



UNIVERSITY OF LEEDS

This is a repository copy of *New Approaches to Traffic Management Solution – With Reference to Sowerby Bridge*.

White Rose Research Online URL for this paper:
<http://eprints.whiterose.ac.uk/2294/>

Monograph:

Hopkinson, P.G., May, A.D., Berrett, B. et al. (2 more authors) (1988) *New Approaches to Traffic Management Solution – With Reference to Sowerby Bridge*. Working Paper. Institute of Transport Studies, University of Leeds, Leeds, UK.

Working Paper 264

Reuse

See Attached

Takedown

If you consider content in White Rose Research Online to be in breach of UK law, please notify us by emailing eprints@whiterose.ac.uk including the URL of the record and the reason for the withdrawal request.



White Rose Research Online

<http://eprints.whiterose.ac.uk/>

ITS

[Institute of Transport Studies](#)

University of Leeds

This is an ITS Working Paper produced and published by the University of Leeds. ITS Working Papers are intended to provide information and encourage discussion on a topic in advance of formal publication. They represent only the views of the authors, and do not necessarily reflect the views or approval of the sponsors.

White Rose Repository URL for this paper:

<http://eprints.whiterose.ac.uk/2294/>

Published paper

Hopkinson, P.G., May, A.D., Berrett, B., Leake, G.R., Alwani, G. (1988) *New Approaches to Traffic Management Solution – With Reference to Sowerby Bridge*. Institute of Transport Studies, University of Leeds. Working Paper 264

Working Paper 264

August 1988

**NEW APPROACHES TO TRAFFIC
MANAGEMENT SOLUTION -
WITH REFERENCE TO
SOWERBY BRIDGE**

**P G Hopkinson, A D May
B Berrett, G R Leake,
G Alwani**

ITS Working Papers are intended to provide information and encourage discussion on a topic in advance of formal publication. They represent only the views of the authors, and do not necessarily reflect the views or approval of the sponsors.

C O N T E N T S

1. IDENTIFICATION OF SOLUTIONS
 - 1.1 Background
 - 1.2 Introduction and Aims

2. APPROACH TO SOLUTION IDENTIFICATION
 - 2.1 Introduction
 - 2.1.1 Group discussions with local people
 - 2.1.2 Response to invitations
 - 2.1.3 Organisation of the discussion sessions
 - 2.1.4 Local people - face to face interviews
 - 2.1.5 Content of survey
 - 2.1.6 Transport planners and consultants
 - 2.1.7 Organisation of 'Think-Tank' session
 - 2.1.8 University Transport Planners

3. IDENTIFIED SOLUTIONS FROM DIFFERENT METHODS
 - 3.1 Introduction
 - 3.2 Overview of Solutions

4. STRATEGY FORMULATION AND TESTING
 - 4.1 Overall Approach
 - 4.2 Solution Assessment
 - 4.3 Strategy Formulation
 - 4.4 Strategy Testing

5. ESTIMATE OF THE ENGINEERING REQUIREMENTS AND ASSOCIATED COSTS
 - 5.1 Introduction
 - 5.2 Recommended Strategy (First Stage Solutions)
 - 5.3 Longer Term Additions to Recommended Strategy
 - 5.4 Summary
 - 5.5 Discussion of Costs

6. CONCLUSIONS AND RECOMMENDED FURTHER WORK

1. IDENTIFICATION OF SOLUTIONS

1.1 BACKGROUND

This study was commissioned by the Civic Trust to identify new approaches to traffic management solutions for Sowerby Bridge. The objective of the overall study was to identify low cost, innovative solutions to problems created by high volumes of traffic using the A58. This road is the main shopping street in Sowerby Bridge. In our brief it was stressed that any new road construction, such as a by-pass, was not a feasible or acceptable solution due to the severe vertical gradients surrounding Sowerby Bridge.

The town is on the brink of a major programme of regeneration. A nationally important canoe slalom course has been created; the riverside mill area fronting onto the River Calder is being developed for commercial and leisure use, and there is a proposal to reopen the Rochdale Canal. In view of this it is essential to ensure that traffic on the A58 is managed so as to minimise its effect on the environment and trade, without adversely affecting local access. In writing our report we have separated the problem and solution identification stages. The solution identification stage is reported in Working Paper 263 (Hopkinson et al, 1988b). The final stage of our study, which involves presenting our final solutions back to the users of Sowerby Bridge for comment, is to be reported in a forthcoming report, WP 265 (Hopkinson et al, 1988c).

1.2 INTRODUCTION AND AIMS

This report describes the formation of a strategy to tackle the main problems identified in Sowerby Bridge as set out in Working Paper 263. The aims of this report are:

- (1) to describe the methods used to identify solutions to the various problems in Sowerby Bridge;
- (2) to describe the process by which those solutions were used to develop and test a strategy;
- (3) to cost the individual elements and overall package of proposals;
- (4) to evaluate the overall approach adopted and to make recommendations for a methodology.

2. APPROACH TO SOLUTION IDENTIFICATION

2.1 INTRODUCTION

The second stage of our study approach, involved identifying solutions to the most important problems identified in the first stage of the study and was concerned with assessing the ways in which solutions could be identified, including their type and range. Accordingly it was decided to approach four different groups of people. These were:

- (1) respondents who had identified problems in the first stage;
- (2) people who lived and/or worked in Sowerby Bridge and who were likely to have specific problems or interests in the project but who had not been included in the first stage of our study;
- (3) transport planners and engineers with a range of knowledge and experience of different approaches to traffic problem-solving in other parts of the UK and Europe;
- (4) Staff of the Leeds University Institute for Transport Studies who have a range of transport planning and research expertise.

In keeping with our original brief, we decided to examine two alternative ways of eliciting and recording people's views and opinions. The main approach adopted was to bring people together in groups to discuss and identify solutions to the identified problems. Since it was not practicable to involve some people from group (2) above in group discussions and because some people from the first stage of our study (1) could not attend the group discussions, they were interviewed individually.

The design and organisation of the two approaches is discussed below.

2.1.1 Group Discussions With Local People

Invitations to respondents who indicated that they would be willing to co-operate in this second stage of our study were made by letter or telephone. Letters were sent out to the sample involved in the first stage on-street interviews and by personal delivery to traders and employers. Telephone invitations were made to the respondents in the driver survey. Follow-up invitations by telephone were made to a random selection of persons initially contacted by letter to ascertain possible numbers attending on either of the two sessions set aside for the discussions. Invitations were given to attend either an afternoon or an evening session depending on individuals' preference. A Wednesday afternoon was chosen since this was half day closing in Sowerby Bridge and would allow traders to attend. The meetings were held in two well known locations; Foundry Street Community Centre and Department of Social Services Meeting Room in Hollins Mill Lane. In total 148 letters were sent out; 44 letters were delivered by hand and 76 telephone contacts were made. Approximately half of the telephone contacts were to individuals who had received a letter through the post or in person to identify whether individuals would attend the meeting. In addition 12 household visits were made to individuals who had received a letter, for this same reason. These telephone follow-up contacts were selected at random from the pooled list of respondents. The household follow-up contacts were selected from the list of respondents who lived in within about 800 m of Wharf Street. Guidelines from the Leeds University Careers and Counselling Development Unit suggested that an overall group size of between 14-18 and individual group sizes of four were the maximum which could be effectively managed and without making people feel "lost in the crowd". To a large extent the actual

numbers who attended the two meetings were out of our control. Since we were neither able to follow-up every letter with a telephone contact and the more obvious reason that people do change their mind about attending a meeting. For each meeting we made sufficient telephone/personal contact until twenty-two people were willing to attend one of the two meetings (forty-four respondents in total). This allowed for the possibility of a number of individuals not attending on the day. It was considered that the number who were likely to drop-out having indicated they were willing to attend would be greater than the number who would attend having received a letter-only invitation. Overall we anticipated that about sixteen people would turn up at the two sessions.

2.1.2 Response to Invitations

14 individuals arrived in the afternoon discussion group and 15 for the evening session. Of interest to note is the composition of the sessions and the method by which they were contacted. (see below).

	<u>AFTERNOON SESSION</u>	<u>EVENING SESSION</u>
Trader	8	6
Employee	0	2
Driver	1	3
Pedestrian	5	2
Friends	0	2
	14	15

METHOD OF CONTACT

Letter/Personal Delivery	8	10
Letter/No Telephone Contact	2	1
Letter/Telephone Contact	3	4
Telephone Contact Only	1	0
	14	15

The predominant representations in the two sessions were of people who had a business interest in the town. Of particular interest was the relatively poor attendance of people who had been interviewed as pedestrians in the first stage of the study. People contacted by a letter sent to their homes, with or without any telephone contact, appeared reluctant to turn out to the meetings.

The breakdown of the groups/methods of contact indicate some important pointers to further work involving public participation.

- (1) People are willing to attend meetings where effort is made to contact them individually.
- (2) People with business interests are more likely to attend a meeting where the issues at stake appear to have some direct bearing on those interests in the future.
- (3) Personal invitations offer a higher probability that people

will attend a meeting since it potentially provides people with more information/interest /confidence in the value of the meeting.

- (4) People caught in a random-sample and with no further involvement in or information about a study are unlikely to attend a meeting to discuss the issues even when they may have a direct influence on them.
- (5) A letter invitation followed by a telephone contact will generally be more successful in persuading people to attend a meeting.

2.1.3 Organisation of the Discussion Sessions

The organisation of the two sessions was as follows:

- (1) Welcoming of participants
- (2) Statement of session aims/objections
- (3) Presentation of problems identified in Stage 1 of the project
- (4) Statement about the future development of the town and possible problems.
- (5) Formation of discussion groups to identify and/or discuss
 - (i) most important problems
 - (ii) solutions to those problems
 - (iii) pooled solutions (after teabreak)
 - (iv) solutions suggested by members of the Institute for Transport Studies.

One of the main aims of the discussion groups was to avoid imposing a rigid agenda on the discussion, and thus allow a free-ranging debate within the broad headings above. People were asked to identify any solutions, however unusual. Instructions were given to all participants not to criticise comments from any other member of the group.

Each group was provided with pens, paper and maps of the town. Each discussion was tape-recorded in case more detailed examination of the group discussions was necessary. The group leader in each case was either a member of the Institute for Transport Studies or else had been involved in the first stage of the study. The group leaders were responsible for introducing the topics for discussion and facilitating the discussion whenever this was necessary. Important lessons were learnt in the organisation and generation of these group discussions. These are discussed later under methodological conclusions.

2.1.4 Local People: Face-to-face interviews

This group included local people who had taken part in the first stage of our study and were keen to be involved in the second stage or else were likely to have particular perceptions, interest or viewpoints relevant to the formation of solution proposals. These included the Project Officer of the Riverside Development; the Traffic Sergeant of Police; owners of potentially large visitor attractions, and registered disabled

persons.

These interviews were on a one-to-one basis and involved discussion of both problems (see Working Paper 263 Section 1.3) and solutions. People were approached either directly in person or else by phone to arrange an interview. The interviews were carried out during January 1988 and took place either at the respondent's work place or home address. The interviews lasted between 1-2 hours on average.

2.1.5 Content of Survey

Each person was asked to:

- (1) Select from a summary list those problems which they perceive to be occurring in Sowerby Bridge.
- (2) Identify the most important problems.
- (3) Outline possible solutions to those problems
- (4) Evaluate a package of solutions identified from previous interviews.

This approach is similar in many respects to the structure adopted for the group discussions; the main difference being greater control in presentation and more time spent on discussion of the different problems and solutions. The different problems were written on show cards under four headings - traffic, pedestrian facilities, parking and image. Each person was asked whether they agreed with the presented problems and whether there were other problems they wished to include in the list. For these other problems and those on the show card which they agreed were "problems", each person was asked to outline any solution(s) they could imagine to solve those problems. Finally a package of solutions was presented on show cards, to determine whether people considered these to be good or bad ideas. These packages were drawn from a range of different sources and were presented as ideas for consideration only, rather than as our recommendations or preferences. At the end of the interview, time was spent discussing the interview and whether it was considered to be a good way of eliciting people's opinions and views.

2.1.6 Transport Planners and Engineers

To identify problems it is evident that the best judges are the people who use Sowerby Bridge. To identify solutions to those problems, however, it was recognised that other perspectives other than the users of Sowerby Bridge would be useful. The reasons for this were:

- (1) Most users of Sowerby Bridge have little familiarity with traffic management solutions compared to transport planners and engineers;
- (2) the users of Sowerby Bridge would be more likely to concentrate on solutions specific to themselves, and less likely to consider problems and solutions for the town as a whole;
- (3) consultants and transport planners are familiar with

solutions to traffic problems practised in other countries.

Consequently a number of traffic management specialists were invited to Sowerby Bridge for a day to identify solutions to problems perceived by them from information presented to them from the first stage of our study. The idea was to allow people to put forward ideas and solutions without criticism from other members of the group.

This plan was adopted firstly, because we were interested in identifying innovative solutions to problems and thereby required people to be creative in their thinking. We were afraid that criticism would suppress imaginative proposals. Secondly, we considered that pointing out problems, difficulties and impracticalities to solutions at this stage was unlikely to be helpful and was an approach all too typical of conventional transport planning and design procedures. Whilst many ideas and solutions would inevitably be impractical, we decided that it was our task to determine these at a later date and not in a concentrated brain-storming session best suited to producing many creative ideas quickly. Finally, and most importantly, we were interested in evaluating the dynamics and output of a group-session free from the normal constraints which face planners and engineers in their everyday work.

The invited specialists included consultants, local authority highways and transportation officers, Department of Transport and Department of Environment staff members. The equal opportunities officer from Calderdale District Council was invited to advise on the needs of the disabled, but was unable to attend.

2.1.7 Organisation of 'Think-Tank' Session

Those invited to the day's event, termed a 'think-tank', travelled to Sowerby Bridge on December 6th some people travelled from London, this imposed a time constraint on the length of the session spent, which had to be scheduled between 11.00 and 15.30 hours.

Prior to the session, each participant was sent a list of the problems identified from the first part of our study, and a map showing their location. A set of simple traffic flow data for key junctions and along the A58 was also included, in order to provide an indication of the scale of the problems which would require solutions.

A total of 13 people were met and taken on a walk along the length of the A58 between Bolton Brow and West Street to observe the sites and problems considered to be most important. This walkabout lasted 45 minutes. Following this the scene switched to the Old Council Chambers in the Department of Social Services in Hollins Mill Lane where the outline for the day was described. This comprised four distinct phases:

- (1) Video presentation showing the worst conditions and problems observed during the study period, as well as proposed developments in the town and the need to design solutions capable of embracing these developments (15 minutes).

- (2) Group discussions to identify initial solutions to the observed problems (1 hour)
- (3) Tea break for informal discussion of initial solutions and collation of common solutions (20 minutes)
- (4) Appraisal of collated solutions and assessment of the session (45 minutes).

Initially it had been proposed to allow the main group to form themselves into smaller discussion groups. However, due to the awkward seating arrangement and layout of the Council Chamber, the members of the smaller discussion groups were determined out beforehand. Three groups, each of four or five specialists, were formed. Each group comprised at least one consultant and one local authority official, and included a member of the research team. Felt pens, sheets of paper and maps were provided. The discussions within each group were tape-recorded to provide a permanent record. The research member in each group recorded the main ideas on paper. The way in which the discussions developed was left to the individual research team member concerned. Comment on the discussions is reported in the findings section.

2.1.8 University Transport Planners

Following the Think-Tank session it was decided to arrange a similar session involving research staff of the Institute for Transport Studies who have a range of expertise in road traffic management planning. This event was considered useful firstly, to compare the types of ideas produced to those from the Think-Tank, and secondly, to gain further experience in the organisation of group discussion work. A similar format was adopted as for the Think-Tank although there was no opportunity for visiting Sowerby Bridge itself. The discussions lasted approximately 1 hour.

3. IDENTIFIED SOLUTIONS FROM DIFFERENT METHODS

This section deals with the specific ideas identified in the different approaches. The following list (Table 3.1) sets out the full range of solutions identified in relation to the perceived problems in Sowerby Bridge.

Traffic

1. Amount/Volume
 - * Traffic signs - divert traffic using A58 at short cut to M62
 - * Toll booths - restraint
 - * Time based restrictions/ platooning of traffic poss. close for period of day
 - * Encourage use of Holmes Road as by-pass for some traffic
 - * Discourage children being taken to school by private transport
 - * Encourage development of water bus - prevent tourists bringing cars to Sowerby Bridge

2. Traffic Speed
 - * Speed restriction sign before entering town and gateway (see "image")
 - * Speed restriction measures e.g. rumble bars
 - * Narrow carriageway - alternate one-way traffic
 - * Offset carriageway - viz. parking bays/pavement widening

3. HGVs
 - * Impose weight restriction - County Bridge
 - * Remove/relocate M62 weigh-bridge
 - * Improve alternative routes for HGVs
 - * Encourage rail freight transport
 - * Time based bans

4. Turning Movements/ Delays/Congestion
 - * Make certain junctions/side streets one-way
 - * Stop up certain junctions
 - * Traffic signal control
 - * Introduce half width bus lane
 - * Ensure traffic light synchronisation
 - * Mini-roundabouts to facilitate flow

5. Traffic/people conflicts
 - * Improve sight line in Town Hall Street
 - * Introduce time-based flow measure (platoons)

Road Crossing: Pedestrians

- | | |
|--|---|
| 1. Danger crossing at Railway Bridge | * Improve lighting
* Whitewash walls
* Warning signs for drivers
* Slow traffic down when approaching |
| 2. Danger/delay crossing Kwik Save/Tuel Lane | * Increase pedestrian phase
* Clarify crossing phases at Tuel Lane |
| 3. Difficulty crossing Bolton Brow | * Provide crossing facility or else use Traffic Signals |
| 4. Difficulty crossing Tower Hill/Wharf Street | * Provide crossing facility (surface)
* Use tunnels to gain access to Riverside development
* Use pavement width extension to reduce crossing width |
| 5. Distance between crossings | * Move crossing at railway bridge or Kwik Save towards Tower Hill |
| 6. Safety crossing junctions | * Make side-streets/car park entrances one way
* Block off certain streets
* Use different coloured materials to indicate priority |
| 7. Pedestrian routes | * Use existing alleyways and Old Causeway as alternative/parallel safe pedestrian routes
* Develop Riverside terrace as low level route |
| 8. Pavement widths/pedestrian space | * wider pavements at Bulls Head/Cartlon Mill area
* Demolish shops on Town Hall Street, relocate at Riverside |
| 9. Pedestrian facilities (lack of) | * more seating/toilets required |
| 10. Safety | * Bollards/capes as part of parking bays |

Table 3.1 (cont)

Parking On-Street

- | | |
|--------------------------------------|--|
| 1. Lack of on-street parking | * Create parking bays on Wharf St (for disabled) |
| | * Improve information about parking regulations (existing) |
| | * Remove double yellow lines on Corporation Street |
| | * Repaint lines on Tower Hill |
| 2. Double parking along Wharf Street | * Introduce continuous double yellow lines |
| | * Monitor enforcement for effectiveness |
| | * Restrict parking near bus stops |
| 3. Alternate day parking (confusion) | * Maintain but improve signs/enforcement |
| | * Remove completely |
| 4. Lorries in Kwik Save car park | * Ban and create alternative lorry parking area |
| 5. Servicing of shops | * Have restricted hours for servicing |
| | * Develop rear loading area |
| 6. Disabled parking | * Develop area on site of old taxi rank at Wharfe Street |

Parking Off-Street

- | | |
|--------------------------------------|---|
| 1. Capacity | * Introduce free short-stay; charge long term parking |
| | * Develop long-stay parks in Moorings area |
| | * Maximise; signpost existing areas |
| | * Encourage bus-use/park and ride |
| | * Develop car parks at Grange Gardens/Stanley Street/Railway Goods Yard |
| | * Provide specific areas for special events, eg concerts |
| | * Build low rise car park in conjunction with canal re-opening |
| | * Convert Carlton Mill to multi-storey car park |
| 2. Access/Exit to existing car parks | * One way system for Kwik Save; entrance on Wharf Street |
| | * Improve entrance to Wharf Street car park |

Table 3.1 (cont)

3. Lack of parking areas
(Town Hall Street)

- * Create parking area behind Bulls Head (currently garden)
- * Clarify position of current car park at Fire Station

4. Tourist parking

- * Holmes Road area - link to town via footbridge
- * Develop car parks on edge of town.

Development/Image of Town

1. Image/Sense of Place

- * Encourage novel signs for shops
- * Develop gateway(s) for town
- * Signs to direct/highlight features for visitors
- * Reduce amount of traffic
- * Continue stone cleaning
- * Create local initiatives e.g. litter pickup for sense of pride
- * Improve town lighting

2. Shops/Facilities

- * Concentrate existing development 'fill-in'
- * Discourage empty/dead developments, e.g. estate agents
- * Encourage development spheres - link to pedestrian routes
- * Reverse frontages of shops/services on south side of Wharf Street (Old Causeway)
- * Use reopening of canal as basis for pedestrian circulation system
- * Encourage improvements to shop frontages
- * Move market to canalside area
- * Abandon Victorian ideas
- * Knock mills down - industrial development
- * Construct canopy on Wharf Street next to Riverside development
- * Convert Carlton Mill - offices/old peoples home
- * Revitalise/relocate Railway Station
- * Glass lift on side of chimney
- * Water lift(s) from River to Wharf Street

Table 3.1 (cont)

3. Community Involvement

- * Employ people as guards viz. vandalism
- * Need to generate a package deal to give people/town confidence
- * Increase information about whats going on

Other Issues

Public Transport

1. Bus Facilities

- * Introduce bus priority measures
- * Relocate bus stops
- * Improve facilities for bus users

Planning

1. General

- * Council as marriage broker
- * Develop integrated/professional team
- * Require whole town management

Table 3.1: Full range of solutions identified from different methods

4. STRATEGY FORMULATION AND TESTING

4.1 OVERALL APPROACH

From this list of solutions shown in Table 3.1 it was evident that the suggestions varied widely in the range of problems they were likely to tackle; their practicability and feasibility; the extent to which they would deal with the problems perceived in Sowerby Bridge and the number of people who would be affected by the scheme proposal. At this stage we were concerned to assess the timescale for implementation, the degree of compatibility with plans for future development, and the extent to which the proposals could be considered innovatory.

The solutions shortlisted from this process were categorised into five main types:

- (i) measures designed to reduce traffic levels;
- (ii) measures designed to manage the remaining traffic;
- (iii) measures to improve parking facilities;
- (iv) measures to assist pedestrian movement;
- (v) measures to improve the image of Sowerby Bridge.

This provided a logical order in which to identify elements which would contribute to the development of an overall strategy and complement other elements of the strategy.

The basic strategy developed in this way was then checked in a number of ways. The initial proposals were discussed with local authority officers to ensure consistency with their current proposals. They were discussed with the Director of the Inheritance Project to ensure that they contributed to plans for the Riverside Development and could accommodate the additional activity generated by that project. They were compared with plans developed elsewhere in Europe to ensure that adequate advantage was being taken of the limited experience already gained of 'traffic calming' techniques. (Bowers 1986, Department des Pyrenees Orientales 1987 Danish Road Data Laboratory 1987). Finally they were checked in detail in an extended site visit and by a series of technical calculations.

4.2 SOLUTION ASSESSMENT

The full list of suggested solutions identified above was assessed critically and, as a first stage, those judged unlikely to contribute to the solution of traffic problems were set aside. Most of these came under the heading of improvements to the image and development of the town. We were conscious that such issues were somewhat outside our terms of reference, but that they should not necessarily be overlooked in an overall review of plans to revitalise the town.

The practical proposals set out in Table 3.2 were assessed in the matrix shown in Table 4.1. The proposals are listed as columns in the matrix, the order of:

- (i) measures designed to reduce traffic levels;
- (ii) measures designed to manage remaining traffic;
- (iii) measures to improve parking facilities;

- (iv) measures to assist pedestrian movement;
- (v) measures to improve the image of Sowerby Bridge.

The first row in the matrix assesses the likely extent of the impact of the proposal on the identified problems. This judgment was based on our knowledge of the traffic patterns and our understanding of driver response to different types of measure.

The second row gives our assessment of the extent to which the individual proposals are innovative. Other things equal, we have been encouraged to identify measures which were innovative, so that they could, if accepted, be tested in a demonstration project for the benefit of practitioners elsewhere. We defined as 'radical' those measures which had not, to our knowledge, been applied elsewhere in the UK. This is not to say that they have not been tested elsewhere in Europe, where interest in 'traffic calming' is more advanced. Measures which were designated in this way were primarily those involving managing traffic still using the street, and integrating planning and traffic engineering philosophies.

Rows three and four consider the timescale for the individual proposals. The first of these considers the time likely to be involved in design and decision making. More complex measures are likely to take longer to design; those which are more expensive may take longer to finance; those which are innovatory may require longer for approval by the Department of Transport. The second provides our assessment of the time which the individual proposals are likely to take from implementation before they have a significant impact on the problem. Those which take longer are typically those involving planning and image enhancing actions.

The fifth row assesses the likely compatibility with future development plans. The main issues considered here are the extent to which the measure might help in encouraging economic activity either directly or through its impact on the environment, and the extent to which it retains flexibility for the additional traffic likely to be generated by such activity.

The sixth row complements this assessment, by indicating how specific the proposal is to one particular problem. Clearly measures which tackle a multiplicity of problems are to be preferred, provided of course that they do not give rise to further problems.

A further series matrices was then developed to assess in more detail the interactions between individual measures. Tables 4.2-4.5 present the matrices developed for traffic related solutions and for measures related to parking, pedestrians and image.

Each matrix assesses each proposal against all the identified problems. It indicates one of four outcomes: no effect, an effect which is unlikely to be significant, a significant positive effect, a significant negative effect, and a potentially significant but unquantifiable effect.

	Divert/reroute through traffic	Reroute local traffic	Widen carriageway	Modify (narrow) carriageway alignment	Synchronise traffic signals	Time based restraint (service vehicles)	Time based restrictions (Periodic - all vehs)	Signal based flow control (new signals)	Influence driver psychology	Speed restraint measures	Roundabout - lane control	Increase supply (off street)	Time based restraint (off street)	Time based restraint (on street)	Ban/Restrict (on street)
Overall Likely Effect on Problem Areas	2	2	3	3	2	2	3	3	1	2	2	3	1	1	2
Innovativeness of Idea	1	1	0	3	0	1	3	3	3	2	2	0	0	0	0
Time Scale for Decisions/Design	I	I	L	L	I	I	L	L	L	L	L	L	L	I	I
Time Scale for Impact on Problems	L	L	I	L	I	I	I	I	L	I	I	I	I	I	I
Impact on Future Development(s)/Problems	3	3	3	3	1	2	3	3	2	3	1	3	2	2	3
Specificity of Solution	3	3	3	3	2	2	3	3	3	2	1	2	1	2	2

4.1 Fundamental Considerations in the Formation of Solutions to Problems in Sowerby Bridge

Key: Overall Impact - 1 = Slight
 2 = Moderate
 3 = Severe

Innovativeness - 0 = Standard
 1 = Slightly
 2 = Moderate
 3 = Radical

Time Scale for Decisions/Design I = Immediate/Short Term
 L = Complex/Longer Term

Time Scale for Impact on Problems I = Immediately Noticeable
 L = Noticeable Over Longer Term

Impact on Future Development/Problems 0 = None
 1 = Slight
 2 = Moderate
 3 = Large

Specificity of Solution 1 = Specific to a Problem
 2 = Specific to Several Problems
 3 = General to a Wide Range of Problems

	Parking bays (on street)	Improve signposts/ directions to ex. parking	Enforce existing restraints	Remove existing restraints (Commercial St/Tower Hill)	Relocate crossing	Increase width - improve warnings - all crossings	Increase pedestrian phase at crossings	Develop alternative routes/access points	New crossing location (addition to existing)	Widen pavements	Refuges	Pedestrian priority at junctions (coloured mat)	Landscaping/greening/ clean up	Up-to-date information (on street access)	Publicity/signpost about town
Overall Likely Effect on Problem Areas	2	1	1	2	3	1	1	3	3	2	2	2	3	2	3
Innovativeness of Idea	2	1	0	0	0	2	0	3	0	1	0	1	2	2	3
Time Scale for Decisions/Design	L	I	I	I	I	I	I	I	I	I	I	I	L	I	I
Time Scale for Impact on Problems	I	I	I	I	I	I	I	L	I	I	I	I	I	L	I
Impact on Future Development(s)/Problems	2	2	1	1	1	0	0	3	2	2	1	1	3	2	2
Specificity of Solutions	3	1	1	1	1	1	1	3	2	2	1	2	2	3	3

Table 4.1 Fundamental Considerations in the Formation of Solutions to Problems in Sowerby Bridge (Cont/d)

	Infill existing developments	Consistency planning control	Public involvement/town management																	
Overall Likely Effect on Problem Areas	3	1	3																	
Innovativeness of Idea	3	3	3																	
Time Scale for Decisions/Design	L	L	L																	
Time Scale for Impact on Problems	L	L	L																	
Impact on Future Development(s)/Problems	3	2	3																	
Specificity of Solutions	3	3	3																	

Table 4.1 Fundamental Considerations in the Formation of Solutions to Problems in Sowerby Bridge (Cont/d)

This series of assessments enabled us to shortlist the most promising packages of solutions. It also helped to identify gaps in the solution of problems, and new problems which might be generated. These in turn led to the need to design additional measures.

4.3 STRATEGY FORMULATION

As noted above, the shortlisted solutions could be categorised into five broad groups:

- (i) measures designed to reduce traffic levels;
- (ii) measures designed to manage remaining traffic;
- (iii) measures to improve parking facilities;
- (iv) measures to assist pedestrian movement;
- (v) measures to improve the image of Sowerby Bridge.

These provided a logical order for developing the detailed strategy. The need to manage traffic in the Sowerby Bridge Town Centre clearly depends on the extent to which it has been possible to remove any through or non-essential traffic from the Town Centre. One effect of this may be to displace parking, and access to new parking has to be consistent with the plans for traffic management. Pedestrian routes will be affected both by the provision which is possible for movement along and across the road as a result of traffic management, and by the location of any parking provision. Image enhancing measures need to build on these traffic related decisions.

Analysis of the traffic survey data demonstrated, as indicated in Working Paper 263, that 10-15% of traffic between Ripponden and Bolton Brow, and 8-12% of traffic between Wakefield Road and Tuel Lane could be reasonably diverted away from Sowerby Bridge. This would be of benefit, and hence it was necessary to consider ways of achieving this. The most obvious is a signing strategy, coupled with any restrictions placed on movement through the town. In addition some improvement to alternative routes would be worth considering. Current plans to improve the junction at Salterhebble and the impact of the weighbridge at Elland may both be relevant. The other possibility for re-routeing is to make increased use of the Holmes Rd./Mearclough Rd. route, thus avoiding Wharf St. This is substandard at several points, and provides poor access to Bolton Brow, but it is still considered feasible as a means of diverting light traffic, particularly in peak directions at peak times.

Having diverted as much traffic as possible, the remaining traffic would need to be managed to reduce its impact to a minimum. The main problems appeared to arise from a lack of adequate crossing facilities, lack of pavement width, and the effects of slow moving traffic queues. To tackle these problems, it was considered necessary in particular to reduce the amount of disruption to traffic moving through the critical lengths of Town Hall Street and Wharf Street. If this could be achieved, the space and time needed for moving traffic would be reduced, and the amount of noise and pollution from acceleration and deceleration would be less. However, it would be essential to ensure that the free moving traffic did not speed through the town.

Possible Solutions to Traffic Issues	Volume of traffic (passing through)	Number and size of heavy goods vehicles	Speed of vehicles (Balton Brow/County Br)	Journey times (too slow)	Vehicular delays (due to pedestrians)	Vehicular delays (due to buses/lorries)	Vehicular delays (due to parked vehicles)	Vehicular delays (due to turning vehs)	Entrance/exit to junctions	Access/exit to car parks	Lack of short stay car parking	Lack of parking (Town Hall Street)	Regulations confusing (Wharf Street)	Difficulty servicing shops (to front)	Availability of parking (Station Road)
Divert/reroute through traffic	+	+	X	+		+	/	+	+	+			+	+	
Reroute local traffic	+	/	/	+		X		X	+	+			+	+	
Widen carriageway	X	X	X	+	/	/	+	+	/	/		+	+	+	
Modify (narrow) carriageway alignment	X	/	+	X	X	X	X	X	X	X		X	X	X	
Synchronise traffic signals			/	+	+	/	/		+						
Time-based restraint (service vehicles)	/	+	/	+	/	/	+	+	/		X	+	+	X	
Time-based restrictions (Periodic - all vehicles)	+	+	X	/	/	/	/	/	+	+		+	+		
Signal based flow control (new signals)	+	+	+	X	/	+	/	/	/	+		+	+	+	
Influence driver psychology			u	u	X		+	+	+	+	u	u	u	u	u
Speed restraint measures	X	+	+	+		/	/	/	+	+				/	
Roundabouts - Lane Control	+	+	/	+		+		+	+	+		/	/	/	

Table 4-2

Effect of Solutions to Traffic Issues on Different Problem Areas

Key:

/

A possible effect but unlikely to be significant

+

A significant positive effect likely requires quantification

u

An important effect likely but difficulty to quantify

X

A significant negative effect likely requires quantification

Possible Solutions to Traffic Issues	Danger crossing (at crossings)	Pedestrian phase too short	Difficulty crossing (at random)	Danger crossing (junctions)	Fear/intimidation along pavements	Narrowness of pavements	Overall image/appearance	Appearance of Main Street	Appearance of shop fronts/displays	Dereliction of buildings	Lack of central focus to town	Uncertainty about time/phase of planning	Low public involvement confidence in planning	Previous/current planning decisions	Exposure to noise/dirt
Divert/reroute through traffic	+	/	+	/	/		+	+							+
Reroute local traffic			+	/	x		+	+							+
Widen carriageway	/	x	x	x	u	x	x	x		+	x		x	x	/
Modify (narrow) carriageway alignment			+	/	u	+	+	+							+
Synchronise traffic signals		+	x	/	/										
Time-based restraint (service vehicles)			+	/	/										
Time-based restrictions (Periodic - all vehicles)	+	+	+	+	u		+								+
Signal based flow control (new signals)	+	+	+	+	u		+	+							+
Influence driver psychology	u		u	u	u										
Speed restraint measures	+	/	+	+	u										x
Roundabout - lane control			/	/											

Table 4.2 Effect of Solutions to Traffic Issues on Different Problem Areas

Possible Solutions to Pedestrian Problems	Volume of traffic (passing through)	Number and size of heavy goods vehicles	Speed of vehicles (Bolton Brow/County Br)	Journey times (too slow)	Vehicular delays (due to pedestrians)	Vehicular delays (due to buses/lorries)	Vehicular delays (due to parked vehs)	Vehicular delays (due to turning vehs)	Entrance/exit to junctions	Access/exit to car parks (road users)	Lack of short stay car parking	Lack of parking (Town Hall Street)	Regulations confusing (Wharf Street)	Difficulty servicing shops (to front)	Availability of parking (Station Road)
Relocate Crossing			/	/	/	/	/	/							
Increase Width/Improve Warnings - All Crossings															
Increase Pedestrian Phase at Crossings	/	/		x	x										
Develop Alternative Routes Access Points				+	+										
New Crossing Location (Extra to Existing)			x	x	x										
Widen Pavements	x		+	x	x	x	x	x		x	x	x		+	+
Refuge	x		+	x	x	x						x	x		
Pedestrian Priority at Junctions (Coloured Mat)								x	x	x					

Table 4.3

Effect of Solutions to Pedestrian Problems on Different Problem Areas

Key:

/

A Possible Effect But Unlikely to be Significant

+

A Significant Positive Effect Likely Requires Quantification

u

An Important Effect Likely But Difficult to Quantify

x

A Significant Negative Effect Likely Requires Quantification

	Danger crossing (at crossing)	Pedestrian phase too short	Difficulty crossing (at random)	Danger crossing (junctions)	Fear/intimidation along pavements	Narrowness of pavements	Overall image/ appearance	Appearance of Main Street	Appearance of shop fronts/displays	Dereliction of buildings	Lack of central focus to town	Uncertainty about time/phase of planning	Low public involvement confidence in planning	Previous/current planning decisions	Exposure to noise/ dirt
Relocate Crossing	+		+												
Increase Width/Improve Warnings - ALL Crossings	+	+						/							
Increase Pedestrian Phase at Crossings	+	+													
Develop Alternative Routes Access Points			+	+	u						+				+
New Crossing Location (Extra to Existing)			+			/									
Widen Pavements			+	/	u	+									+
Refuge			+					/							
Pedestrian Priority at Junctions (Coloured Mat)				+	u										

Table 4-3

Effect of Solutions to Pedestrian Problems on Different Problem Areas (Cont/d)

Solutions to Parking Problems	Volume of traffic (passing through)	Number and size of heavy goods vehicles	Speed of vehicles (Bolton Brow/County Br)	Journey times (too slow)	Vehicular delays (due to pedestrians)	Vehicular delays (due to buses/lorries)	Vehicular delays (due to parked vehicles)	Vehicular delays (due to turning vehs)	Entrance/exit to junctions	Access/exit to car parks	Lack of short stay car parking	Lack of parking (Town Hall Street)	Regulations confusing (Wharf Street)	Difficulty servicing shops (to front)	Availability of parking (Station Rd)
Increase Supply (Off-Street)	/						+	x	/		+	+	u	+	+
Time-Based Restraint (Off-Street)							/	x		x	+	+	+	/	/
Time-Based Restraint (On-Street)	/	/	x	+	/	/	+				x	x	+	x	/
Ban/Restrict (On-Street)	x	x	x	+	+	+	+	x	/	/	x	x	+	x	/
Parking Bays (On-Street)	x		+	x	x	+	x	/	/	/	+	+	+	+	
Improve Signposts/ Directions to Ex Parking							+	+		x	+	/	/		/
Enforce Existing Restraints	+	/	x	+	/	+	+	x	/	/	x	x	+	x	
Remove Existing Restraints (Comm St/Twr H)							/					+			

Table 4.4

Effect of Solutions for Parking Problems on Different Problem Areas

Key:

/

A Possible Effect Likely But Unlikely to be Significant

+

A Significant Positive Effect Likely Requires Quantification

u

An Important Effect Likely But Difficult to Quantify

x

A Significant Negative Effect Likely Requires Quantification

Solutions to Parking Problems	Danger crossing (at crossing)	Pedestrian phase too short	Difficult crossing (at random)	Danger crossing (junctions)	Fear/intimidation along pavements	Narrowness of pavements	Overall image/appearance	Appearance of Main Street	Appearance of shop fronts/displays	Dereliction of buildings	Lack of central focus to town	Uncertainty about time/phase of planning	Low public involvement confidence in planning	Previous/current planning decisions	Exposure to noise/dirt
Increase Supply (Off-Street)							/	/							
Time-Based Restraint (Off-Street)															
Time-Based Restraint (On-Street)			x			+	/	/							
Ban/Restrict (On-Street)			x	/		+	/	/							
Parking Bays (On-Street)			+	/	u	+	+	+							
Improve Signposts/Directions to Ex Parking							/	/							
Enforce Existing Restraints			/												
Remove Existing Restraints (Comm St/Twr H)															

Table 4.4 Effect of Solutions for Parking Problems on Different Problem Areas (Cont/d)

Visual Effects/ Planning Solutions	Volume of traffic (passing through)	Number and size of heavy goods vehicles	Speed of vehicles (Bolton Brow/County Br)	Journey times (too slow)	Vehicular delays (due to pedestrians)	Vehicular delays (due to buses/lorries)	Vehicular delays (due to parked vehs)	Vehicular delays (due to turning vehs)	Entrance/exit to junctions	Access/exit to car parks	Lack of short stay car parking	Lack of parking (Town Hall Street)	Regulations confusing (Wharf Street)	Difficulty servicing shops (to front)	Availability of parking (Station Rd)
Landscaping/Greening/ Clean Up															
Up-to-Date Information (On-Street/Access)															
Publicity/Signposts About Town	/	/	u	/											u
Infill Existing Develop- ment (Consolidate)															
Consistency Planning Control															
Public Involvement/ Town Management															

Table 4.5 Effect of Solutions for Image/Planning Problems on Different Problem Areas

Key:

/

A Possible Effect Likely but Unlikely to be Significant

+

A Significant Positive Effect Likely Requires Quantification

u

An Important Effect Likely But Difficult to Quantify

x

A Significant Negative Effect Likely Requires Quantification

Visual Effects/ Planning Solutions	Danger crossing (at crossing)	Pedestrian phase too short	Difficult crossing (at random)	Danger crossing (junctions)	Fear/intimidation along pavements	Narrowness of pavements	Overall image/ appearance	Appearance of Main Street	Appearance of shop fronts/displays	Dereliction of buildings	Lack of central focus to town	Uncertainty about time/ phase of planning	Low public involvement confidence in planning	Previous/current planning decisions	Exposure to noise/ dirt
Landscaping/Greening/ Clean Up							u	u	u						/
Up-to-Date Information (On-Street/Access)												u	u	u	
Publicity/Signposts About Town	u		u	u	u		u						u	u	
Infill Existing Develop- ment (Consolidate)							u	u	u	u	u		u	u	
Consistency Planning Control									u				u	u	
Public Involvement/ Town Management												u	u	u	

Table 4.5 Effect of Solutions for Image/Planning Problems on Different Problem Areas (Cont/d)

5. ESTIMATE OF THE ENGINEERING REQUIREMENTS AND ASSOCIATED COSTS

5.1 INTRODUCTION

The required engineering elements which would need to be implemented in order to introduce the recommended strategy, together with an approximate cost are outlined below. The schedule is broken down into two broad headings, namely:

1. Recommended Strategy (First Stage Solutions)
2. Longer Term Additions to Recommended Strategy

Within each of the above broad headings, there are a series of elements numbered 1, 2 etc. - Both the above broad headings and the numbered elements relate to Figures 3 and 4 in the Summary Report. These figures are reproduced in Appendix 1.

It should be stressed that the costs presented only provide approximate indications of the likely level of expenditure. They do not include any cost for design or evaluation. Only the major anticipated items of expenditure have been itemised. In some instances quantities have had to be estimated, as indeed have the costs.

5.2 RECOMMENDED STRATEGY (FIRST STAGE SOLUTIONS)

Element 1 - Reduce traffic volume in Wharf Street

This is intended to reduce the amount of westbound traffic using Wharf Street by diverting that approaching Sowerby Bridge on the A6026 via Mearclough Road/Holmes Road. This will require some kerb re-alignments at the Wakefield Road (A6026)/Canal Road junction, and new signposting at the Station Road/West Street (A58) junction.

a) New signs	3 No	£	450
b) Junction improvements	Item (2 jns)	£	25,000
c) Improvements, where necessary, on Holmes Road and Mearclough Road	Item	£	5,000

		£	30,450

Elements 2, 11, 13 - Reduce traffic congestion/ pedestrian crossing

The objective is to control traffic flow through Bolton Brow, Wharf Street and Town Hall Street by releasing traffic at the traffic signals in platoons and hence providing long time gaps for pedestrians crossing the main road.

a) New signs	5 No	£	1,250
b) Traffic signals	2 sets	£	60,000
c) Linking 3 sets of signals, including existing ones at Tuel Lane	Item	£	25,000
d) Mini-roundabout at Sowerby Street/Foundary Street	1 No	£	8,000
e) Junction improvement, Foundary Street/West Street	Item	£	15,000

		£	109,250

Element 3 - Long stay parking area

This is a new long stay parking area with a capacity of approximately 100 cars and with access via Holmes Road/Mearclough Road. A pedestrian link to the canal and town centre will require re-design of the existing pipe footbridge.

a) Re-design of existing pipe footbridge	22m long	£ 100,000
b) Parking signs	6 No	£ 300
c) Construction, surfacing and drainage of new car park	2000 m ²	£ 60,000
d) Ticket issuing machines	2 No	£ 5,000

		£ 165,300

Element 4 - New vehicle free pedestrian areas

This consists of developing Old Causey, Canal path, Riverbank, and Back Wharf Street as a pedestrian route linking the Sowerby Basin area with the new Riverside Area development. A new footbridge across the Canal will be required.

a) Signing, resurfacing and lighting of pedestrian route	310m long	£ 10,000
b) Canal footbridge	10m long	£ 4,000

		£ 14,000

Element 5 - Relieve congestion in Wharf Street

This involves blocking off Tower Hill where it links with Wharf Street. Re-open Tower Hill at its junctions with Tuel Lane and close off Kwik Save entrance off Wharf Street.

a) Block off Tower Hill. Provide seating and plating.	77m ²	£ 3,000
b) Re-open junction Tower Hill/Tuel Lane	Item	£ 15,000
c) Close off Kwik Save car park entrance	Item	£ 1,500
d) Mini-roundabout at Tuel Lane/Hollins Mill Lane junction	1 No	£ 5,000

		£ 24,500

Element 6 - Safe pedestrian routes

Direct pedestrian movements away from the Wharf Street/Tuel Lane junction and improve pedestrian routes linking Church View area with town centre. At the same time as the canal re-opening, develop a N-S subway pedestrian-crossing across Wharf Street.

a)	Signs for pedestrian routes	3 No	£	150
b)	Improvements to pedestrian routes (surfacing, dropped kerbs etc.)	Item	£	5,000
c)	N-S subway across Wharf Street (for use by pedestrians and cyclists)	50m long	£	250,000

				£ 255,150

Element 7 - Traffic calming

Provide speed tables at 50m intervals along Tuel Lane and Wharf Street. Remove existing signalised pedestrian crossings at Church Bank and Wharf Street.

a)	Speed tables (see p 12) 2.5m long	9 No	£	36,000
b)	Remove existing pelican crossings	2 No	£	4,000

				£ 40,000

Element 8 - Pedestrian safety

Widen footpaths on the south side of Town Hall Street and include some bays for servicing vehicles. Road width of Town Hall Street and Wharf Street to be 6m, increased to 8m on tight bend at junction with Hollins Mill Lane.

a)	Re-align kerb on south side of Town Hall Street, including drainage	100m	£	10,000
b)	Relocate lighting columns	2 No	£	500
c)	Provide service vehicle bay 30m x 2.5m	1 No	£	1,500
d)	Additional footpath width	130m ²	£	10,000

				£ 35,500

Element 9 - On-street car parking

Widen footpaths on south side of Wharf Street. Provide bus bays on north and south side of Wharf Street, and servicing vehicle bays on south side.

a)	Bus bays 2.5m wide x 50m long with tapers	2 No	£	30,000
b)	Servicing vehicle bays, 2.5m wide, using existing roadway between sections of widened footpath	-		
c)	Re-alignment of kerb - south side of Wharf Street, including drainage	370m	£	37,000
d)	Re-locate lighting columns	5 No	£	2,500
e)	Increase footpath width	350m ²	£	37,000

			£	106,500

Element 10 - Off-street parking

Introduce a short stay parking policy in the Kwik Save car park.

a)	Ticket issuing machine	1 No	£	2,500

			£	2,500

Element 12 - Parking supply

Provide parking spaces for 95 cars at the Railway Goods Yard.

a)	Parking signs	3 No	£	150
b)	Construction, surfacing and drainage of car park	1900m ²	£	60,000
c)	Ticket issuing machine	2 No	£	5,000

			£	65,150

Element 14 - Long range signposting

This is directed towards minimising the amount of long-distance traffic (particularly heavy commercials) passing through Sowerby Bridge.

a)	Providing direction signs on major roads	6 sites	£	2,500

			£	2,500

5.3 LONGER TERM ADDITIONS TO RECOMMENDED STRATEGY

Element 1 - Increased parking for visitors

This is intended to increase the amount of long stay car parking for shoppers and visitors - the implementation to run in parallel with the development of the Riverside area. The existing scrapyard to be bought and the site cleared. Access via Chapel Lane, exit via Gas Works Road.

a) Bus and clear scrapyard site	2000m ²	£ 250,000
b) Construction, surfacing and drainage of new car park	2000m ²	£ 65,000
c) Ticket issuing machines	2 No	£ 5,000
d) Parking signs (possibly 4 variable message)	6 No	£ 4,500
e) Strengthening Gas Works Bridge	Item	£ 350,000
f) Re-design of Bolton Brow/Chapel Lane junction	Item	£ 140,000

		£ 814,500

Element 2 - Increase pedestrian priority

This will extend the speed tables and the widening of the footpath on the south side of the main road between the Tuel Lane junction and the Bolton Brow/Wakefield Road junction.

a) Speed tables, 2.5m long	5 No	£ 20,000
b) Re-alignment of kerb, including drainage	250m	£ 25,000
c) Re-locate lighting columns	5 No	£ 1,250
d) Increase footpath width	500m ²	£ 25,000

		£ 71,250

Element 3 - River crossing for pedestrians

Construction of a new footbridge over the River Calder; this to form part of a new pedestrian route from the Railway Goods yard car park to the market area via disused third track across railway bridge. The new footbridge would provide a direct link between the market area and the new Riverside development.

a) New pedestrian footbridge, 30m span	Item	£ 150,000
b) Miscellaneous pedestrian footway approach works to new bridge	Item	£ 4,000
c) New pedestrian route across existing railway bridge	200m	£ 40,000

		£ 194,000

Element 4 - Pavement widening

Widening the footpath on the south side of Wharf Street to overlook the Riverside development - the footpath to be cantilevered.

a) Cantilevered footpath (2m wide)	65m	£	50,000

		£	50,000

Element 5 - Traffic control on alternative routes

Traffic signals to be provided at the junction of Station Road/Norland Road to control traffic using the Holmes Road/Station Road alternative route.

a) New direction signs	2 No	£	300
b) Traffic signals	1 Set	£	30,000
c) Miscellaneous junction works	Item	£	5,000

		£	35,300

5.4 SUMMARY

First Stage

Element 1	£ 30,450
Elements 2, 11, 13	£ 109,250
Element 3	£ 165,300
Element 4	£ 14,000
Element 5	£ 24,500
Element 6	£ 255,150
Element 7	£ 40,000
Element 8	£ 35,500
Element 9	£ 106,500
Element 10	£ 2,500
Element 12	£ 65,150
Element 14	£ 2,500

	£ 815,000

Add 25% (minor works, contingencies)	£ 213,000

TOTAL, STAGE ONE	£ 1,064,000

Longer Term Additions

Element 1	£ 814,500
Element 2	£ 71,250
Element 3	£ 194,000
Element 4	£ 50,000
Element 5	£ 35,300

	£ 1,165,050

Add 25% (minor works, contingencies)	£ 291,260

TOTAL, LONGER TERM	£ 1,456,310

CONCLUSIONS

The conclusions to this stage of the study can be considered in two parts. Firstly in terms of methodology and second in terms of the strategy formulated. Three different groups of individuals were approached to suggest solutions to the problems identified in Sowerby Bridge. These were local people, transport planners and consultants and University transport researchers. Local peoples views' were obtained using either group discussions or in-depth interviews. The other two groups suggestions were elicited using a brainstorming technique. The group discussions and brainstorm were both successful producing a wide range of innovative ideas. There was a surprisingly large overlap of ideas from the 3 group sessions although not surprisingly the group sessions and interviews with local people tended to produce more conventional and problem specific solutions than from the other two groups. It was considered that given a well delivered problem-structure that the group approach could provide a rapid and effective first means of generating solutions to the problems. The in-depth interview was found to require considerable time and did not produce any more information than was obtained by the group method. The advantage of the in-depth interview is the ability to work through a solution and to consider its consequences and effects in detail. The list of solutions produced from the different groups were found possible to list under 5 main types:

- (1) Measures designed to reduce traffic levels
- (2) Measures designed to manage the remaining traffic
- (3) Measures to improve parking facilities
- (4) Measures to assist pedestrian movement
- (5) Measures to improve the image of Sowerby Bridge

The main feature of the strategy developed was the control of traffic flow and speed by forming traffic platoons which would travel through the town at speeds of 30km/h regulated by speed - tables positioned at 50 m intervals. This would provide a smooth flow of vehicles and also create large gaps in the traffic flow for pedestrians to cross the A58. The maximum gap width would be in the locations of maximum pedestrian activity and adjacent to spheres of new activity. At the same time a network of pedestrian routes parallel to the A58 is recommended linking existing and new areas of activity and providing crossing points where the maximum gaps in traffic would occur. The development of long-stay car parks on the town periphery would be developed for day-visitors and local long-stay car parkers. A short-term parking policy would be developed with the existing car parking areas in the town centre. Attention to building appearance and attractive shop features/design would considerably improve the appearance and image of the town and generate confidence amongst local people and outsiders that the town was an attractive place to work, live, visit and invest in.