UNDERSTANDING THE EVOLUTION OF COMMUNITY SEVERANCE AND ITS CONSEQUENCES ON MOBILITY AND SOCIAL COHESION OVER THE PAST CENTURY

Dr A Bradbury
Transport Strategy and Policy, Halcrow Group Ltd (formerly TRL Limited), UK
bradburya@halcrow.com
P Tomlinson
Centre for Sustainability, TRL Limited, UK
ptomlinson-trl@tiscali.co.uk

ABSTRACT

The concept of community severance has been recognised as an environmental impact of transport since the 1920s [1]. Initially, in the 1920s and 1930s, community severance was seen purely as the separation of homes and work places. With the introduction of large urban highways from the 1950s onwards, practitioners started to recognise both the social and psychological dimensions of community severance. The social dimensions of severance were thought to include factors that affected community cohesion, such as the reduction of interaction caused by the presence of a physical barrier (e.g. a road or railway line). Psychological dimensions were related to an individual's perceptions of the barrier and included the perceived unpleasantness and difficulty of making a journey along or across a road.

More recent empirical research and theoretical work on understanding community severance focused on defining both its causes and impacts in greater detail. This paper reports on a research study undertaken by the Transport Research Laboratory (TRL) [2] for the Department for Transport in response to the UK Government's report 'Transport and Social Exclusion: Making the Connections' [3]. The main objective of the study was to explore how communities experience severance effects, explore how practitioners deal with community severance, and investigate whether there are any lessons to be learnt for improving the way in which community severance is assessed for appraisal.

1 INTRODUCTION

This paper introduces the historical background and evolution of the concept of community severance and its consequences. It examines lessons learnt from implementing mitigation measures (for example underpasses and footbridges) and ways in which accessibility planning guidance can benefit from a historical perspective to ensure that mitigation strategies alleviate, and not exacerbate, the symptoms of community severance, for a more inclusive society.

Community severance in the UK transport assessment system is defined as:
"The separation of residents from facilities and services they use within their community caused by new or improved roads or by changes in traffic flows" [4].

However, research has indicated that the concept of community severance is much more multifaceted than the division of people from services. Community severance displays a complex range of impacts, from the psychological effects of traffic, the effects that traffic can have on quality of life and social cohesiveness, through to links to accessibility planning, planning for disabled people and wider links to mobility and social exclusion.

Perhaps a better definition of severance would be that used in some recent research in New Zealand that defined severance as [5]:
“The divisive effects that result from the provision and use of transport infrastructure.”

There is no one agreed definition for community severance, rather, each explanation generally encapsulates a similar range of impacts on affected individuals and communities. It is recognised that community severance can have physical, social and psychological dimensions:

- Physical barriers - such as the introduction of new traffic infrastructure [1]
- Psychological or perceived barriers - such as traffic noise or road safety fears [3]
- Social impacts - such as the disruption of ‘neighbourhood lifestyle’ [6] or inhibition of social interaction [3].

Current guidance for practitioners on identifying, measuring and mitigating community severance is limited to guidance on transport scheme appraisal and environmental assessment. Both these forms of analysis occur prior to schemes being built or approved and the definition of severance is confined to consideration of the physical separation of residents from key facilities.

The next section explores the history of community severance and the influence that transport planning policies in the Twentieth Century have had on its physical, social and psychological dimensions.

2 BACKGROUND AND HISTORICAL CONTEXT

The concept of 'community severance' has been recognised as an environmental impact of transport since the 1920s. However, Guo et al [1], in their summary of the development of the concept, note that its meaning has evolved since its original definition (see Table 1).

In the previous century, older forms of transport network, such as railways and canals, affected land use by influencing industrial location and hence the location of consumers and markets [7]. Yet, with the development of the motorcar, and with it the dormitory suburb and the extension of the journey to work in the early Twentieth Century, severance became viewed as a product of the increasing size of cities and the tendency for particular land uses to dominate in some localities [6].

According to Clark et al [6], by the late 1950s, the definition of severance had shifted with the development of motorways being essentially rural. The rural road network consisted of limited access roads that could not be used by the expanding farming industry, and divided farms had to be connected by crossings (principally via over and under-bridges).

Later in the 1960s, The Buchanan Report [10] theoretically applied the motorway concept to urban areas, and while the term ‘severance’ was not specifically used, reference was made to environmental areas where local cohesiveness was to be retained and not affected by the emerging high-speed, high-volume roads, which adopted the lines of pre-existing barriers [6].

Table 1 - Evolution of the concept of community severance [2]

Originator	Year	Definition and meaning	Source
Pigou [8]	1924	Severance is the divorce between residence and work place	Academic
Liepmann [9]	1944	Severance of dwelling and workplace and its effect on community life	Academic
Ministry of Transport [10]	1963	Reflected the idea that geographical areas could contain a local cohesiveness	Government research
Urban Motorways Committee [11]	1972	The sum of the divisive effects a major urban road has on the inhabitants either side of it	Government research
Organisation for Economic Co-operation and Development [12]	1973	Disturbance to established neighbourhoods, social patterns, life styles, shopping patterns etc that have cultural and psychological impacts	International research report
Lee et al [13]	1975	A complex social response to the presence of a physical barrier and is measured at the levels of perception, cognition and behaviour	Academic
Department of Transport [14]	1983	The separation of residents from facilities and services they use within their community, from friends and relations and perhaps from place of work as a result of changes in road patterns and traffic levels	Government guidance
Standing Advisory Committee on Trunk Road Assessment [15]	1986	Separation of adjacent areas by road or rail infrastructure or heavy traffic, causing negative impact on human beings or flora and fauna	Government research
Clark et al [6]	1991	Community severance is the sum of the divisive effects a road has on those in the locality	Government research
Highways Agency [4]	1993	The separation of residents from facilities and services they use within their community caused by new or improved roads or by changes in traffic flows	Government guidance
Chinn and Davies [16]	1995	The range of community effects from small increases in journey lengths or times through to the situation where journeys are no longer made, or alternative facilities are visited because of the additional inconvenience, delay or danger caused by the barrier or because the barrier is perceived to be impassable	Government research
Scottish Executive [17]	2001	The positive or negative effects of a scheme on the ability to move around on foot bicycle or horseback. It reflects in particular the improvement in or deterioration of the ability of the community to cross major road or rail links and thereby reach local destinations	Government guidance

A decade later, the Urban Motorways Committee rejected the idea of a community as a geographically identifiable and socially cohesive group. Nevertheless, the Committee did recognise the link between severance and pedestrian delay. ‘Pedestrian delay’, being when vehicular traffic acts as a barrier to pedestrians crossing main roads away from designated pedestrian crossing facilities [1]. This phenomenon is described in traffic flow theory dating from the 1930s [18] [19].

More recent empirical research and theoretical work on understanding community severance has focused on defining both its causes and impacts in greater detail. For instance, in the mid-Eighties the Department of Transport [20], commissioned a case study of London that defined populations and groups considered most vulnerable to severance, and recorded facilities (including post offices and doctors surgeries) to which these groups would require access and that were potentially severed by an intervening main road [6]. However, the study focused on the propensity for severance rather than measuring numbers of affected people, routes travelled or quality of trips made.

Other studies undertaken in the 1980s also contributed to the debate. These included Travers Morgan Planning [21], whose focus was on delays at pedestrian crossing points; and work by Halcrow [22] on the definition of catchment areas to identify which people are inhibited from gaining access to specific facilities. Halcrow progressed the debate by engaging with affected communities to obtain a clearer understanding of how people perceive severance, in which a combination of delay, diversion, danger, noise and pollution were cited as undesirable effects from the ‘heaviness’ of traffic. This reaction was also found among pedestrians not necessarily wishing to cross the road, but also those forced to walk alongside it.

Section 3 explores present day characteristics of severance and how severance theory has evolved to be included in contemporary planning policies and strategies in the UK.

3 CHARACTERISTICS OF SEVERANCE TODAY

3.1 Causes of community severance

Community severance can have physical, social and psychological dimensions. The physical and psychological dimensions can be seen to relate to the development of barriers to an individual's movement (either real or perceived). These barriers of severance have been explored by a number of authors.

3.1.1 Physical barriers

Guo et al [1] suggest that physical severance can be divided into two types of barrier:

1. Static severance: caused by the introduction of a new road with high embankments and controlled crossing points through an area where there are existing patterns of social interaction.

"A man-made structure artificially divides an area into two separate parts so that it is difficult for one side to interact with the other" [1]

2. Dynamic severance: caused by the traffic on a road creating a 'dynamic time-dependent barrier'. In essence, this means that pedestrians may experience an intermittent barrier to movement (across the road) caused by the flow of traffic.

Tate [5] identifies the following impacts of physical barriers on individuals:

- Pedestrian or trip delay: the lengthening of a person's journey caused by the transport infrastructure (e.g. a road and the position of formal crossing points)
- Trip diversion: a person is diverted from taking the most desirable route (in terms of journey time)

3.1.2 Psychological barriers

These are felt to be factors which affect how people perceive the experience of moving through an area. Research with pedestrians by Clark et al [6] identified the following perceptual impacts of traffic which may contribute to a psychological barrier developing:

- Traffic noise: relating mainly to longitudinal severance, a situation where pedestrians or cyclists are deterred from travelling along a road because of the noise emitted by the traffic (due to its speed or volume)
- Traffic pollution: relating to the deterrent effect on pedestrians and cyclists travelling along or across a road due to poor air quality caused by heavy traffic
- Perceived danger: the deterrent effect on pedestrians and cyclists of fear being hit by speeding or heavy traffic.

A combination of either or both physical and psychological barriers can create:

- Trip suppression: resulting in an individual being completely deterred from making a journey due to factors associated with the transport infrastructure.

Further research has shown that the cumulative effects of physical and psychological barriers on the individuals living in an area can have a social impact on the local residential community as a whole.

3.2 Social impacts of community severance

By the late 1960s the social dimensions of severance had come to be recognised. The Buchanan Report [10] concluded that identifiable geographical areas could contain a 'local cohesiveness'. This notion led further authors to acknowledge that physical and psychological barriers caused by the introduction of roads could lead to a disruption of 'neighbourhood lifestyle' [11].

One of the earliest studies into how roads disrupted neighbourhood lifestyles was conducted by Lee et al [13]. They used interviews and cognitive mapping techniques to identify the changes in behaviour that the introduction of a major road caused. Their hypothesis was that major roads would act as a strong barrier to free movement, leading to smaller neighbourhoods and little ‘bridging’ (or crossing) behaviour across the road. They went on to propose that these effects would diminish with distance away from the road and that severance would be relieved by creating pedestrian crossing points. Their study concluded that:

- People responded to the road line as a barrier and the consequence of this was that they reduced their involvement with the opposite side and, therefore, social activity across the road was impeded
- Mitigation measures, such as pedestrian crossings affected behaviour and increased crossing activity
- Over time, the neighbourhoods enlarged on either side of the road and people reorganised their patterns of travel so that they did not have to cross the road as often
- The number of trips people made were not reduced (and this was attributed to the enlargement of the neighbourhoods on either side) but there was less crossing to the other side of the area than had been before the road was constructed

- Although trips to the other side of the area which the road cut through were reduced, people living nearest to the road still conducted up to a third of their activities on the other side.

Lee et al's study [13] indicates that, over time, the original neighbourhood appeared to split and evolve to accommodate the road. Clark et al [6] note that this suggests that the effects of severance may 'decay' over time.

More recent work by the Highways Agency involving case studies with affected communities [23] [24] explored in detail why the barriers associated with severance changed people's behaviour. A range of reasons why behaviour had changed were identified (both in relation to new roads and to roads that had become increasingly busy over time):

- There was a reduction in the desire or ability to socialise or go for a walk in the affected area
- Parents restricted children from playing outside or crossing the road due to road safety fears
- People shut themselves off from their surroundings and modified their lifestyles and working patterns to counter the negative effects of congestion; this included changing their shift patterns at work and the use of different areas for shopping and recreation.

The Social Exclusion Unit [25] note that damage to local social networks (which could be seen as resulting from the changes in behaviour outlined by Lee et al [13] and the Highways Agency [23] [24]) can contribute to a decline in community cohesion.

Despite the provision of many bypass schemes through the years, many towns and villages still have trunk roads passing through their centres and these can create a physical and psychological barrier between separate parts of the community, causing people to use their cars for journeys they might otherwise make on foot or by bicycle. Furthermore, the ring roads and bypasses of yesteryear that were intended to relieve burgeoning inner city roads have now been subsumed into the urban fabric and are themselves causing community severance effects in the suburbs of these settlements [26].

The next section examines contemporary community experiences of severance in the UK (adapted from James et al [2]).

4 COMMUNITY EXPERIENCES OF SEVERANCE

Communities are able to identify a broad range of impacts created by the existence of a ring road. This section examines each of these and explores how the community defines itself and how severance changes over time.

4.1 Identification and profile of the case study area

The case study was conducted in a small town in the South West Region of England with a population of 18,324 [27].[1] The ring road which encircles the town centre was built in around 1972 and divides two of the largest administrative wards in the town which comprise of predominantly residential properties (see Figure 1).

[1] The name and exact location of the case study town has been withheld to maintain anonymity.

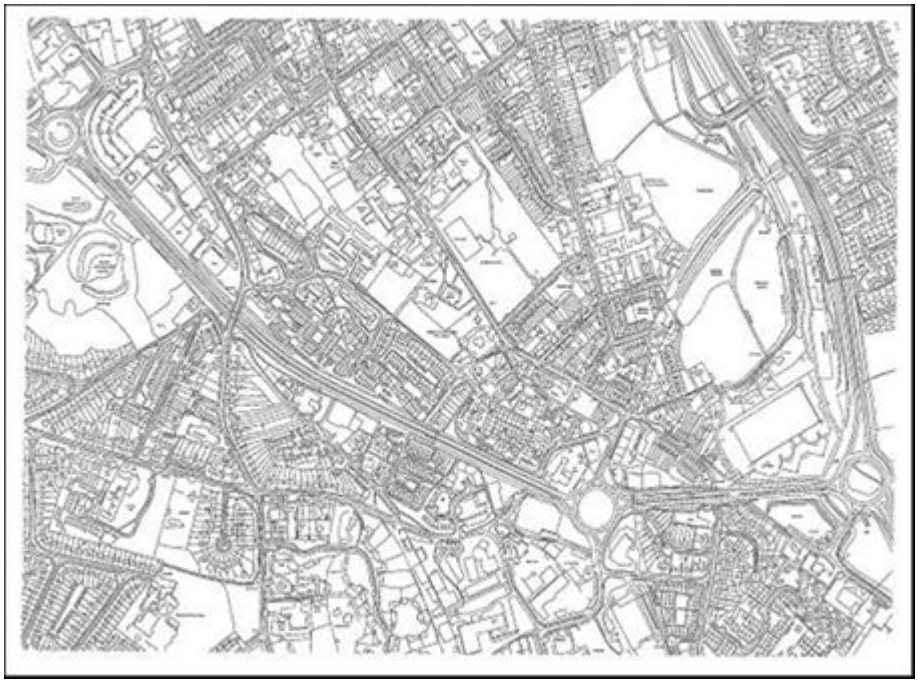

Figure 1 – Aerial view of a severance causing arterial road

The study area focused on a stretch of dual carriageway segregating a large residential area and extending from a hospital, leisure centre and a large supermarket to the west of the town to another supermarket to the east. Access from the case study area to the hospital on foot is only available via a footbridge.

When the ring road was built in the early 1970s, a selection of severance mitigation measures were built, these included two pedestrian subways and a footbridge. There are no surface level crossings along the ring road. Since the ring road was constructed, no additional mitigation measures have been implemented to facilitate pedestrian access across the road.

At the last Census (2001), the case study area had a population of 3,852 of which 30% of households had no car or van, while 47% of households owned one car or van, 18% owned two cars or vans and 4% owned three cars or vans [27].

Three focus groups were held with a range of respondents felt most likely to be affected by community severance issues. The focus groups were disaggregated by age and life stage as follows:

- Older people aged 65 and over (or over 50 if considered self to have 'restricted mobility')
- Parents of children aged 13 and under
- Young people aged between 16 and 22

The next section describes the responses from participants with respect to severance impacts experienced and perceptions of the mitigation measures.

4.2 Community severance barriers and impacts experienced by the community

Trip delay and trip diversion appear to be important factors for people, since frequent informal crossing of the ring road is evident. Most respondents were able to identify a few well known informal crossing points suggesting that these are very regularly used. Mitigation measures such as subways (see Figure 2) are not used by pedestrians even

when placed along ‘desire lines’ (i.e. the desired route a person would wish to take when moving through an area), since popular informal crossing points were sited close to the mitigation measures.

> "*I’d just go straight across [the road] instead of going down [into the subway] because I’m on my own then, so I’d just jump the railings, and walk across…because it’s probably like 30 foot shorter*"
>
> (Male, Parent's group)

Trip delay appears to be one of the main reasons for not using the formal mitigation measures. For example, school children were said to run across the road in order to get to school quicker than if they had gone through the subway and many of the respondents concurred that they used an informal crossing because it reduced journey time.

Little evidence was found of people being totally put off from travelling although most people reported using their cars rather than travelling on foot to cross the ring road. This raises important issues around the greater impacts on those people without cars. Although non-car owners generally reported getting lifts from friends and family or using taxis to get around, it is not clear how much this restricts them to making only the most important journeys. It also has implications for encouraging people to use more sustainable modes of transport such as cycling or walking.

In addition, residents living alongside the road reported loud noise disturbance from the road rattling their windows late at night due to high traffic speeds. Residents also reported loud traffic noise when sitting in their back gardens. These factors represent a significant impact on the quality of life for people living by the road.

> "*The noise [from the road], you can’t sit in your garden in the summertime and relax because it is so noisy*"
>
> (Female, Parent's group)

4.3 Variability of barriers and impacts for different social groups

Women and older people were found to be most concerned about travelling across the ring road (especially at night) due to fear of becoming a victim of crime in the subways or on the footbridges. Men also reported feeling concerned, but appeared more willing to run across the ring road to overcome the secondary severance of the mitigation measures. People generally felt safer travelling with a companion or in a group.

Those with no access to a car were sometimes forced to travel on foot and, therefore, use the subways or footbridge regardless of their acceptability. It is unclear from the case study whether these people were deterred completely from making some non-urgent but important journeys as a result of this.

People with restricted physical mobility, wheelchair users and parents/carers pushing buggies experienced similar types of problems in using the mitigation measures. It was clear that physical accessibility of the original mitigation measures (both the subways and footbridges) had not been considered at time of building and that retrofitting was needed to rectify these issues now. In addition, poor maintenance, including flooding of the subways or un-gritted surfaces cause further difficulties for these groups. People generally seemed to use cars to overcome these issues, but there were instances where both buggy and wheelchair users did not have access to a car and were forced to use the mitigation measures despite them being poorly designed.

"They've got to be used [the subways] because there's no other way you can get across. You couldn't get across with buggies anywhere else really"

(Male, Parents focus group)

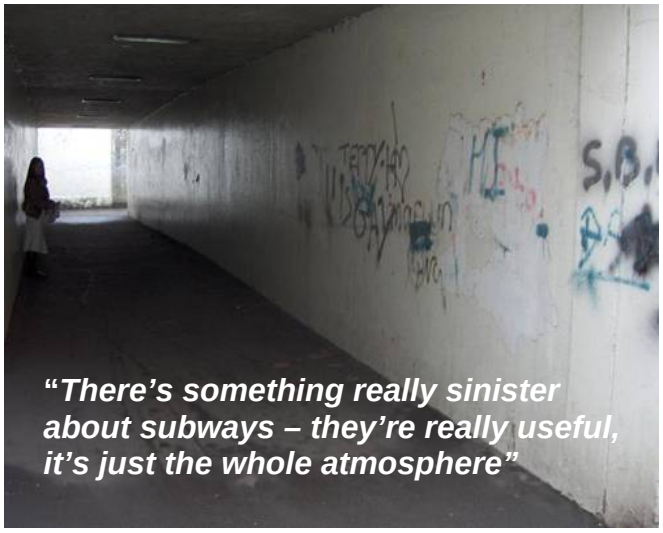

Figure 2 – Community perceptions of mitigation: subway

Buggy users also reported difficulties in using local taxi services because the recent change in legislation has forced taxi drivers not to carry small children as passengers unless they are strapped into a child car seat.

Children appeared to be affected by the trip delaying affects of the mitigation measures and were often reported as seen running across the ring road to get to school more quickly. The focus groups felt that the mitigation measures were not situated along the desire lines for the quickest route to some of the schools.

"I've actually had to stop where kids have just run out [across the ring road], they don't look they just run straight across"

(Female, Parents focus group)

Focus group respondents felt that the presence of the road had contributed to a reduced 'sense of community' and that over time the ring road had become a psychological boundary between the two wards dissected by the road. People use cars to overcome the severance caused by the road, but many felt this has also contributed to the loss of a sense of community as trips on foot were felt to aid interaction between residents.

4.4 Perceptions of mitigation methods

The study found that there are few pedestrian crossings that people are willing to use. Among the reasons for this are trip delay and diversion. In addition, there was found to be a range of 'secondary' severance effects caused by the ease and experience of using the mitigation measures themselves. Hence, the mitigation measure creates a barrier and, therefore, contributes to the severing effects of the road.

4.4.1 Subways

There are three main interlinked issues around the acceptability of the subways as mitigation measures for the ring road.

Perceptual:
Many respondents feel intimidated by using the subways as they fear becoming a victim of crime whilst using them. This is partly due to structural issues regarding the design of the subways meaning that people feel isolated, trapped and obscured from road level view and, therefore, 'informal surveillance' by other people is not possible. Environmental issues also play a part as respondents felt that vandalism such as graffiti is not removed regularly enough by the local authority and this further contributed to a feeling of fear (especially as lighting in the subway had been blacked out by graffiti). Fear of crime increases in the evening meaning that informal crossing is common at night. Respondents noted that people crossing the road at night were obscured from the driver's vision until the last minute due to the darkness and this increased fears around road safety.

Structural:
As well as making people feel isolated, the structural design of the subway also proved to be a problem in making accessibility difficult or impossible for some pedestrians. Factors such as the steepness of the ramps into and out of the subways were an issue for parents pushing buggies or prams, people with restricted physical mobility and wheelchair users. Cycle lane barriers that run through the middle of the subway entrances were also raised as an issue when trying to manoeuvre buggies, prams or wheelchairs through them (see Figure 3). Structural issues also contributed to some of the environmental problems.

Figure 3 – Community perceptions of mitigation: subway entrance

Environmental:
The structural design of the subways meant that flooding occurred after heavy rain preventing people from crossing without their feet getting submerged. Many people felt that the maintenance of the subways was poor in general and that graffiti, rubbish and even vomit were not being cleared away regularly enough. Lighting and convex mirrors to provide a view around the corners of the subway had been vandalised, fuelling the impression that the subways are hotspots for anti-social behaviour and increasing the perception and fear of crime.

> *"If it has rained heavily I jump across the dual carriageway in front of my house because it [the subway] is filled by floods… it can be up to your knee"*
>
> (Female, Young persons group)

4.4.2 Footbridges:

There is only one footbridge traversing the ring road but it was the key pedestrian route to the hospital and leisure centre. Crossing the footbridge at night was considered to be unpleasant when walking alone as the structural design meant that people felt trapped and this increased fear of becoming a victim of crime. This was compounded by the absence of lighting on the bridge apart from a minimal amount provided by adjacent street lamps along the ring road

> *"I would go straight across the road rather than using the bridge because you are more in sight and it is quite scary going over the bridge if you are by yourself. It is completely pitch black up that way and you are in complete darkness"*
>
> (Female, Young persons group)

People also reported that youths throw objects from the footbridge onto passing vehicles below.

Older people tended not to use the bridge and found the long sloping ramps up to the bridge difficult to use (see Figure 4). The bridge was not gritted in winter and was felt to be unsafe to use in the ice and snow, particularly for the elderly.

Figure 4 - Sloping ramp to footbridge

People who had lived in the area at the time of the ring road construction felt they had not been listened to by practitioners designing the road and its mitigation. In particular, the local knowledge regarding desire lines appears not to have been taken into account. Although the road was constructed around thirty years ago, it is clear that proper consultation with communities on the design and mitigation of the road might have prevented some of the existing problems.

In summary, the following can be concluded from the community dissected by a major road:

- Community members were able to identify a broad range of physical and psychological barriers caused by the road itself. In addition, 'secondary' severance where a second barrier had been created by the inadequate mitigation measures in place was also identified. The result of the physical and psychological barriers meant that a perceptual boundary between the two parts of the ward severed by the road had developed. The severing effects of the road had not diminished over time and this appears primarily to

be as a result of the poor mitigation measures put in place when the road was constructed in the 1970s.

- There is little evidence of people being totally deterred from making a journey to the other side of the ring road although most people reported using their cars rather than travelling on foot to get across. However, those people without access to a car for a particular journey (including getting a lift or taxi) are forced to use the mitigation measures despite their lack of acceptability and accessibility.
- The impacts of severance on those living alongside the road varied at different times of the night and day. Heavy traffic caused problems during the day, and loud noise occurred at night, due to people speeding along the road.
- In order for mitigation to be effective it needs to take into account the ease and experience of using the subways and footbridge at different times of the day and for different social groups. Good design and maintenance would help to raise accessibility and acceptability levels and this is especially important for those people without access to a car. Designing in good informal surveillance (for example CCTV) and lighting, in addition to reducing the visible existence of vandalism or poor maintenance, can help to reduce fear of crime.
- People need to be fully consulted on any proposed new schemes or changes to schemes (including the addition or modification of mitigation measures). Consultation should aim to be representative of all the social groups affected and in practice this means using a 'purposive sampling' technique that will *actively* sample different types of people from communities. Using this technique also avoids consultation that only feeds back the views of those in the community who are most vocal. Some groups such as parents of young children and those with restricted mobility may find it difficult to make journeys to consultation meetings or presentations and so specifically sampling and recruiting these groups ensures that their needs are fully taken into consideration.

The next section briefly outlines the UK policy environment in which community severance is addressed.

5 ADDRESSING SEVERANCE: GUIDANCE FOR PRACTITIONERS

There are currently two ways in which community severance might be identified when considering the implementation of a new transport scheme; appraisal of major schemes and environmental impact assessment. Official guidance for practitioners on how to identify, measure and mitigate the barriers associated with community severance is primarily focused on the stages of transport scheme appraisal and environmental assessment of new or large scale improvements of transport schemes [2].

Prior to the construction of new or large scale improvement of existing transport schemes, analyses are conducted to assess the potential impacts of a scheme (economic, environmental and social). The extent of community severance that might occur (should the scheme go ahead) is considered during two forms of analysis: transport scheme appraisal and environmental assessment.

Transport scheme appraisal aims to estimate the potential costs and benefits (economic, environmental and social) of a scheme prior to its construction or improvement. Appraisal information for 'major schemes' is used by the Highways Agency and Department for Transport to decide whether to approve the implementation of a proposed scheme. Guidance on how to conduct transport scheme appraisals is set out in WebTag (the Transport Analysis Guidance website).

Environmental assessment is undertaken as a matter of regulation to inform the land use planning process of the significant environmental effects that a programme, plan or project may have. There are two forms of environmental assessment: strategic environmental assessment (SEA) which applies to programmes and plans in England, and environmental impact assessment (EIA) which applies to projects in the UK. The approach to the environmental assessment of highways in England is set out in the Design Manual for Roads and Bridges (DMRB) Volume 11 [4].

The definition of community severance given in DfT's WebTag and DMRB is limited to analysis that considers the physical separation of residents from facilities, with recognition that community severance barriers may affect the movement of older people, children and disabled people to a greater degree than other groups.

6 CONCLUSION AND RECOMMENDATIONS

The Social Exclusion Unit [25] made links between the social impacts of community severance and social exclusion. Physical and psychological severance barriers are seen to both reduce accessibility to key services (such as health, education and employment opportunities and food shops) and also to damage local social networks and community 'cohesion' by inhibiting social interaction. Both these factors are felt to contribute to the social exclusion experienced by particular groups of people (predominantly those on low incomes). Those people living in areas suffering from a wider range of social exclusion issues are felt to be disproportionately affected by the impacts of severance.

As part of this study, 45 local authorities from each of the nine English regions were asked to identify the practitioners in their area that dealt with community severance. Very few of those sampled were involved in assessment appraisal and there was a lack of knowledge amongst practitioners about the DMRB volume 11 method for assessing community severance. This raises questions about who is conducting transport scheme appraisals, how they are conducting the analysis of potential community severance and how findings from appraisals are fed back to practitioners in the local highway authority.

Practitioners noted that in order to assess the effectiveness of the mitigation measures used, more funding would be needed. Evaluation of the impacts of mitigation measures would provide evidence that could inform them about good practice when designing future schemes.

6.1 Recommendations

There are three national level policies that encourage the formal identification of either new or existing community severance. These are accessibility planning, transport scheme appraisal and environmental assessment. The following enhancements to these approaches could be considered in order to deal with community severance more effectively:

Where appropriate, policies could be further developed to include the following effects of community severance:

- Consideration of whether community severance will encourage greater car use in order to mitigate physical or psychological barriers as this is felt to reduce community cohesion through a lack of face to face interaction, and has implications for other areas of transport policy, such as congestion

- Consideration of how community severance effects might change between day and night (e.g. congestion in the day and high traffic speeds and noise at night)
- Consideration of how secondary community severance might occur through the inaccessibility or unacceptability of mitigation measures
- Consideration of the needs of a wider range of social groups than those currently identified as being most vulnerable to the effects of community severance (currently noted as children, older and disabled people) to include those without access to a car (identifiable using national statistics) and parents/carers pushing buggies
- Where public consultation is undertaken as a part of the process of assessment, representation of a wide range of social groups should be actively sought including those most hard to reach; The use of purposive sampling (used for the community case study) would help to enable targeting of consultation at the most affected groups. Truly representative consultation would enable a reduction in the impact of the community severing effects of a new scheme and an increase in the acceptability of the mitigation measures put in place.

6.1.1 Local transport plans and accessibility planning recommendations

Currently accessibility planning guidance and indicators map the location of key facilities in relation to public transport service provision and 'as the crow flies' walking distances between disadvantaged communities and key services, such as health services, education and good quality food shopping, and employment opportunities. It is suggested here that a consideration of whether community severance barriers reduce a person's ability to access key services (especially on foot, by wheelchair or bicycle) could also be taken into account during this process.

Practitioners noted that little funding is available to maintain or modify existing poor mitigation. If post-opening evaluation were undertaken, ineffectual mitigation could be identified and funding put in place to rectify problems. Lessons learnt through evaluation would also provide practitioners with the case study evidence they requested.

6.1.2 Appraisal and assessment recommendations

It is clearly very challenging to try to predict the social impacts of a scheme, but post-opening evaluation of a scheme could be an effective way of learning lessons, a) to feed back throughout the process and b) to make further improvements to the scheme and/or other transport schemes in the local area. Evidence from a number of evaluations could be reviewed to assess common lessons learnt relating to the social impacts of schemes, which could further refine guidance. Certainly, it is recognised that representative public consultation would ensure that the needs of all social groups (including those who do not respond to traditional consultation methods) are taken into account prior to scheme construction.

There is an apparent lack of funding for scheme developers to consider mitigation measures up until the very last stages of obtaining approval for a scheme. It would perhaps be prudent for DfT to review whether it is possible to encourage scheme designers to consider a 'mitigation strategy' for entire schemes at a very early stage.

Given its history and inertia in the UK, community severance is increasingly being acknowledged as a principal barrier to social inclusion and wellbeing among more deprived and vulnerable members of society. The challenge now is for the government to recognise the merits of evaluating the impacts of mitigation measures and provide evidence that informs practitioners when designing future schemes.

REFERENCES

1. Guo, X. Black, J. and Dunne, M. (2001). Crossing pedestrians and dynamic severance on main roads. Road and Transport Research, September 2001

2. James, E. Millington, A. Tomlinson, P. (2005). Understanding community severance part 1: views of practitioners and communities. TRL Report produced for the Department for Transport. Crowthorne: TRL Limited

3. Social Exclusion Unit (2003). Making the connections: final report on transport and social exclusion. London: Office of the Deputy Prime Minister

4. Highways Agency (1993). Design manual for roads and bridges, Volume 11, Section 3, Part 8: Pedestrians, Cyclists, Equestrians and Community Effects. London: Stationary Office

5. Tate, F. N. (1997). Social Severance. Transfund Research Report No. 80. New Zealand: Transfund

6. Clark, J. M. Hutton, B. J. Burnett, N. Hathway, A. and Harrison, A. (1991). The appraisal of community severance. Contractor Report 135. Crowthorne: Transport and Road Research Laboratory

7. Grigg, A. O. and Ford, W. G. (1983). Review of some effects of major roads on urban communities. TRRL Supplementary Report 778. Crowthorne: Transport and Road Research Laboratory

8. Pigou, A. C. (1924). The concentration of population. Essays in Practical Economics

9. Liepmann, K. K. (1944). The journey to work: its significance for industrial and community life. Kegan Paul, Trench, Trubner and Co. Ltd.

10. Ministry of Transport (1963). Traffic in towns, the Buchanan report. London: The Stationary Office

11. Urban Motorways Committee (1972). New roads in towns. London: The Stationary Office

12. OECD (1973). The effects of traffic and roads on the environment in urban areas. A report prepared by an OECD Roads Research Group. Paris: Organisation for Economic Co-operation and Development

13. Lee, T. R. Tagg, S. K. and Abbott D. J. (1975). Social severance by urban roads and motorways. Department of the Environment Symposium on Environmental Evaluation. London: The Stationary Office

14. Department of Transport (1983). Manual of environmental appraisal. London: Stationary Office

15. Standing Advisory Committee on Trunk Road Assessment (1986). Urban road appraisal. London: The Stationary Office

16. Chinn, L. and Davies, G. (1995). Developing a simple method for estimating potential community severance. Crowthorne: TRL Limited

17. Scottish Executive (2001). Scottish transport appraisal guidance. Edinburgh: the Scottish Executive

18. Adams, W. F. (1936). Road traffic considered as a random series. Journal of Civil Engineers, 4, pp 121-130

19. Tanner, J. C. (1962). A theoretical analysis of delay at an uncontrolled intersection. Biometrika, 49, pp 163-170

20. Department of Transport (1984). Traffic Appraisal Manual. London: The Stationary Office

21. Travers Morgan Planning (1987). South circular assessment study. Environmental Study: Technical Report. London: Department of Transport

22. Halcrow et al (1987). West London assessment study. Stage 1 report – technical note 4: Environment Appendix 4H: Severance. London: Department of Transport

23. Highways Agency (2002a). Access to transport and accessibility and community effects. London: Highways Agency

24. Highways Agency (2002b). Managing integration: understanding non-motorised user audits. London: Highways Agency

25. Social Exclusion Unit (2003). Making the connections: final report on transport and social exclusion. London: Social Exclusion Unit

26. Reducing community severance 2007, Highways Agency, London, viewed 17 January 2007 [www.highways.gov.uk/knowledge/9631.aspx]

27. Office of National Statistics (2001). Census of population. London: Office of National Statistics