers. *In: D. Cornish and R. Clarke (eds.) The Reasoning Criminal*. New York, Springer-Verlag. 53-71.

Finnie, W.C. (1973) Field Experiments in Litter Control. *Environment and Behaviour*, 5, 123-144.

Gabor, T. *et al.* (1987) *Armed Robbery: Cops, Robbers, and Victims*. Springfield, IL, Charles C. Thomas.

Groff, E.R. and LaVigne, N.G. (2001) Mapping an Opportunity Surface of Residential Burglary. *Journal of Research in Crime and Delinquency*, 38 (3), 257-278.

Hakim, S., Rengert, G. & Shachamurove, Y. (2001). Target Search of Burglars: A Revised Economic Model. *Papers in Regional Science*, 6(4), 445–464.

Hillier, B. (2004) Can streets be made safer. *Urban Design International*. 9. 31-45.

Hillier, B. and Sahbaz O. (2009) Crime and Urban Design: An Evidence-based Approach in R. Cooper, G. Evans, and C Boyko (eds.) *Designing Sustainable Cities*. Chichester, Wiley-Blackwell.

Hillier, B. and Shu, S. (1998) *Crime and Urban Layout: The Need for Evidence: Home Office Crime Prevention College*. Easingwold.

Johnson, S. and Bowers, K.J. (2010) Permeability and Burglary Risk: Are Cul-de-Sacs Safer? *Quantitative Journal of Criminology*, 26 (1), 89-111.

Lasley, J. (1998) *Designing Out Gang Homicides and Street Assaults* US National Institute of Justice, Washington, DC.

- Letskemann, P. (1973) *Crime as Work*. Englewood Cliffs, NJ: Prentice-Hall.
- Matthews, R. (1992) Regulating Street Prostitution. *British Journal of criminology*. 32 (1), 18-34.
- Merry, S.E. (1981) Defensible Space undefended: Social Factors in Crime Control through Environmental Design. *Urban Affairs Quarterly*, 16, 397-422.
- Mirlees-Black, C. *et al.* (1998) *The 1998 British Crime Survey – England and Wales*. London: Home Office.
- Newman, O. (1973) *Defensible Space: People and Design in the Violent City*. London: Architectural Press
- Newman, O. (1995) Defensible Space: A New Physical Planning Tool for Urban Revitalization. *American Planning Association Journal*, 61 (2), 149-155.
- Newman, O. (1996) *Creating Defensible Space*. Rutgers University, Centre for Urban Policy Research.
- Nubani, L. and Wineman, J. (2005) *The Role of Space Syntax in Identifying the Relationship Between Space and Crime*. Paper Presented at the Proceedings of the 5th Space Syntax Symposium on Space Syntax, Delft, Holland.

Pascoe, T. (1999) *Evaluation of Secured by Design in Public Sector Housing – Final Report*. Watford: BRE.

Pascoe, T. and Topping, P. (1997) Secured by Design: Assessing the Basis of the Scheme. *International Journal of Risk, Security and Crime Prevention*, 2 (3), pp. 161-173.

Pease, K. (1998) *Repeat Victimisation: Taking Stock*. Crime Detection and Prevention Series Paper 90. London: Home Office.

Poyner, B. and Webb, B. (1991) *Crime Free Housing*. Oxford, Butterworth.

Rengert, G. & Hakim, S. (1998) Burglary in affluent communities: a planning perspective. In: M. Felson & Pieser (eds) *Reducing Crime Through Real Estate Development and Management*. Washington DC: Urban Land Institute.

Repetto, T.A. (1974) *Residential Crime*. Cambridge, MA: Ballinger.

Rubenstein, H. *et al.* (1980) *The Link Between Crime and the Built Environment. The Current State of Knowledge*. Washington, DC, National Institute of Justice.

Shu, S. (2000) Housing Layout and Crime Vulnerability. *Urban Design International*, 5, 177-188.

Skogan, W.G. (1990) *Disorder and Decline: Crime and the Spiral of Decay in American Neighbourhoods*. California, University of California Press.

Taylor, R. (2002) Crime Prevention Through Environmental Design (CPTED): Yes, No, Maybe, Unknowable and All of the Above. In: R.B. Bechtel and A. Churchman (eds.) *Handbook of Environmental Psychology*. New York, John Wiley and Son.

Taylor, R. and Gottfredson, S.D. (1987) Environmental Design, Crime and Prevention: An Examination of Community Dynamics. *Crime and Justice: An Annual Review of the Research*, 8, 387-416.

Teedon, P., and Reid, T. (Jan 2009) *Evaluation of SBD – Glasgow Housing Association (Draft)* - Architectural Liaison Officer's Conference, Nottingham, January 2009.

Van Der Voordt, T.J.M. and Van Wegen, H.B.R. (1990) Testing Building Plans for Public Safety: Usefulness of the Delft Checklist. *Netherlands Journal of Housing and Environmental Research* 5(2), 129-154.

White, G. (1990) Neighbourhood Permeability and Burglary Rates. *Justice Quarterly* 7 (1), 57-67.

Wiles, P. and Costello, A. (2000) *The 'Road to Nowhere': The Evidence for Travelling Criminals, Home Office Research Study 207*. London, Home Office.

Wilson, J.Q. and Kelling, G.L. (1982) The Police and Neighbourhood Safety. *The Atlantic*, March 1982, 29-38.

Winchester, S. and Jackson, H. (1982) *Residential Burglary: The Limits of Prevention*, Home Office Research Study Number 74. London, Home Office.

Wootton, A., Marselle, M., Davey, C., Armitage, R., and Monchuk, L. (2009) *NPCPS: Implementation Planning Research Project*. Salford: Design Against Crime Solution Centre, Salford University.

Yang, X. (2006) Exploring The Influence of Environmental Features on Residential Burglary Using Spatial-Temporal Pattern Analysis. Unpublished PhD dissertation, University of Florida. Available at: www://etd.fcla.edu/UF/UFE0013390/yang_x.pdf. [Access 17 Feb 2010].

Zavoski, R., Lapidus, G., Lerer, T., Burke, G. and Banco, L. (1999) Evaluating the impact of a street barrier on urban crime. *Injury Prevention* 5, 65-68.

Zimbardo, P.G. (1970) The Human Choice: Individuation, Reason, and Order Versus Deindividuation, Impulse and Chaos. In: W. Arnold and D. Levine (eds.) *Nebraska Symposium on Motivation 1969*. Lincoln, NB, University of Nebraska Press. p. 237-307.

ⁱ The following information was provided by Jon Cole of ACPO CPI.

ⁱⁱ It is not possible to quantify the increase in ALO/CPDAs over the ten year period as figures have not been collated on a regular basis.

ⁱⁱⁱ It should be highlighted that these figures are likely to represent a peak in numbers, as the period post 2009 (when this research was conducted) has seen cuts in police budgets with many police forces reducing the number of ALO/CPDAs dramatically.

^{iv} There was no use of violence in burglaries against the SBD sample. However, violence was used in 1% of burglaries against the non-SBD sample.

^v The British Crime Survey is a victimisation survey conducted with residents (aged 16 and over) living in households in England and Wales. Although the findings of the BCS do not differentiate between SBD status, this figure provides an average response for all households within England and Wales and is a useful benchmark against which to compare SBD and non-SBD responses.

^{vi} Through interviews with Registered Social Landlords, quantity surveyors, architects and local authorities conducted in 1999/2000.

^{vii} Several complexities of cost-benefit analyses render the authors to urge caution regarding these figures. Firstly, economists would suggest that the additional costs of building to SBD have not taken account of discounting whereby spending £1000 today would cost 3.5% more to society than spending £1000 in a year's time. Therefore, spending £1000 in 1999 costs £99.49 a year for 20 years. Similarly, spending £795 in 1999 costs £79.09 a year for 20 years. However, if the analysis is to take account of the changing costs of building to SBD, it must take account of the changing costs of crime. As evermore expensive technological devices become commonplace in the household, the average cost of a burglary is likely to rise dramatically over the next two decades.

^{viii} Property located within 1,000 feet of major road.

^{ix} Property is visible from traffic lights.

^x Other crimes included: Arson, public order offences, dangerous dogs, harassment, theft from shops, non specific thefts (e.g. metal thefts) and drug offences.

^{xi} Although the original project had a response rate of 47%, the resources allocated to that study allowed for face-to-face interviews with residents (as opposed to a postal survey). The resources also allowed several visits to developments to re-visit residents who had not been in at the first visit. The study reported in this paper was considerably less well funded and, therefore, had to rely upon residents choosing to return the questionnaire (in a freepost envelope). The limited resources meant that a second sweep (to boost the sample size) was not possible.

^{xii} Due to changes in housing policy, it was not possible to find 'new' non-SBD developments which were social housing as all newly built social housing within West Yorkshire must meet (or attempt to meet) SBD standards.

^{xiii} This suggests that the gap between the SBD and non-SBD samples is widening – and that the performance of SBD, as a crime reduction measure, is improving.

^{xiv} Pease (1998) explains repeat victimisation using two accounts - Risk Heterogeneity (Flags) and Event Dependency (Boosts). Risk Heterogeneity suggests that crime *flags* the people and places where crime was always likely to occur, for example, a property with poor levels of security which contains readily accessible, high value goods. According to this theory, the first, the second and the third crimes against this property could all be explained through the same enduring attributes. Event Dependency would argue that the first crime *boosts* the likelihood of later crimes. The fact that an offender did not take all valuable goods on the first visit, that they are now aware of the layout and the security measures within the property and that they can assume that the stolen valuable goods will be replaced through insurance, increases the likelihood that the offender will return to offend against the property.

^{xv} The obvious concern regarding these findings are the small number of offences taking place within the two developments at both periods of time. The two developments were randomly selected without prior knowledge of crime levels. The small numbers preclude the authors for making any generalised statements about the performance of SBD across West Yorkshire, however, they do give some general indication of levels of sustained crime reduction benefits.

^{xvi} This research was conducted using several very small grants from ACPO CPI, West Yorkshire Police and the university of Huddersfield. Unlike the original evaluation, where questionnaires were administered as face-to-face interviews (with sufficient funds for follow-up), the survey was hand-posted, with a reliance upon the respondent to post the survey in a free-post envelope.