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M. Page and R. Dixey (1996) *Schools in the Community: Action Research on Safety (SCARS) Project. Deliverable Number 2, Report on Before Surveys.* Institute of Transport Studies, University of Leeds, Working Paper 473

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ITS Working Paper 473

May 1996

SCHOOLS IN THE COMMUNITY: ACTION RESEARCH ON SAFETY (SCARS) PROJECT
Deliverable Number 2, Report on Before Surveys

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Work on the SCARS project was supported by the LINK TIO programme

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Schools in the Community: Action Research on Safety (SCARS) Project

Deliverable number 2

Report on Before Surveys

Document control information

Title	:	Deliverable 2, Report on Before Surveys
Author(s)	:	Matthew Page, Rachael Dixey (LMU)
Reference Number	:	446523/002
Version Number	:	1.0
Date	:	7 May 1996
Distribution	:	SCARS project team; DoT
Availability	:	Unrestricted
File	:	K:\HOME\MPAGE\SCARS\DEL2.DOC
Authorised	:	M.TIGHT
Signature	:	

Contents

1. Introduction

This document represents the second deliverable of the Schools in the Community: Action Research on Safety (SCARS) project. The project is a joint one between Leeds City Council's Road Safety Promotion Unit (RSPU), the Faculty of Health and Social Care at Leeds Metropolitan University (LMU) and the Institute for Transport Studies at the University of Leeds (ITS). The objectives of the project are:

- To develop a whole school approach to road safety
- To raise awareness among adults about their responsibilities for road safety
- To evaluate the benefits of the approach

This document outlines the way the project team has approached the last of these, the evaluation of the benefits. In particular it gives details on the selection of study sites, the various studies that were undertaken and some preliminary results from these studies. This document does not give information on the interventions that have and are taking place. It is inevitable that, as part of these interventions additional information about the success or otherwise of the initiative may be obtained, such as how much information has been successfully imparted to children, how many meetings of community groups have occurred etc. The studies outlined in this document, therefore, only form part of the evaluation process. As the project is only part way through, this document does not include any evaluation of the success or otherwise of the initiative as a whole for the very simple reason that no 'after' studies have yet taken place. The initiative as a whole will be evaluated in the Final Report of the project.

2. The evaluation of road safety benefit

The evaluation of the road safety benefits of schemes or initiatives at both the local or national level has often been a source of some controversy. Even at the national level there is disagreement about whether the current general picture one of improvement. It is indeed the case that over recent years total road accident casualties have declined and that fatalities have declined more quickly than other casualty classes, but there has been disquiet that these results have partly come about because of changes in behaviour (especially the behaviour of vulnerable road users) as well as for other more obvious reasons such as the increased use of in-car safety devices and improvements in road design.

At a more local level there has been much discussion over whether an accident record actually indicates how safe (or unsafe) a particular location or road user group actually are. Whether an accident occurs obviously depends upon a range of different factors. Even if the exposure of vulnerable road users is similar in different locations, increased vigilance can lead to a lower accident record in places which are perceived as dangerous. Similarly, roads which are perceived as safer, can appear to be more dangerous than they really are from the accident record. It is widely accepted that some degree of risk compensation occurs and that this can lead to a false idea of the real and intuitively correct level of safety or danger. Inevitably, this leads to problems in evaluating whether safety is improving or not.

The SCARS project proposal identifies the number of accidents in a given period as the standard measure of safety outcome and goes on to recommend the use of methods involving the observation of near-accidents (or conflicts) as a proxy. The technique of conflict studies can allow safety schemes to be successfully evaluated in a much shorter time as 'near-misses' are far more common than actual injury accidents. However, the project team identified a number of problems with this approach at a fairly early stage in the project.

The approach which it was anticipated would be taken in developing and implementing the interventions, explicitly questions the relationship between accidents and danger (for, amongst others, the reasons outlined above). It may well be that this approach, which seeks to reveal and influence the very real conflict on the roads through questioning the present status quo, will lead to increased levels of conflict at least in the short term. The longer term aim of such an approach is to encourage a change towards a safer transport system which might include more restrictions on private motorised transport and greater use of intrinsically safer modes. The intervention was also felt likely to include some kind of training or advice on how to cope with danger on the roads. It was thought likely that this might reduce conflicts on the roads, or at least help vulnerable road users to cope with conflicts that were occurring and therefore reduce their severity. However, it was also possible that the conflict reduction effects of the training elements of the intervention might well be outweighed by increased use of vulnerable modes and some effects of the other elements of the intervention (such as the critical examination of the present hierarchy of road users). On the other hand, if sites with a serious accident record which might be expected to be used by a large enough proportion of trained vulnerable road users and if exposure was also taken into account, it was felt that it might be possible to measure a change in the number of conflicts.

It was also felt that conflict studies of the type anticipated were mainly developed for the study of particular locations to evaluate the effect of a direct physical intervention at the location. For the SCARS project, they were to be used to evaluate the effects of an indirect intervention at school and community level, which involves trying to influence road users by means of education, training and publicity. How successful such a technique is likely to be at detecting what might be a much more subtle and longer term effect was felt to be open to question. It certainly poses potential problems in the selection of appropriate sites where a high enough proportion of the road users have been exposed to the intervention.

There was also concern that it might be extremely difficult to identify appropriate sites which have a serious enough accident record to indicate that they might have a sufficiently large number of conflicts over a practical time scale for the evaluation to demonstrate a high level of confidence in any reduction which is likely to occur.

It was therefore felt that other surveys were necessary to try and ensure that a convincing evaluation of the interventions could be undertaken. The design and planning of these additional surveys was problematical as it was difficult to foresee what tangible effects the interventions might have which would be measurable by some form of quantitative data gathering process. This problem has been encountered by other researchers, Routledge et al (1976) when looking at the different ways adults and

children cross the road, were '...unable to identify any simple behavioural measures by which we can assess safety programmes.' (they were interpreting safety in terms of accidents divided by exposure).

After extensive discussion and experimentation, a mobile observer method was developed for the collection of pedestrian crossing behaviour. This method is described in section 4.2.1. It was hoped that this data collection method will have collected a wide enough range of behavioural information to allow analysis of the effects of the interventions on pedestrian crossing behaviour in the study areas.

The project plan also outlined various project evaluation procedures, some of which would involve more in depth behavioural and attitudinal work. This was carried out by staff from LMU. This involved questioning of the people who might be affected by the interventions and some more in depth interviewing of parents (which is ongoing).

As the interventions planned sought to tackle road safety partly from the point of view of identifying the sources of danger on the roads, it was critical that the behaviour of motor vehicles was also surveyed as part of the evaluation procedure

In essence therefore, as it was impossible to be certain of the nature and extent of the behavioural changes and other changes that might occur. As wide a selection of data as possible was collected. Table 1 gives a brief description of the types of data that were collected.

Table 1 The types of data which were collected

type of data	collector	use	analysis	see sections
conflict studies	LCC	evaluate changes in numbers of conflicts and therefore predict changes in accidents	ITS	4.1
pedestrian road crossing data	ITS	evaluate changes in pedestrian crossing behaviour and flows	ITS	4.2, 5.1
vehicle speeds and flows	LCC	evaluate changes in vehicle speeds and flows	ITS	4.3, 5.2
In depth attitudinal and behavioural data	LMU	evaluate changes in attitudes and perceptions of road users	LMU	4.4, 5.3

3. Selection of the study areas

The selection of study sites to try out the interventions proceeded at the same time as consideration of the most appropriate way of evaluating the road safety effects. The two processes therefore interacted to a certain extent with the development of the evaluation methods being influenced by the nature and extent of the study areas and the choice of study areas being influenced by the evaluation methods envisaged.

It was decided at an initial stage that three different study areas were required. In one of these areas (the 'control' area) no interventions would be attempted (apart from the

normal range of services that are offered by the RSPU to all schools in the Leeds area), in the second area intervention at the school level alone would take place, while in the third a full school and community approach would be implemented. This meant that there exists the potential for examination of which levels of intervention (the school or community approaches) were responsible for observed changes (if any) and whether there was value in undertaking the fuller approach. All three areas had to be reasonably similar (in size, type of housing, transport use etc.) for this method to be valid, they also had to have a reasonably identifiable community to enable community based interventions, as well as appropriately sited primary schools. The study areas were initially identified from an overplot of accidents involving primary school age children. After site visits and further consideration the following areas were identified as being appropriate:

- Middleton to the south of the city
- Swarcliffe to the east of the city, outside the outer ring road.
- Seacroft to the east of the city inside the ring road

Maps of the general location and the more detailed layout of these areas are given in Appendices A and B.

These areas were selected because they represented similar outer residential area 'estates' with similar low density housing stock. Three schools were identified in each area and these are also marked on the maps.

After further consideration and contact with the schools who might have to get involved in the interventions, the three levels of intervention were allocated to the areas in the following manner:

- Middleton - school interventions only
- Swarcliffe - school and community interventions together
- Seacroft - control

It is conceivable that since the willingness of schools to take part in the project influenced the choice of level of intervention in an area an element of bias might be introduced to the experiment. However, it was difficult to adopt any other strategy given the practical difficulties in persuading schools to get involved in the project. In any case, while the three areas are similar, they are not, of course, identical and therefore there are other possible biasing factors involved in the experiment. The choice of level of intervention did not affect the evaluation studies that were undertaken in all three areas.

4. The studies that were undertaken

4.1 Conflict studies

One of the problems with the conflict studies that was identified early on was the lack of locations that had an accident record which would indicate that a sufficient number of conflicts could be detected in a feasible observation period. This was not just apparent for our study areas, but was also apparent across large areas of Leeds.

One site in each study area was however identified as showing the greatest potential for conflict observation. These sites are shown on the study area maps in Appendix B. Note that the Seacroft site was moved from near the parade of shops on the main South Parkway road to a nearby cross roads when it was discovered that the Local Authority had a road improvement planned for South Parkway.

The conflict studies observers used were specially trained members of the Accident Studies section of the Highways and Transportation department of Leeds City Council. They were issued with specific instructions about the collection of data and blank incident recording sheets. The technique used was the Swedish Traffic Conflicts Technique (Hyden, 1987). The instructions issued to the observers are given in Appendix C.

Pilot studies were organised for early in June 1995 for one hour at each of the three sites. In order to minimise the number of hours spent observing while maximising the chances of observing a conflict, the observers were only present at the study sites between 3 and 4pm on weekdays, when the greatest amount of child pedestrian activity was liable to occur (due to school closing times during this hour).

The studies only revealed two conflicts at all three sites over the three hours spent observing (in total), one in Seacroft and one in Middleton. Using a standard table, the times to accident were calculated and found to be 1.8 and 2.4 seconds respectively. Taking into account the speed of the vehicles involved (20 km/h and 30 km/h respectively), both conflicts were assessed as 'non-serious'. Report sheets from these conflicts are given in Appendix D.

The extremely low level of conflicts observed meant that there was only a negligible likelihood of collecting data on enough conflicts to be able to say, with any degree of confidence, that a change in behaviour would be detectable in the 'after' case. Bearing in mind the high cost of this kind of data collection and the limited time available, it was decided not to continue with this form of data collection.

4.2 Behavioural studies

As explained above, it was anticipated by the project team that additional data on the behaviour of pedestrians in the study areas would be collected.

At first video methods were investigated to see if recording of pedestrian behaviour could provide a convenient way of collecting the data required. However this proved to be impractical because it proved difficult to provide locations where the videoing could take place from. Lighting standards were impractical because the cameras would have to be easily accessible, weatherproof and theft proof and there were few appropriate standards in the study areas. Appropriate upstairs windows were also considered, but rejected because of the degree of access required and the restricted views that could be obtained from the few appropriately sighted windows. In addition, the video technique would be very tied to a particular location, in the same way as the conflict studies. While it is easier to collect data at a particular location, because of the nature of the intervention, it seemed more valid to collect data over a wider area. It

was also felt that it might be important to collect data for more than just the school journey and/or over a wider area than directly outside the school itself.

It was therefore decided that a mobile observer method would be best suited to the needs of the project. After a series of site visits and pilot studies a firm description of the technique was developed.

4.2.1 The data collection technique

The purpose of the data collection exercise was to collect relatively simple data on the crossing behaviour of groups of people (particularly primary school children) in the study areas. While it was difficult to be completely fair in selecting a sample of crossing incidents, it was hoped that by ensuring consistency in the before and after studies, changes in behaviour would be detected.

The method chosen was to use an observer, who collected data at a number of points in the study area at similar times over a five day period. There are 10 data collection points in each study area (details of these data collection points are given in Appendices B and E). They are arranged in a particular numbered order and two observers were used to traverse them On each day of the observation period, a different start point was selected, thus ensuring that, over the five day period, every point was an initial point (for one or other of the observers).

4.2.1.1 Details

Each crossing movement by a group of people or an individual person or sight of a group playing in the road is defined as an 'incident'. The aim was to record details of all incidents seen by the observer from the data collection points.

Two observers were used, they both start at adjacent points on each day, but go in different directions, one clockwise, one anticlockwise, round the route (the clockwise observer counts through the data collection points in one direction, the anticlockwise the other). The observers generally passed each other half way round the route (usually somewhere between the fifth and sixth data collection points) and were at adjacent data collection points at the end of the hour.

Observers recorded the time (hours and minutes) each time they started recording at a point, together with the point number, and then again when they finished recording at a point. Small hand-held cassette recorders were used to record the data, it was hoped that these would be relatively inconspicuous.

Observers collected details of all incidents in the area they are covering from their data collection point. These areas were indicated on maps of each area and in words in the data collection point descriptions (see Appendices B and E). Observers collected data for precisely two minutes at each data collection point, then moved on to the next point. Observers attempted to space their observations, that is, tried to ensure that they started collecting data at a point about 6 minutes after they started collecting at the previous point.

Observers were given some more detailed instructions about exactly how to collect the data and what to do if challenged. Each school was informed that a data collection exercise was going on in their area and the police were also contacted.

4.2.1.2 What data was collected

Incident data was collected for all groups or individuals crossing the road. A 'group' was defined as any number of children and/or adults walking together. The precise details that were collected for each group were:

1. Number of adults (aged 18 or over) in the group, together with sex
2. Number of infants in prams/buggies in the group
3. Number of older children in the group (over primary school age, i.e. over 11)
4. For the primary school age children in the group:
   a) number who were hand in hand with adult
   b) number who were under the close supervision of an adult (less than 10m from an adult in the same group)
   c) number who were walking independently (no adult in group)
5. Whether the group was playing in the road or not.
6. For groups using a controlled crossing (pelican zebra or school crossing patrol), whether the crossing was used correctly or not or a dash '-' if controlled crossing not used at all.
7. For other groups:
   a) whether the leader of the group looked before crossing
   b) whether the leader of the group stopped before crossing to give way to traffic
   c) whether the leader of the group stopped before crossing anyway
   d) whether any children in the group ran all or part of the way across the road
   e) whether any adults in the group ran all or part of the way across the road

Preformatted forms for transcribing the data into the Excel spreadsheet program were provided. An example of a completed form is given in Appendix F.

4.3 Vehicle behaviour studies

In order to record details of vehicle behaviour, standard pneumatic tube detectors were used. These allowed data on flow and speed at 15 minute intervals at two sites within each study area to be collected (the locations of the vehicle data collection points are shown in Appendix B). Sites were chosen to be as representative as possible of the roads that pedestrians (and child pedestrians in particular) were crossing in the study areas. In each study area what were perceived (from the site visits) to be a relatively quiet and a busier road were selected to give a range of conditions. Care was taken to position the data collection points away from where they might be interfered with, but due to the high level of child pedestrian traffic, the possibility of tampering could not be entirely prevented.

4.4 LMU Behavioural and attitudinal studies

A questionnaire survey was planned, such that behaviour and attitudes could be recorded for control and participating schools, prior to any educational and community intervention, and then recorded again at the end of the intervention. Results from pre- and post-intervention would then be compared. The questionnaires for parents and children were thus designed bearing in mind the intentions of the intervention. The

questions were piloted with a sample of mothers and with their primary school aged children. This gave useful feedback. They were also presented to teachers in two schools to test suitability for the age groups. It was decided on the basis of this discussion that the children's questionnaire would be given to children aged 7-11 but not below 7. Meetings had been held with all the schools taking part (pilot and participating in the intervention) to explain the purpose of the pre-survey. The final version of the questionnaires were taken to schools in the second half of June 1995, with instructions for teachers on how to ask their class to fill them in. The children were asked to take a questionnaire home for their parents. Completed questionnaires were collected from the schools before the end of the summer term, with an envelope left for any latecomers (only a handful were sent on in this way.)

The first section of both questionnaires asked about actual and preferred mode of journey to school. The second section 'Outside School' was interested in whether these modes were also favoured for travel for other journeys and also whether children were allowed to play out. The third section asked questions about the neighbourhood, with general queries first, to see whether the issue of road safety came up here, or whether there were also other safety issues which were of concern. Finally personal details were recorded. The questionnaires were anonymous, with no names or addresses asked for.

1043 completed children's questionnaires were returned, and 748 from parents. Approximately 46% of parents returned the questionnaire, and approximately 65% of children. However, these figures mask differences between schools; for example one school only returned 25 completed children's questionnaires, with much higher returns from others.

Copies of the questionnaires used are given in Appendices G and H.

5. The results of the studies

5.1 Behavioural studies

There seemed to be no serious problems with the data collection exercise. The observers completed Excel spreadsheets for each day of data collection, an example of a completed spreadsheet page is shown in Appendix F. The actual amount of data collected was enormous, each data collection point (10 in each area, so 30 in all) was visited five times by each observer (10 times in all) at different times between 3 and 4pm on weekday afternoons. The number of group crossings ('incidents') observed in the two minute observation periods varied very widely. At quiet periods and in quiet parts of the study areas it was frequently the case that no crossings were observed, however, at busy sites and at busy times (immediately after school closing time) 30 - 40 pedestrians were observed to cross in some two minute periods. The total number of pedestrians observed was 2166 (including infants in prams).

For the following figures, data from the two different observers and for different days has been plotted on the same graphs. This allows the analysis of pedestrian flow over time.

Figure 1 shows the pedestrian flow over time at data collection point 6 outside Grimes Dyke school in Swarcliffe. The dramatic rise in pedestrian crossing activity at school closing time is obvious, as is the low level of pedestrian crossing activity outside this time. Note the number of female adults crossing rises steeply just before school closing, whereas the number of male adults is little changed. This indicates that escorting the children home from school is still a predominantly female activity.

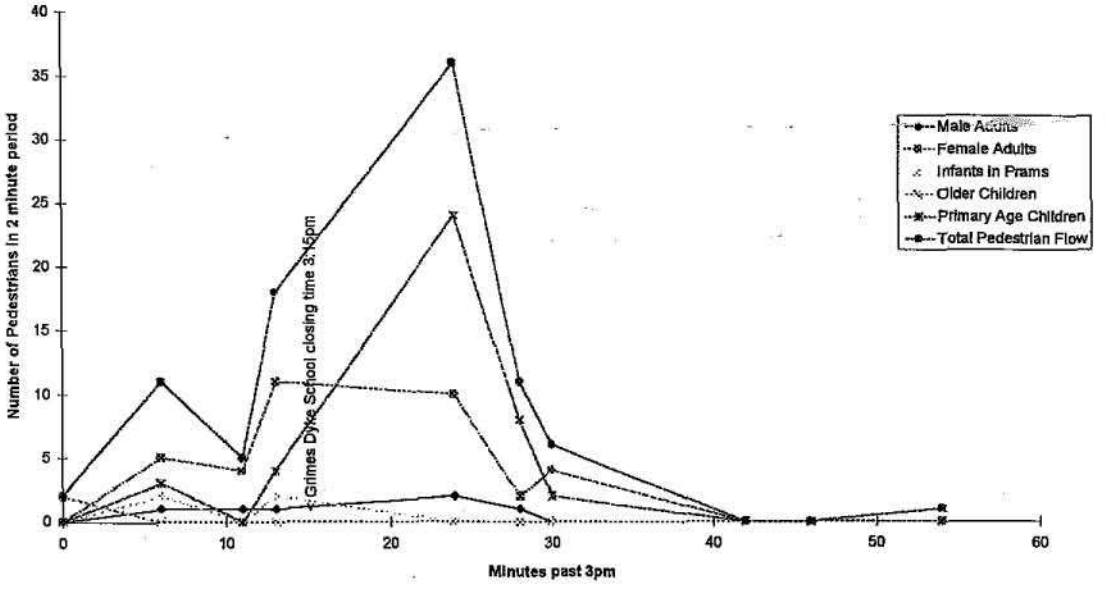


Figure 1 Pedestrian flow over time, data collection point 6 in Swarcliffe

A similar pattern is seen in Figure 2, which shows data collection point 1 in Swarcliffe. However, this data collection point is some distance from the nearest school (St

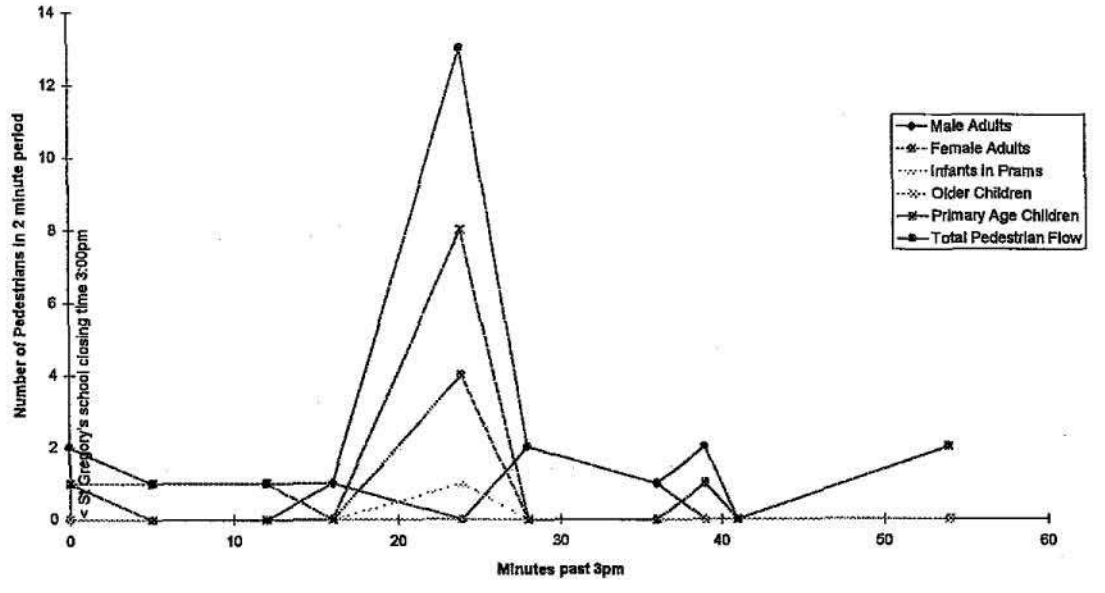


Figure 2 Pedestrian flow over time, data collection point 1 in Swarcliffe

Gregory's), so the increase in pedestrian crossing activity is delayed somewhat.

Similar graphs were obtained from many of the other data collection points. It seems that pedestrian activity in these residential areas is dominated by trips to and from school, at least at the times and places surveyed.

An analysis was also done of the proportion of groups where the leader of the group looked before crossing (note that this information was only recorded if the group was not on a controlled crossing or did not use a crossing correctly). See section 4.2.1.2 for a description of what data was collected.

Figure 3 shows (for Swarcliffe) the numbers of groups crossing and the percentage (right hand scale) of groups whose leaders looked before crossing. The data from only one enumerator was used in this analysis because the other enumerator was slightly inconsistent in his recording of group behaviour. Similar analyses were done for the other two study areas.

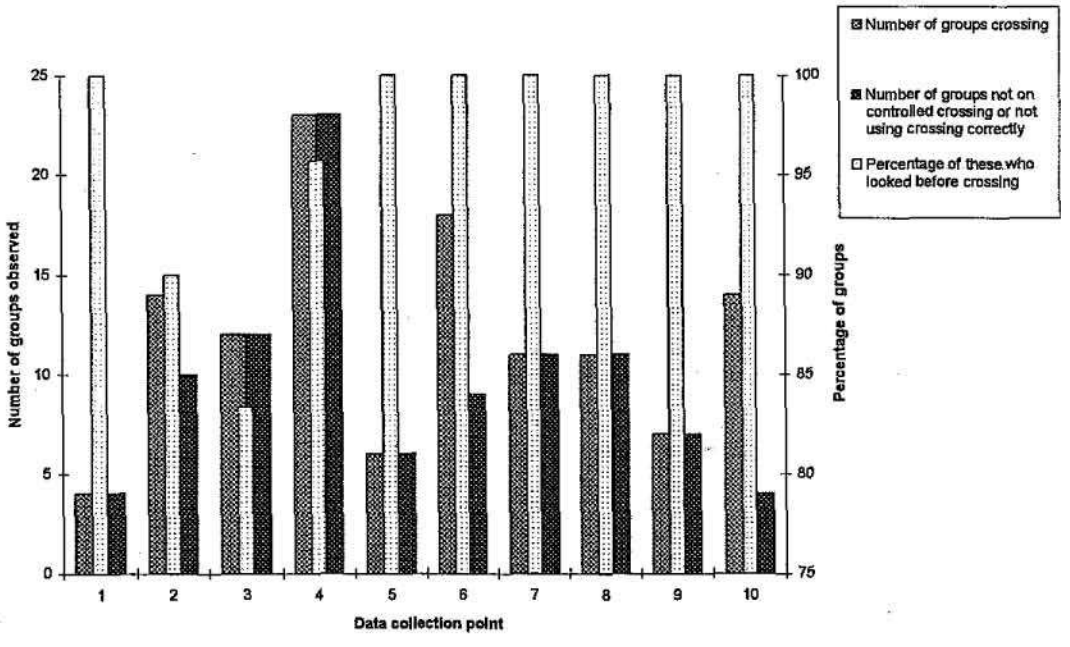


Figure 3 Groups crossing and percentage looking before crossing in Swarcliffe

As can be seen from Figure 4 the data collection points where lower percentages of looking were seen (for Swarcliffe only data collection points 2, 3 and 4 gave percentages lower than 100) did not seem to be those sites which were particularly quiet, next to school or have any other distinguishing features. Additionally, the percentages were generally so close to 100 that the variations from 100 could easily be attributable to error (the observation of looking behaviour in real crossing situations is difficult). The lowest percentage of lookers was 84 (data collection point 3 in Swarcliffe), but this represented only 2 (out of 12) groups whose leader was not seen to look. Only at one data collection point were three cases of not looking recorded (data collection point 10 in Seacroft, out of 21 groups, therefore 86% did look).

In general, therefore, it seems that there was a generally high level of looking and this does not appear to be correlated with factors such as whether the road is a main one or not and proximity to the schools.

A similar analysis was done for groups where either a child or an adult member of the group were observed to run part or all of the way across the road.

Figure 4 shows (for Swarcliffe) the number of groups not on a controlled crossing or not using a crossing correctly (running behaviour was only recorded for such groups), together with the percentage of groups where one or more adults ran and the percentage of groups where one or more children ran (both on the right hand scale).

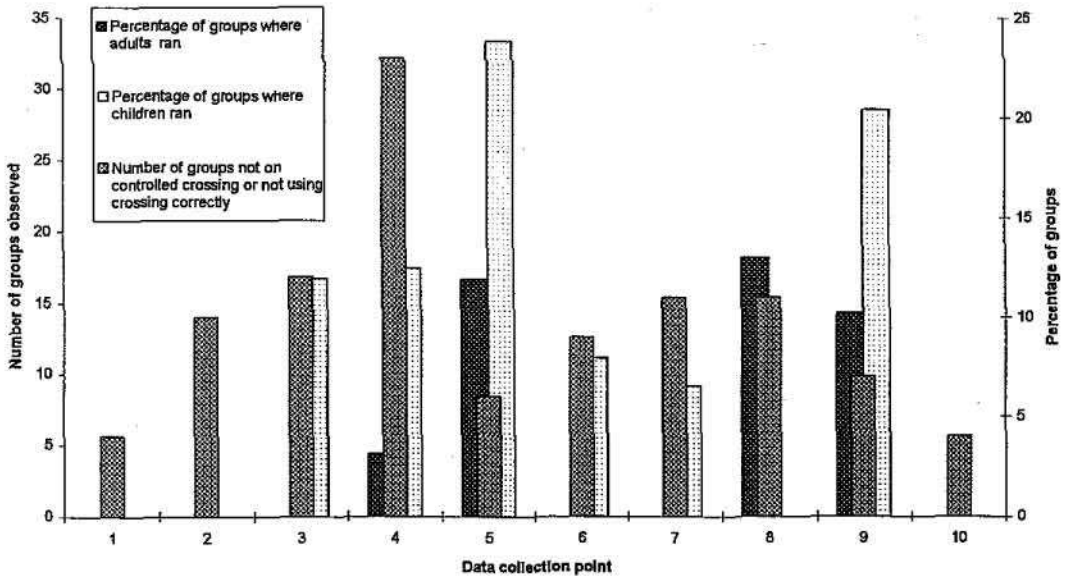


Figure 4 Percentage of groups where members ran in Swarcliffe

Again, the data collection points where there was either a high or a low proportion of running did not seem to be associated with either particularly quiet or busy roads, or proximity to schools. It might be that running behaviour (particularly in children) is impulsive or frequently done for reasons unrelated to the presence or absence of motor vehicles. Alternatively, the relatively modest differences in the 'busyness' of the roads observed may not be sufficient for changes in behaviour due to traffic to be observed.

Figure 5 shows (again for Swarcliffe), the number of total number of primary school age children, the number of these who were hand in hand and the percentage of the total number that this represents. Analysis of level of supervision was initially done for children who were hand in hand as this was the highest level of supervision recorded and was the easiest to observe. The data from both observers was used in this analysis. As with the other graphs, there seems to be no relationship between hand holding and the 'busyness' of the road being observed, but the same observations that were made about running and looking behaviour could be made about supervisory behaviour.

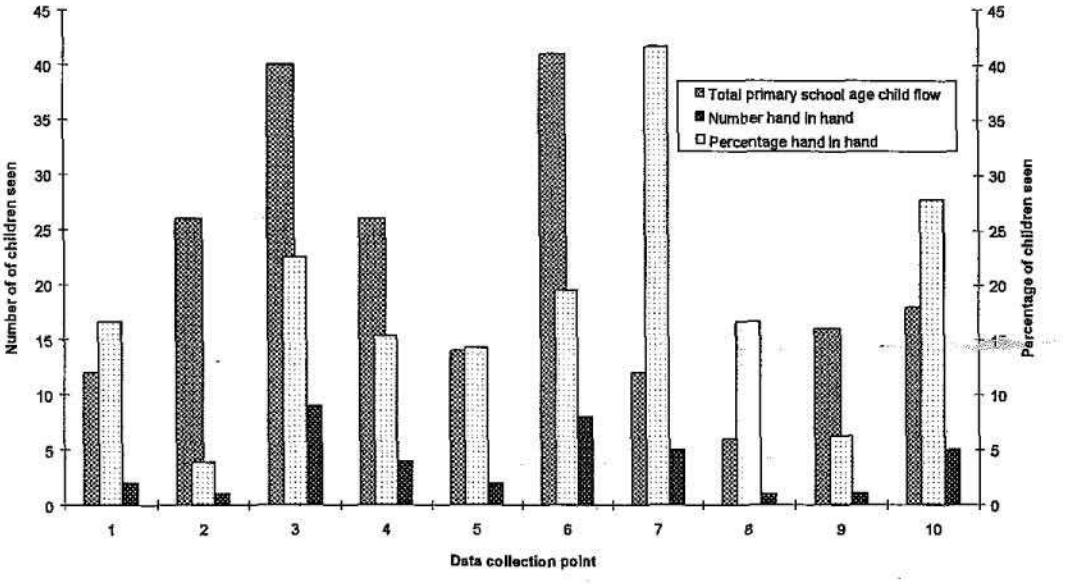


Figure 5 Percentage of primary age school children hand in hand in Swarcliffe

5.2 Vehicle behaviour studies

The data collection exercise provided two way traffic counts, classified by speed over a week. The data were collected over a similar period to the behavioural data at 15 minute intervals. From the 15 minute counts, 24 hour flows were calculated along with 85th percentile speeds.

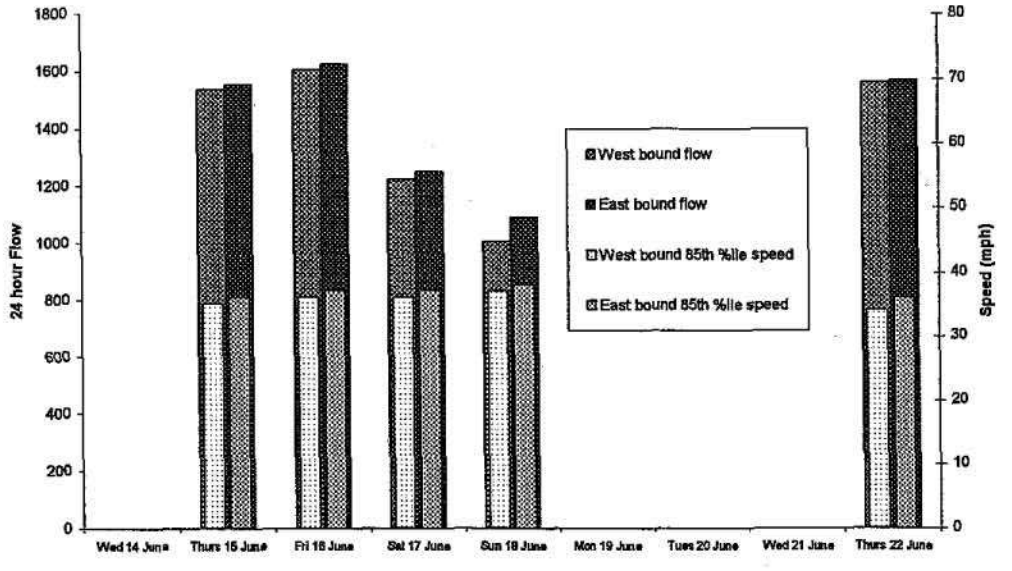


Figure 6 Flows and speeds at Stanks Drive, Swarcliffe

Figure 6 shows the 24 hour flows and 85th percentile speeds (right hand scale) for Stanks Drive in Swarcliffe. Unfortunately on only 5 of the 9 day data collection period was enough data collected to allow 24 hour totals to be calculated. The conclusions that can be drawn from the data are relatively obvious - there is less traffic at the weekend, east bound flows are slightly higher than west bound and the 85th percentile speed (right hand scale) are well in excess of the speed limit (30mph).

Figure 7 shows a similar graph for Town Street in Middleton, where flows are similar, but speeds are higher. Again a full data set is not available (at least not for the 24 hour totals plotted here). From the data it is clear that the majority of drivers are exceeding the 30mph speed limit. This is also true of Stanks Drive in Swarcliffe, though drivers are generally travelling slower.

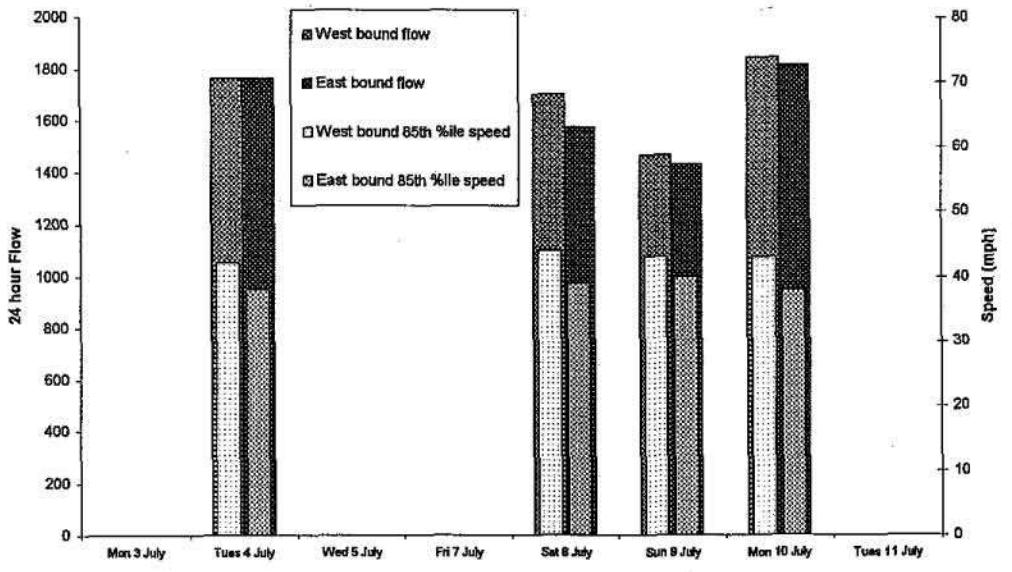


Figure 7 Flows and speeds at Town Street, Middleton

Further analysis of the large amount of data produced is continuing. It might prove of particular interest to see whether there is any evidence of a change in behaviour by drivers during the periods of high pedestrian crossing activity at or near the data collection points.

5.3 LMU Behavioural and attitudinal studies

The following is a summary of the main findings; the data have not yet been fully analysed. Differences between the three areas, for example, have yet to be examined fully. In the final report, when the post-survey has been carried out, results will be compared with other similar studies.

5.3.1 The Parents' Survey

Most of the questionnaires (89%) were completed by mothers. More parents of girls returned the questionnaire, with information about 416 girls and 330 boys collected (2 did not specify gender). Parents were asked to complete the questionnaire in relation to the child who brought it home even if they had more than one child. No conclusions

can be drawn about the gender imbalance; more girls could have taken the questionnaire home, parents with girls might have been more motivated to complete, or there might have been more girls than boys in the study population. 62% of respondents had a car in the household and thus 38% did not. Almost half the respondents did not go out to work (47%); 18% worked full time and 34% part time.

In the majority of cases, children walked to school (74%) and home again (75%) on the day of the survey. 22% were taken by car, 4% caught the bus and also did so for the return journey. Of those who walked to school, they were accompanied by mothers in 58% of cases, fathers in 7% and by another adult in 7%. The remainder were unaccompanied. There were no significant differences in mode of travel by gender, or by age, although younger children were slightly more likely to be driven. Where the respondent was in full time or part time work the child was more likely to travel by bus than if the respondent was not working; however, differences by employment status were not statistically significant. Parents' preferred mode for their children was walking, (in 55% of cases) and car (34%). Thus more parents would choose the car, if they had a choice, than currently do use the car, showing an unmet demand for car use.

Outside school the most used transport for children (according to their parents) was the car. 44% 'usually' travelled by car, 27% by bus, 15% walked and 14% cycled. Thus some children did use bikes, though none used them to get to school. More of those who journeyed to school by car also used the car outside school. Children were allowed to play outdoors without adult supervision, 32% often and 31% sometimes. Only 6% were 'never' allowed to play out, and 27% rarely. The most usual place to play out was the street (25%), 'close to home' (19%), and on fields or the park (10%). The average age which it was felt children could cross roads safely on their own was 10.

Half the respondents thought that the area they lived in was unsafe; there were no differences by gender of child, and as the child grew older, parents were more likely to feel the area was safe, though this was not statistically significant. Of those who felt the area was unsafe, the majority cited traffic problems, and others suggested strangers, gangs of older children, drugs and crime. The most serious problems were traffic related, with 18% of the total referring to roads generally, 16% to speed, 9% to joyriders, and 3% to young drivers. Drugs or crime were cited as the most serious problems by 13%. When asked about safety generally, road related issues came out strongly. When asked specifically about road safety, 81% said that roads were not safe. Traffic speed was seen as the worst problem, mentioned by 38%; other problems mentioned were joyriders, mentioned by 15%, lack of crossings, 7% and bad drivers 5%. Asked who is responsible for improving road safety, 42% thought the Local Authority was, and 15% said the police. When asked if they thought that they personally could do something about the problems on the road, 24% of the total thought they could, by educating their children and campaigning.

5.3.2 The Children's Survey

Not surprisingly, the children's survey produced similar results to the parents'. Thus the majority of children walked to school (76%), 21% went by car, with no difference between boys and girls. Very few used buses (14 girls and 12 boys) and only 1 girl

and 4 boys said they came to school by bike. Slightly fewer, 17%, were driven home, with some children therefore driven to school and walking home. There were differences by area regarding being driven to school, with just over one third being driven to school in Middleton, compared with between 10% and 19% at other schools except for the Catholic school in Swarcliffe, where a quarter came by car. This possibly reflects the larger catchment areas of denominational schools. Of those who walked to school, 28% walked with a parent, 26% with a friend. There was an even split between mothers and fathers as drivers. There were significant differences between actual and preferred mode of travel. 36% said they would like to cycle to school, 32% to walk, 27% to be driven. Only 3% preferred to use buses. 18% said they liked the exercise from cycling or walking.

Outside school, half the children generally used the car for journeys (66% of their households had a car). 21% usually walked and 19% went by bus. Bus use is thus not a common or popular way of getting around. In 78% of cases, children said they were allowed to play outside without adult supervision. They usually played in the street (27%); 18% played on a field or park; 16% at friends' houses; and 10% in their own garden.

Whereas the majority (77%) said they liked living where they did, 47% said they had worries about the area, 10% were concerned about theft, 7% about violence, 7% about strangers. Another 8% mentioned roads and the worry of getting run over. 72% said they were allowed to cross the road without an adult, but 49% said they felt unsafe on the roads. When asked specifically about road danger, 20% were concerned about being run over, and 12% were alarmed by fast cars. 73% felt the roads could be made safer. 41% proposed traffic calming measures and 13% simply said slow down cars. More crossing patrols were wanted by 7% and others suggested banning vehicles and stopping joyriders.

5.3.3 Discussion

The survey was particularly interested in children's independent mobility and thus in the extent of escorted journeys to school, in unescorted play outside, and how these are affected by age and gender. Significant levels of escorted journeys to and from school were in fact found (where children were either taken by car or escorted by a walking adult). Table 2 shows some results form the children's questionnaire indicating levels of escorting.

Table 2 Percentages of children escorted to school by age

Age of children (years)	Boys	Girls
7	71	94
11	39	39

Differences by gender were also apparent in the percentages of children who walked to school alone (of those who walked to school), this is indicated in Table 3.

Table 3 Percentage of those who walked to school who were alone

Age of children (years)	Boys	Girls
7	29	6
8	26	18

Girls were more likely to be accompanied by 'another adult' than boys, suggesting that where parents could or did not take girls, they were more likely to be escorted by another adult, whereas boys would go alone or with friends. At age 8, 70% of girl walkers were accompanied by an adult, and 46% of boys; at age 9, 38% of boy walkers and 47% of girl walkers were accompanied. Boys were thus more likely to be alone, that is, without an adult or friends. This is also demonstrated by the boys responding that they were more likely to cross roads by themselves than were girls. Table 4 shows the percentage of children reporting that they crossed roads by themselves. It is clear that only at age 11 do children of different sexes report the same degree of independent road crossing behaviour.

Table 4 Percentage of children allowed to cross road by themselves

Age of children (years)	Boys	Girls
7	44	30
8	73	52
9	79	69
10	91	78
11	93	91

This is also related to what children said about being allowed to play out on their own. 66% of 7 year old boys and 49% of girls were allowed out, with children let out more and more as they grew older.

The parents questionnaire showed that boys were more likely to be allowed to play out 'often' than were girls, and girls were more likely to be let out 'rarely' or 'never'. This protection of girls accords with other studies and with anecdotal evidence, but interestingly the findings did not show that parents of girls were not more likely to feel that the area was unsafe. Children themselves showed some variation in where they played; only half as many girls as boys played in woods, fields and other areas likely to be regarded by parents as 'unsafe' at age 10 and 11, but the differences between the sexes were less at ages 8 and 9. It may be that girls themselves begin to perceive these areas as unsafe as they grow older, or that their appeal diminishes. Girls in each group were slightly more worried about their neighbourhood, but these differences are not statistically significant. In relation to roads specifically, 44% of boys and 31% of girls felt safe at age 7, but at the age of 10, 76% of boys said they felt safe and only 35% of girls.

In summary, boys are allowed independent mobility at a younger age than girls, and girls feel less safe generally than boys.

The survey was also interested in the extent of car use for journeys to school. Approximately one fifth of journeys to and from school for both sexes were by car, and three quarters were on foot. Both the parents' and children's questionnaires showed

that children who were driven to school were far more likely to use the car for journeys outside school too. Likewise, children who used the bus to school were more likely to use the bus for other journeys. No conclusions can be drawn, as the location of car and bus users has not yet been analysed. Children clearly indicated that they would like the opportunity to cycle to school (29% of girls and 45% of boys). There is thus a large unmet demand here from children, though parents show no wish for children to use bikes more than they do already. Walking is clearly not popular, as only a third would choose this option (compared with the three quarters who actually do walk).

A further aim of the survey was to investigate the extent to which parents and children feel safe in their area. This data has yet to be analysed by area, but generally there appears to be a significant level of concern, with road safety featuring strongly. The questionnaire does not mention that this is a specific concern of the investigators, but it is possibly apparent from the line of questioning. The comments written on some responses provide additional useful data. Respondents were asked what they felt could be done to improve the situation. This data will be fed to the Local Council.

The questionnaire survey is being supplemented by in-depth interviews with mothers of primary school children in Swarcliffe. 24 have been carried out to date, with a target of 35. The questionnaire survey will be carried out again in June 1996.

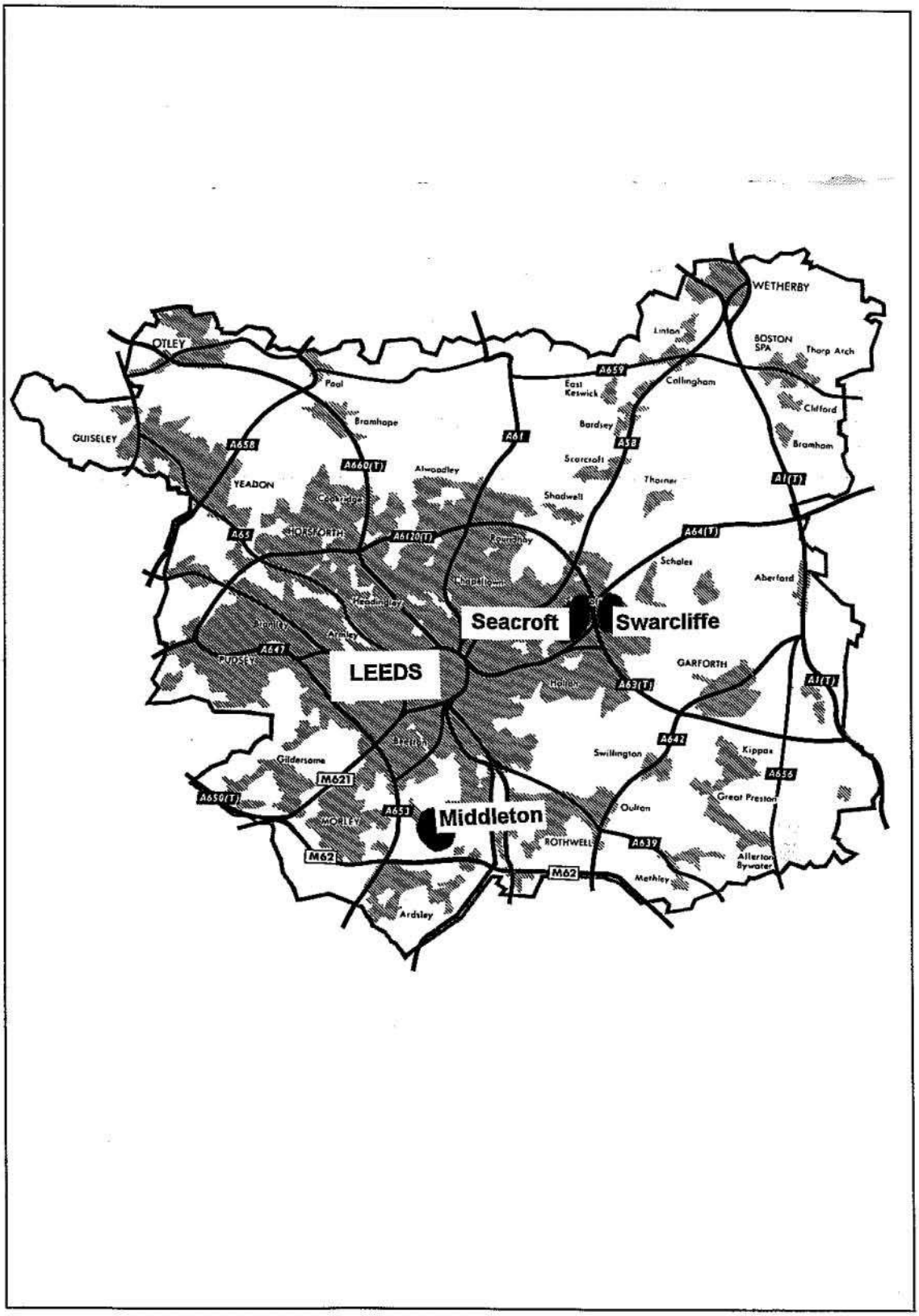
6. References

Hyden C, 1987, *The development of a method for traffic safety evaluation: The Swedish Traffic Conflicts Technique*, Lund Institute of Technology.

Routledge D A, Repetto-Wright R and Howarth C I, 1976, *The Development of Road Crossing Skill by Child Pedestrians*, International Conference on Pedestrian Safety, Haifa, Israel.

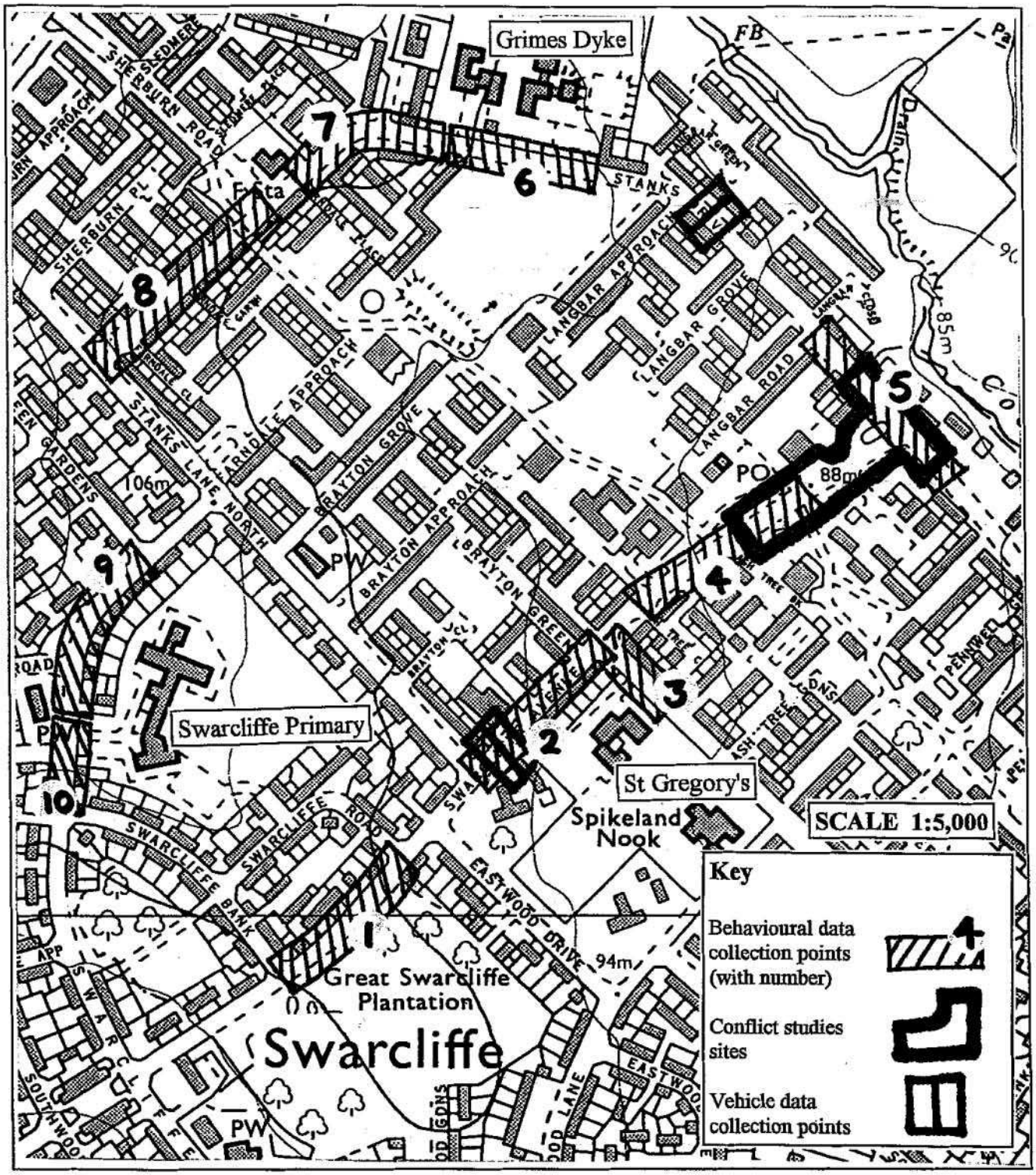
Appendices

Appendix A Map showing the location of the three study areas



Appendix B Maps of the study areas

Swarcliffe



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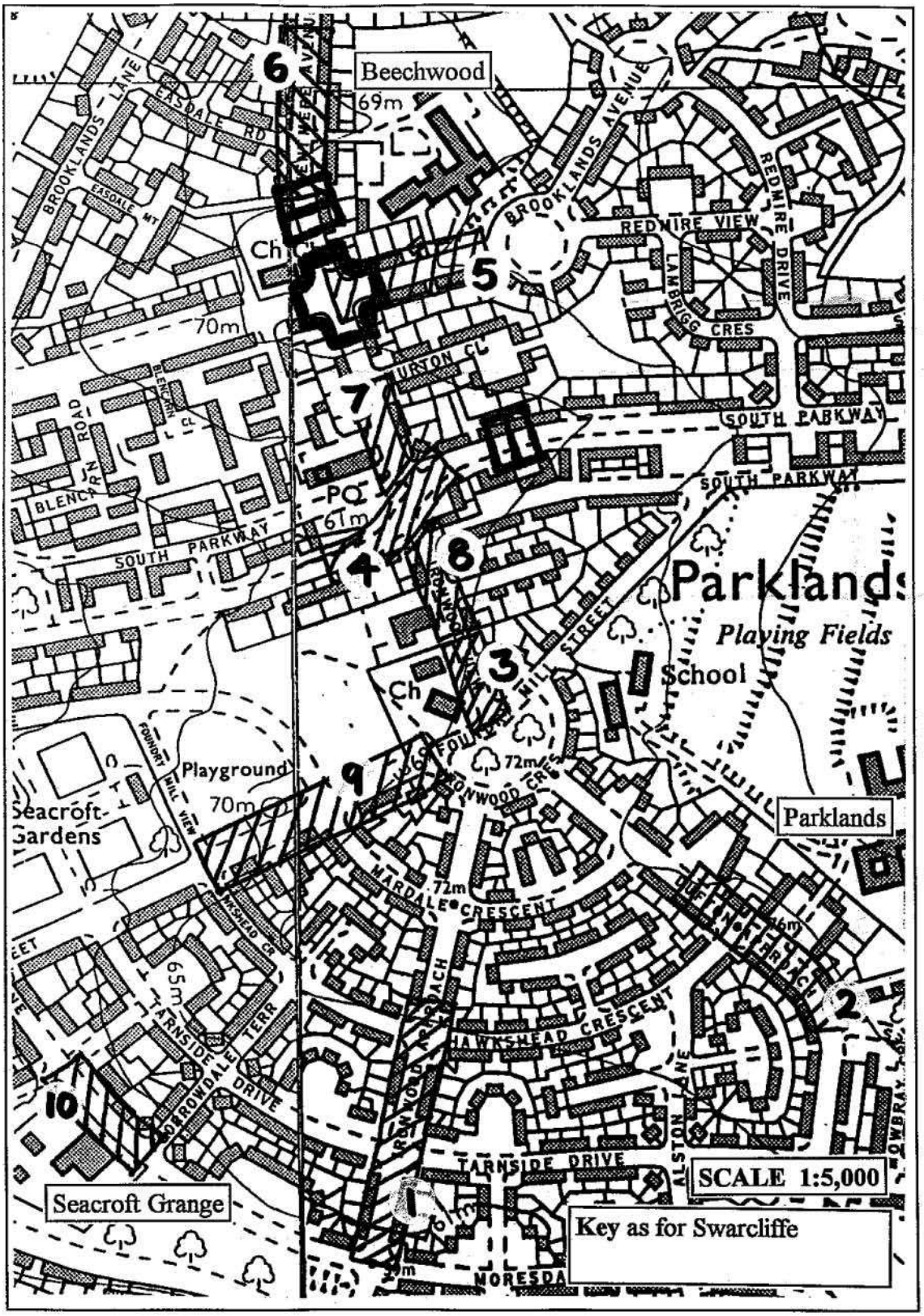
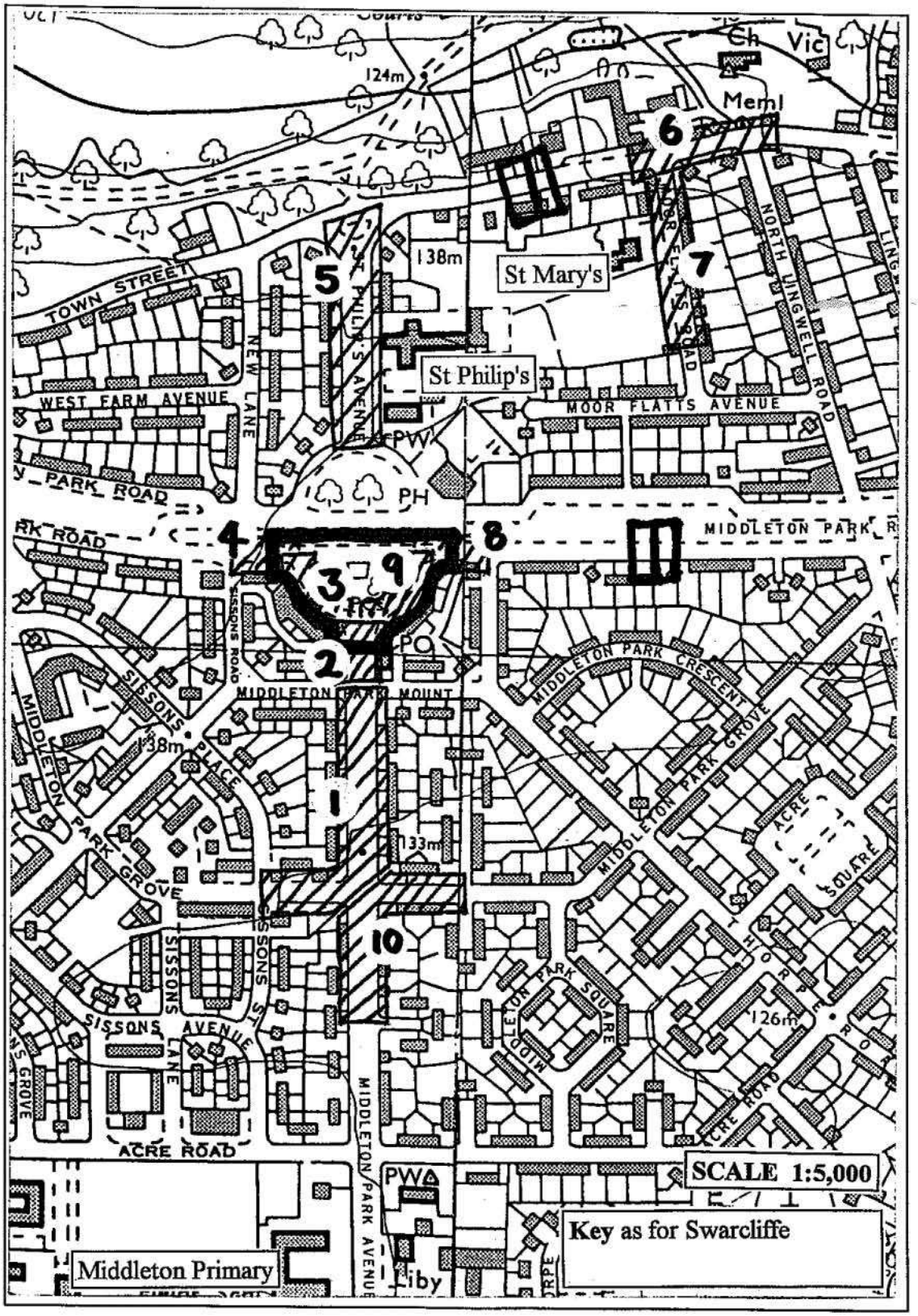
Seacroft


Beechwood
69m
BROOKLANDS AVENUE
REDMIRE VIEW
REDMIRE DRIVE
LAMBRIGG CRES
EASDALE RD
BROOKLANDS LANE
EASDALE MT
70m
LURTON CL
SOUTH PARKWAY
BLENCARN ROAD
PENCRAIN CL
PO
6Tm
Parklands
Playing Fields
School
WILL STREET
Playground
70m
Seacroft Gardens
FOXHOUSE HILL VIEW
72m
RONWOOD CRES
Parklands
MARDALE CRESCENT
HAWKSHEAD CRESCENT
TARNSIDE DRIVE
BORROWDALE TERR
ALSTON LANE
SCALE 1:5,000
Seacroft Grange
Key as for Swarcliffe
MORESDA

Middleton


124m
Ch
Vic
Meml
St Mary's
St Philip's
TOWN STREET
NEW LANE
WEST FARM AVENUE
MOOR FLATTS AVENUE
NORTH LINGWELL ROAD
PARK ROAD
MIDDLETON PARK ROAD
MIDDLETON PARK CRESCENT
MIDDLETON PARK GROVE
MIDDLETON PARK SQUARE
MIDDLETON PARK AVENUE
MIDDLETON PARK MOUNT
SISSONS ROAD
SISSONS PLACE
SISSONS AVENUE
SISSONS LANE
ACRE ROAD
ACRE SQUARE
PH
PO
PW
138m
133m
126m
SCALE 1:5,000
Key as for Swarcliffe
Middleton Primary
Liby

Appendix C Conflict Studies - Instructions to observers

SCARS, Initial Conflict Studies 1995

Instructions for Conflict Study Observers

Equipment Required:
- Forms for each site to be observed
- Tape measure and chalk
- Clip board and pen
- Weatherproof wear for light rain

1. Proceed to the correct site according to the timetable, in good time.
2. Observations should begin and end at the correct times
3. Mark out 15m in 5m stages on the pavement or kerb stone. This will aid the distance measurements when doing the observations
4. All conflicts should be recorded (slight and serious).
5. Only conflicts between vehicles and pedestrians should be recorded, please distinguish vehicle types, i.e., powered two wheeler, van, HGV, private car.
6. All the information on the conflict form should be filled in.
7. Care should be taken to ensure that the drawing of the incident clearly shows the position of the observer and the location of the incident in the roadway (e.g., which lane, whether on crossing or not)
8. Always carry some form of identification and be prepared to show it if necessary.
9. If asked please inform people that you are doing a traffic survey for the University of Leeds and not a safety survey. Try and be as unobtrusive as possible.
10. Contact: Matthew Page, Institute for Transport Studies, University of Leeds, Tel: 233 5350

Make sure that you keep the completed conflict forms safely until they can be returned to Matthew Page for processing

THANK YOU

Appendix D Conflict studies - Completed report sheets

Seacroft Site

Observer: MJC	Date: 7-6-95	Time: 15.30

Weather: Sunny ☐ Cloudy ☑ Rain ☐

Surface: Dry ☑ Wet ☐

	Road User I	Road User II	Secondary Involved
Private Car	☑		☑
Bicycle		☐	☐
Pedestrian		☑	☐
Other	.....	2 PEDS	.....
Sex	M☐ F☐	M☑ F☐	M☐ F☐
Age	.....years	9 (Betty) years	.....years
Speed	20 km/h	.....km/h	.....km/h
Dist. to Coll. pt.	10 mtrs	.....mtrs	
Time to Collision	1.8 secs	.....secs	
Avoiding Action Taken	Yes ☑ No ☐	Yes ☐ No ☐	Yes ☐ No ☐
Slowing Down	☑	☑	☐
Swerving Away	☐	☐	☐
Acceleration	☐	☐	☐
Possibility to Swerve	Yes ☐ No ☐	Yes ☐ No ☐	Yes ☐ No ☐

Estimated Risk of Collision:

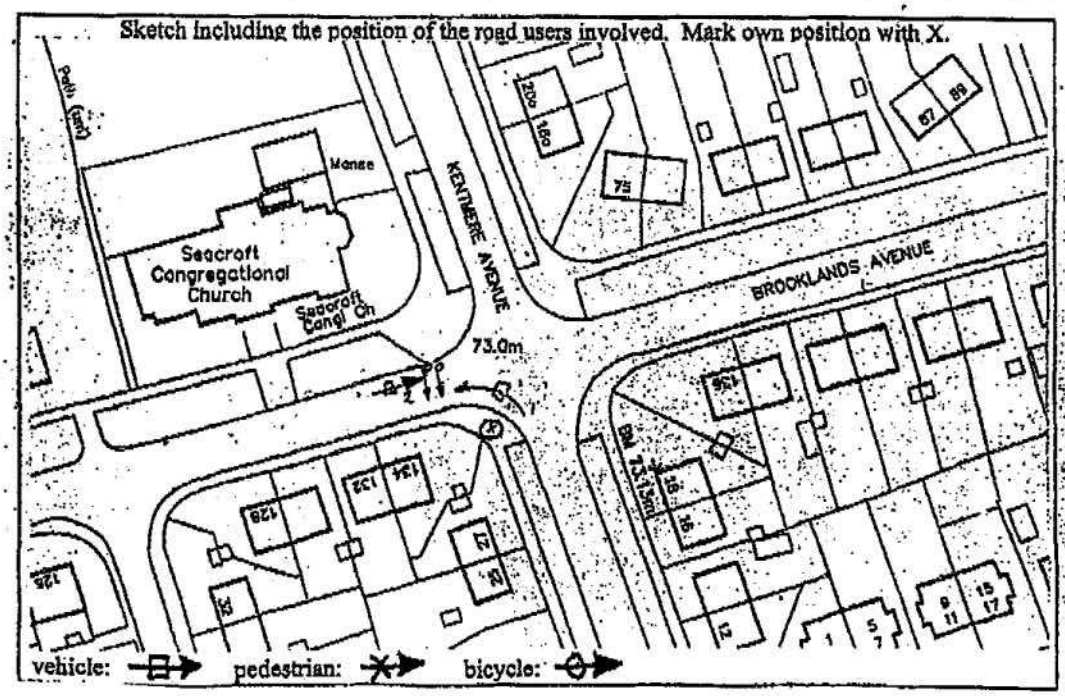
☐1 very small	☐4
☑2	☐5 very high
☐3	☐6 collision

Description of the Cause of Event:

PEDS INATTENTIVE. QUICKENED TO CROSS BEFORE CAR ARRIVED FORCING CAR TO BRAKE AT DRIVER TURNED CORNER. - POSSIBLY MASKED BY OBSERVER.

continued overleaf ☐

Sketch including the position of the road users involved. Mark own position with X.



Middleton
~~Seacroft~~ Site

Observer: M. CALLAGHAN	Date: 8-6-95	Time: 15:10

Weather: Sunny ☐ Cloudy ☑ Rain ☐

Surface: Dry ☑ Wet ☐

	Road User I	Road User II	Secondary Involved
Private Car	☐		☐
Bicycle		☐	☐
Pedestrian		☑	☐
Other	M/C	.....	.....
Sex	M☐ F☐	M☑ F☐	M☐ F☐
Age	.....years	25 years	.....years
Speed	30 km/h	.....km/h	.....km/h
Dist. to Coll. pt.	20 mtrs	.....mtrs	
Time to Collision	2.4 secs	.....secs	
Avoiding Action Taken	Yes ☑ No ☐	Yes ☐ No ☐	Yes ☐ No ☐
Slowing Down	☑	☐	☐
Swerving Away	☐	☐	☐
Acceleration	☐	☐	☐
Possibility to Swerve	Yes ☑ No ☐	Yes ☐ No ☐	Yes ☐ No ☐

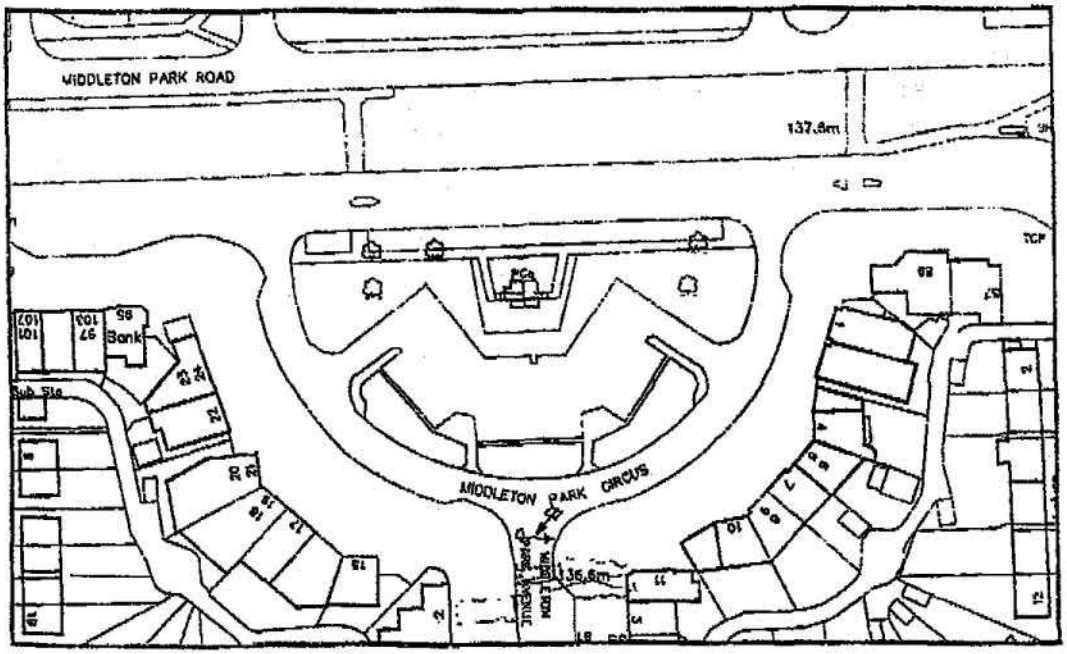
Estimated Risk of Collision:

☑1 very small	☐4
☐2	☐5 very high
☐3	☐6 collision

Description of the Cause of Event:

PED PAYING ATTENTION TO CHILD IN PUSHCHAIR M/CYCLIST APPRECIATES SITUATION AND SLOWS IN GOOD TIME

continued overleaf ☐



Appendix E Behavioural studies - Data collection point descriptions

The data collection points are shown on the maps in Appendix B.

Swarcliffe

Where roads are used to delimit the length of road described, crossings from the near kerb of the delimiting road (across the road being covered) should be included. Thus, if you have to observe 'Swarcliffe Avenue, from Swarcliffe Bank to Swarcliffe Road', observers should include crossings made across Swarcliffe Avenue to or from the closest side of Swarcliffe Bank or Swarcliffe Road (and every crossing made in between), but not crossings of Swarcliffe Avenue to or from the far side of Swarcliffe Bank or Swarcliffe Road.

Note that observers may need to move around to a certain extent to see round obstacles (parked cars etc.).

Number	Location	Area to be observed
1	Bench	Swarcliffe Avenue, from Swarcliffe Bank to Swarcliffe Road
2	Bus Stop	Swarcliffe Avenue, from Stanks Lane North to Stanks Gardens
3	Footpath	Stanks Gardens, from Swarcliffe Avenue to level with the end of the first school building on the right
4	Pile of Stones	Swarcliffe Avenue, from Ash Tree Close to the large block of flats
5	Bench near Bus Stop	Stanks Drive, from Langbar Road to level with the start of the second building on the right
6	Bus Stop	Stanks Drive, from and including the School Crossing Patrol to level with the first building on the right
7	Corner	Stanks Drive, from Farndale Place to just before the School Crossing Patrol
8	Bus Stop	Stanks Drive, from Stanks Lane North to Sherburn Road
9	Telephone box	Swarcliffe Drive, from Mill Green Gardens to just before the School Crossing Patrol

10	Bus Stop	Swarcliffe Drive, from and including the School Crossing Patrol to Swarcliffe Bank

Seacroft

The notes with the Swarcliffe data collection point descriptions are also relevant to these data collection point descriptions.

Number	Location	Area to be observed
1	Bus Stop	Ironwood Approach, from Moresdale Lane to level with the bus stop on the opposite side of the road
2	Street corner	Dufton Approach, from Mowbray Crescent to half way between Hawkshead Crescent and Mardale Crescent
3	Bus Stop	Ironwood View, from Foundry Mill Street to the end of the church grounds
4	Telephone Boxes	South Parkway, from level with the start of the flats on the right, to 10m **past** the intersection with Kentmere Avenue
5	Bus Stop	Brooklands Avenue, from Kentmere Avenue to the intersection which forms the roundabout
6	Pavement	Kentmere Avenue, from the egress from Easdale Mount, to the bus stop up the hill opposite
7	Bus Stop	Kentmere Avenue, from Murton Close to South Parkway
8	Bus Stop	Ironwood View, from South Parkway to the end of the church grounds
9	Pavement	Foundry Mill Street, from Ironwood Crescent to Foundry Mill View
10	Pavement	Moresdale Lane, from Foundry Mill Walk to Borrowdale Terrace

Middleton

The notes with the Swarcliffe data collection point descriptions are also relevant to these data collection point descriptions. Some of the road names are not marked on the OS map provided, but they should be obvious.

Number	Location	Area to be observed
1	Near Bus Stop	Middleton Park Grove, from Sissons Street to Middleton Park Avenue AND Middleton Park Avenue, from Middleton Park Grove to Middleton Park Mount (this is an 'L' shape and may be best observed from the opposite side of the junction)
2	Outside Shops	Middleton Park Avenue, from Middleton Park Mount to Middleton Circus
3	Outside Shops	Middleton Circus, from Middleton Park Avenue to Middleton Park Road
4	Bus Stop	Middleton Park Road (near (busy) side only), from Sissons Road to Middleton Circus
5	Pavement opp. school	St Philip's Avenue, from Town Street to Middleton Circus
6	Bus Stop	Town Street, from (and including) the School Crossing Patrol, to the bus stop opposite North Lingwell Road
7	Pavement	Moor Flatts Road, from the end of the school grounds to Town Street
8	Telephone Box	Middleton Park Road (near (busy) side only) from Middleton Circus to Thorpe Road (includes Pelican Crossing)
9	Outside Shops	Middleton Circus, from Middleton Park Avenue to Middleton Park Road
10	Near Bus Stop	Middleton Park Avenue, from Glasshouse View to Middleton Park Grove AND Middleton Park Grove, from Middleton Park Avenue to Middleton Park Terrace (this is the opposite 'L' shape to 1 and may be best observed from the opposite side of the junction).

Appendix F Behavioural studies - Example of raw data collected

Area:		Swarcliffe													
Date:		16/06/95													
Observer:		MJP								* - something must be entered in this column					
Direction:		Clockwise													
Time check	Section/Road/ Xing Start/ End					No. of Prim. Age Children			For Group	For Groups on Cont. Xings	For Other Xing Groups or if Controlled Xing not used Correctly				
		No. of Male Adults	No. of Female Adults	No. of Infants in prams	No. of Older Children	Hand in Hand	Close Super.	Ind	Playing in Road (P) or Xing (X)	Used Correctly (Y/N/-) *	Look before Xing (Y/N)	Stop before Xing (traffic) (Y/N)	Stop before Xing (none) (Y/N)	Adult(s) run (Y/N)	Child(ren) run (Y/N)
03.00.00	8														
					1				X	O	Y				
		1							X	O	Y				
03.02.00	8														
03.05.00	7														
			1						X	O		Y			
03.07.00	7														
03.11.00	6														
			1						X	O	Y				
			3						X	O	Y				
		1							X	O	Y				
03.13.00	6														
03.18.00	5														
		1							X	O	Y			Y	
					3				X	O	Y				
03.20.00	5														
03.24.00	4														
					2				X	O	Y				Y
		1							X	O		Y			
03.26.00	4														
03.30.00	3														
		1							X	O	Y				
03.32.00	3														
03.35.00	2														
								3	X	O	Y				
03.37.00	2														

Appendix G Copy of the letter and questionnaire given to parents

Dear parent

Schools in the community: action research on safety (SCARS)

We want parents views on children's safety in the area in which they live.

We are carrying out the research in a number of areas including the area around Parklands Primary School in Seacroft. Our reasons for choosing this school are purely to do with research practice. There is no reason to think that your children are more at risk here than in any other part of the city.

The views of children, parents and teachers at the school are essential to our research. So we will be very grateful if you can spare a few minutes to answer the questions on the enclosed questionnaire.

The work is being done by Leeds City Council together with the city's two universities. If you need any help or have any questions about the research please telephone Alan Wolinski on 0113 247 5196 between 9 am and 4 pm.

We would like you to answer the questions about the child who brought the questionaire home. We realise that for those with more than one child this will be more work! So, if you only want to fill in one questionaire, fill it in about your youngest school child.

Please send the questionaire back to the school with your child - as soon as possible - please!

Once again, your views will be very helpful.

Thank you very much for your assistance.

SCARS Questionnaire for parents

CONFIDENTIAL

Your views will be very helpful. Please try to find a few minutes to answer the following questions. **Please answer the questions about the child who brought this questionnaire home.**

Please tick (√) the appropriate box, or write in your answer.

TRAVEL ARRANGEMENTS TO AND FROM SCHOOL

1 How did your child travel to school today?

2 How did s/he travel home today?

3 If s/he travels to school in a car - who usually drives?

mum	
dad	
someone else	

4 If s/he travels home in a car - who usually drives?

mum	
dad	
someone else	

5 If s/he walks to school does an adult walk with them?

no	
yes, mum	
yes, dad	
yes, other person	

6 If s/he walks home does an adult walk with them?

no	
yes, mum	
yes, dad	
yes, other person	

7 If you had a choice how would prefer your child to travel to/from school everyday?

bike	
bus	
car	
walk	
other	

8 Why would you prefer this?

OUTSIDE SCHOOL

9 Outside school, how does your child usually travel?

bike	
bus	
car	
walk	
other	

10 Does your child play outdoors **(other than in the garden)** without adults being present?

often	
sometimes	
rarely	

11 Where does s/he play?

ABOUT YOUR NEIGHBOURHOOD

(Please write here the name of the area where you live)

12 Do you think **this** area is generally safe for children?

yes	
no	

IF NO What makes it unsafe?

13 What do you think is the **most serious** problem?

14 Who do you think is responsible for doing something to tackle this problem?

15 Do you think the roads around here are safe?

yes	
no	

IF NO What is the **most serious** problem on the roads?

16 Who do you think is responsible for improving road safety?

17 Do you think you could help to improve things?

yes	
no	
don't know	

IF YES What do you think you could do?

18 At what age do you think children are ready to cross main roads on their own?

ABOUT YOU

19 Are you

female	male

20 Do you go out to work?

no	
yes full time	
yes part time	

22 Do you have a car in your household?

Yes	
No	

FINALLY ABOUT THE CHILD WHO BROUGHT THIS QUESTIONNAIRE HOME

25 What is her/his age?

26 Is this child

a girl	
a boy	

Please write any other comments you would like to make:

Thank you very much for your help.

Appendix H Copy of the questionnaire given to children

SCARS Questionnaire for children

CONFIDENTIAL

Please **tick** (√) the box next to the answer you think is right, or write in your answer. If you want help please ask your teacher.

ABOUT YOU

1 How old are you? ☐

2 Are you

a girl	
a boy	

COMING TO SCHOOL

3 How did you get to school today?

car	
bus	
bike	
walk	

4 If you came to school in a car - who drove?

mum	
dad	
someone else	

5 If you walked to school - did anyone walk with you?

yes, a friend	
yes, mum or dad	
yes, other grown up	
no	

6 How will you get home today?

car	
buś	
bike	
walk	

7 If you could choose, how would like to get to and from school everyday?

car	
bus	
bike	
walk	

8 Why would you choose this?

AWAY FROM SCHOOL

9 When you are not at school how do you usually travel?

car	
bus	
bike	
walk	

10 Are you allowed to play away from the house without a grown up?

yes	
no	

11 If you play out on your own, where do you play?

12 Does your family have a car?

yes, mum	
yes, dad	
yes, brother/sister	
no	

ABOUT YOUR NEIGHBOURHOOD

(Please write in the name of the area where you live)

13 Do you like living where you live?

yes	
no	

14 Do you ever get worried about anything in your area?

yes	
no	

IF YES What is it that worries you most?

15 Are you allowed to cross the road without an adult?

yes	
no	

16 Do you feel safe on the roads?

yes	
no	

IF NO Why do you not feel safe?

17 Do you think that roads can be made safer?

yes	
no	

18 What do you think could be done?

Thanks very much for helping us.