Countryside Traffic Measures Group: Traffic calming schemes in Norfolk and Suffolk

Prepared for Charging and Local Transport Division, Department for Transport, Local Government and the Regions

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TRL Report 500

First Published 2001
ISSN 0968-4107

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Introduction

The Countryside Traffic Measures Group (CTMG) was set up in 1997 by the Countryside Agency and the Department for Transport, Local Government and the Regions (DTLR) to support the planning and implementation by local authorities of innovative rural traffic management schemes. Under this initiative, local authorities were invited to propose schemes forming part of their traffic and transport strategies, which were designed to integrate sensitively into the local environment. The DTLR's Charging and Local Transport Division commissioned TRL to monitor the effectiveness of a selection of schemes being progressed within the CTMG initiative. The chosen schemes were located in Norfolk (Stiffkey, Blakeney and Wiveton), Suffolk (Occold), Surrey, Hampshire, Devon and Cumbria but for various reasons, those in Hampshire, Devon and Cumbria were not pursued. The monitoring of the schemes in Norfolk and Suffolk is the subject of this report.

The four schemes described here were all in villages and were aimed at reducing traffic speeds using low visual impact, low cost, measures. The scope of the monitoring depended on the scale of the scheme. Automatic speed/flow measurements were undertaken in all the villages and air quality monitoring in Stiffkey, before and after scheme installation. Public opinion surveys on the installed schemes were also carried out, about three months after implementation.

The schemes

The North Norfolk Coast Transport Strategy includes the implementation of village traffic calming techniques along the A149 within the North Norfolk Coast Area of Outstanding Natural Beauty; the A149 is a principal (non-primary) road, the villages on which suffer high tourist traffic pressure in summer. The schemes at Stiffkey, Blakeney and Wiveton were introduced in May 1999 as part of this Strategy. In addition to using sympathetically designed measures to lower vehicle speeds, the schemes included changes to signing, in order to maintain village character.

The Suffolk scheme, at Occold (just off the B1077 near Eye), was introduced in August 1999 as part of a rural package strategy by the County Council. It was aimed at improving safety for children on school journeys, together with other vulnerable road users, within a village environment. The main feature of the scheme was a 20 miles/h zone.

Prior to scheme installation, the mean two-way traffic flow was about 3,500 vehicles per day in Blakeney, 2,500 in Stiffkey and under 1,500 in Wiveton and Occold.

The *changes in signing* in the three Norfolk villages were: new village signs; a rationalisation of road signs (removing some signs and replacing others with smaller ones); speed limit signs being mounted on wooden posts in Stiffkey and Blakeney; and the use of fingerpost signs in Stiffkey and Wiveton. Gateway features were also introduced, comprising new *signing* and *patches of sandy coloured surfacing*.

In Stiffkey, the speed limit on the A149 was 30 miles/h before scheme installation. Mean vehicle speeds were just above this at the gateways but much lower (about 22 miles/h) in the village centre, where they were constrained by the narrow carriageway and winding alignment, giving limited forward visibility. The main village centre measures were a *20 miles/h speed limit* having *sandy coloured surfacing with no road markings* to impart a 'country-lane' feel, and a short stretch of *overrunable footway* (composed of grey imprinted surfacing). The footway is intended for use by pedestrians, but can also be used by cyclists and by vehicles when they do not have sufficient space to pass each other.

In Blakeney, the A149 is relatively wide and much of the development is set back, imparting an open aspect. Mean speeds were between 30 and 35 miles/h before scheme installation, well below the 40 miles/h speed limit. This limit was lowered to 30 miles/h and a *vehicle activated fibre optic speed limit reminder sign* was installed 100m inside the west gateway.

The C599 in Wiveton has scattered frontage development but is narrow with a right-angled bend and has no footway provision. Mean speeds before scheme installation were less than 34 miles/h. The national speed limit was retained, the main changes being to *signing* and the *replacement of one set of bend chevrons by reflector posts*.

In Occold, the scheme was specifically targeted at improving safety outside the school, which is situated at a Y-junction between two roads. There is little footway provision in the village. Mean vehicle speeds (within the 30 miles/h speed limit) were below 25 miles/h before scheme installation. A *20 miles/h zone* was introduced, with the intention of avoiding the use of road humps and chicanes normally associated with more urban schemes of this type. The 'gateways' to the zone have one-way working *kerbed build outs* with *patches of light coloured surfacing* and *white edge markings*. A further *kerbed build-out* and *simulated narrowings* (*patches of light coloured surfacing* and *white edge markings*) were installed at intervals through the zone. The Y-junction was re-aligned to a T-junction, using *light coloured surfacing to give horizontal deflection*.

Results

- There appeared to be little change in traffic flow levels (or in the proportion of heavy vehicles) following scheme installation.
- At the gateways in Stiffkey and the east ends of Wiveton and Blakeney, changes in mean inbound speeds were all less than 2 miles/h. By contrast, the reduction at the west end of Blakeney, with the *vehicle actuated fibre optic 30 miles/h reminder sign*, was almost 5 miles/h.
- In the centre of Stiffkey, on the continuous *sandy*

coloured surfacing with no road markings, the mean speed from west to east was hardly changed, whereas that in the opposite direction was reduced by almost 3 miles/h. It remained just above the *20 miles/h speed limit*, outside the summer season. There was little change in mean speed in the centres of either Blakeney or Wiveton.

- In Occold, mean speed fell by 6 miles/h at the entries to the 20 miles/h zone, which had *kerbed build outs* with one-way working. In the village centre, where there were simulated narrowings and a further kerbed build-out, mean speed fell by 4-5 miles/h to 21 miles/h.
- The scheme in Stiffkey did not have a statistically significant effect on air quality. Measured concentrations of benzene and NO_2 were well below the current Air Quality Standards.
- In the Norfolk villages, the opinion surveys showed that the *changes in signing* were seen as improving the villages' appearance. Those interviewed were generally in favour of the use of wooden posts for speed limit signs, although a few saw them as being out of proportion to the signs. *Finger post signs* were also considered to improve the appearance of the villages, although a small minority said they were hard to see. They are appropriate when speeds are low, and therefore make sense as part of an overall strategy to reduce speeds, but strangers may require advance warning of a junction.
- The *20 miles/h speed limit* and the *sandy coloured surfacing and absence of road markings* in the centre of Stiffkey were seen as effective but only about 20% of residents thought speeds had been reduced enough. Most of the residents thought the sandy coloured surfacing improved the appearance of the village, or made no difference to it; a few disliked the colour.
- The *overrunable footway* in Stiffkey was considered effective by two-thirds of those interviewed. One drawback was that vehicles tended to park on it. That aside, it seems an excellent method of providing a footway where a road is too narrow for a kerbed pavement. It could ideally have been extended to provide for pedestrians along the length of the village rather than just outside the shop.
- In Blakeney, over 80% of those interviewed found the *speed limit reminder sign* effective.
- In Wiveton, speeds were still considered too high. There was concern about pedestrian safety and 40% thought that the speed limit should be reduced.
- Public reaction to the Occold scheme was somewhat unfavourable with only two-fifths of the people interviewed satisfied with the scheme overall and about half with the appearance of the scheme. The *patches of light coloured surfacing* were considered to be untidy looking and ineffective in reducing speed. The 20 miles/h zone was supported but people still felt that speeds had not been reduced enough, in spite of the encouraging reductions measured. About one-third of residents wanted to see road humps installed and others called for more policing, and the provision of footways and speed cameras.

Conclusions

The main conclusions were as follows:

- Overall, the success of the schemes in meeting CTMG objectives has been mixed. Measured speed reductions were small except at the fibre-optic sign in Blakeney and in the 20 miles/h zone in Occold. Mean speeds in Stiffkey and Occold remained above the 20 miles/h limit; the reductions were not considered sufficient by residents.
- The Norfolk schemes were generally popular with the efforts to improve the appearance of the villages particularly appreciated by residents and visitors alike.
- At Occold, the residents' dislike of the patches of light coloured surfacing and their perceived ineffectiveness at reducing speeds, contributed towards the scheme not achieving full public acceptability. Nevertheless, the scheme was inexpensive, and had a substantial effect on speeds.
- More extensive physical measures would be required to reduce speeds further. For example, in Occold, road humps would have had to be very closely spaced to achieve a greater speed reduction and would not have been appropriate without street lighting. Mini-roundabouts could possibly have been used in some of the schemes.
- The trade-off between the effectiveness of a scheme in reducing speeds and increasing safety and visual intrusiveness needs to be explored more fully – for example, by greater use of appropriate colour and more experimentation with different sizes / types of sign.

1 Introduction

In recent years, local authorities have been able to install a wider range of speed reducing measures on main roads as a result of changes to legislation, together with special authorisation procedures. This has led to the implementation of a variety of village traffic calming schemes. Many of these have been studied by TRL for the Department for Transport, Local Government and the Regions (Wheeler *et al.*, 1993, 1994, 1996, 1997, 1998; Wheeler and Taylor, 1995, 1999, 2000; Taylor and Wheeler, 2000). A number of schemes, however, have been criticised for their appearance being out of keeping with the rural environment.

The Countryside Traffic Measures Group (CTMG) was set up in 1997 by the Countryside Agency and the Department for Transport, Local Government and the Regions (DTLR) to support the planning and implementation by local authorities of innovative rural traffic management schemes. Under this initiative, local authorities were invited to propose schemes, forming part of their traffic and transport strategies, which are designed to integrate sensitively into the local environment. The DTLR's Charging and Local Transport Division commissioned TRL to monitor the effectiveness of a selection of schemes being progressed within the CTMG initiative. The schemes, which feature village traffic calming, are located in Surrey, Norfolk and Suffolk (Kennedy and Wheeler, 2001; Wheeler *et al.*, 2001*)*. Three other schemes, in Cumbria, Devon and Hampshire, were originally included, but for various reasons, were not pursued.

The aim of the study was to investigate the extent to which schemes can be effective in meeting their traffic, transport and safety objectives whilst being designed with sensitivity to the countryside environment in which they are set. The results will be used to provide the basis for the development of technical advice suitable for widespread application.

The monitoring of three village traffic calming schemes in the A149 corridor in Norfolk, and one at Occold in Suffolk, featuring low visual impact, low cost, measures, is the subject of this report. The features of the CTMG initiative, which forms part of a Transport Strategy for North Norfolk, and a rural safety strategy for Suffolk, are briefly summarised in Section 2. The remainder of the report describes the monitoring and the results.

2 The CTMG initiative in Norfolk and Suffolk

2.1 Norfolk

The A149 is a principal (non-primary) road running from Kings Lynn to Great Yarmouth via Hunstanton, Sheringham and Cromer. The Hunstanton-Cromer section, designated a main distributor route within the County Council's Route Hierarchy, runs through some of the most environmentally and ecologically sensitive parts of the North Norfolk Coast Area of Outstanding Natural Beauty. The AONB was included in the development, by the County Council and the Norfolk Coast Project, of the North Norfolk Coast Transport Strategy. Formulated to address traffic management, public transport and tourism issues, the Strategy covers the area between the A148 Kings Lynn-Cromer primary road and the Cromer-Great Yarmouth section of the A149, and the coast. An element of the Strategy aimed to afford special status for the Hunstanton-Cromer section of the A149 and the B1159 Cromer-Caister road, as a 'seasonal tourist route' along the coast. Part of this concept was the development of a speed management zone between Hunstanton and Sheringham, involving the use of sensitively designed traffic calming techniques in villages along the route.

The Strategy suggested that speeds within villages could be reduced to 20 miles/h where appropriate, and a local speed control campaign could be initiated to encourage 'self-enforcement' of speed limits.

The schemes aimed to ensure that countryside character is maintained or enhanced by:

- Discouraging the predominance of the car, and the consequent reduction in the 'urbanisation' of the road environment.
- Maintaining the integrity of the character of villages on the A149.
- Development of locally characteristic signs and street furniture.

In May/June 1999, traffic calming measures at Blakeney, Stiffkey and Wiveton were introduced as demonstration schemes for the CTMG programme, the schemes being developed by Norfolk County Council in partnership with the community. These villages, which lie to the east of Wells-next-the-Sea (Figure 1), suffer high tourist traffic pressure in summer - whereas the average annual daily traffic (AADT) on this stretch of the A149 is around 2,000 vehicles, the peak 12-hour flow in summer can exceed 6,000.

It is envisaged that the best of the techniques learned in this study will be applied subsequently to all the villages on the Hunstanton-Sheringham section of the A149.

2.2 Suffolk

Occold was one of three locations (the others being Orford and Thorpeness) originally proposed as CTMG demonstration schemes in Suffolk of village 20 miles/h speed limits. The main objective of the schemes was to reduce the accident risk to vulnerable road users within village environments. The Occold and Thorpeness schemes formed part of Suffolk County Council's rural package strategy outlined in their 1998/99 Transport Policies and Programmes (TPP) submission. The Occold scheme was proposed as part of the County Council's strategies to reduce traffic impacts in rural communities and to improve safety for children going to school. In parallel, a 5-10 year county-wide 'Safety to School' campaign was launched in 1998 covering 60 villages including Occold, forming part of the County Council's 'Travelwise' initiative. The campaign was publicised in a newsletter *APPLEnews* (APPLE = Accident Prevention Promoted through Local Education) produced by the County Council.

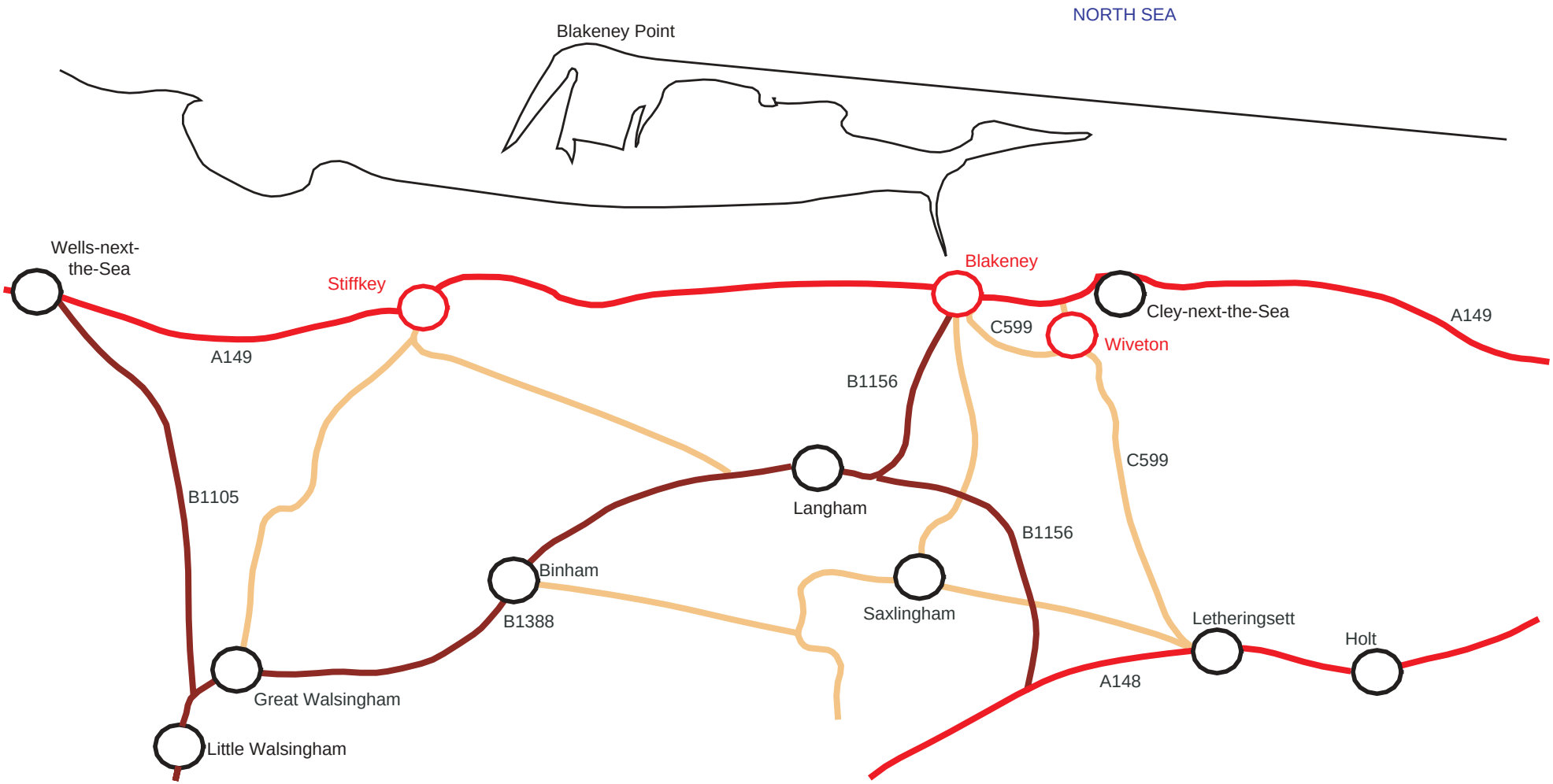

Figure 1 Location plan for Stiffkey, Blakeney and Wiveton (not all roads shown)

Occold, Orford and Thorpeness have little or no footway provision. Whereas the latter are popular tourist destinations with much pedestrian/cyclist activity, the Occold scheme was proposed as a school safety zone. This arose out of concern within the local community about the vulnerability of children walking to school and in the playground.

It was intended that the local communities have 'ownership' of the schemes. Extensive open consultation was carried out to determine the acceptability of various elements of the proposals. The Occold scheme, the first to be installed, in August 1999, was designated a 20 miles/h zone. A design competition was held at the school for the zone signing; this competition opened the way to raising school safety issues with the children and for them to take the discussion home to parents. This fed into the wider discussion in the village about whether the scheme was appropriate.

3 Stiffkey (Norfolk)

3.1 The village

The layout of Stiffkey is shown in Figure 2. The whole of the village centre, including the area around the church, lies within a conservation area. Before scheme installation there was a 30 miles/h speed limit within the built-up area of the village, extending for 1,350m along the A149 and for 300m along Bridge Street.

The village has frontage development along both sides of the A149 except at the western end where development is more sparse, separated from the main village by an undeveloped length of around 200m. Within the village centre, many of the buildings abut the carriageway edge. This, in combination with the narrow carriageway (less than 5m wide in places) and winding alignment gives the road a constricted feel with limited forward visibility, thus constraining speeds. This effect is reinforced in the summer by congestion of both vehicles and pedestrians.

East of the church and west of the public house, the A149 has a more open aspect with buildings set back from the carriageway, here 5-6m wide. Lighting in the village is limited to the occasional parish maintained lamp.

Other than a short length of footway on one side of the road near the public house, there was no pedestrian provision in the village before scheme installation. This was indicated at each end of the village by signing 'pedestrians in the road ¾ mile'.

3.2 The measures

The purpose of the scheme, designed within a budget of £48,000 (1998 prices), was to implement a 20 miles/h speed limit in the village centre without the use of heavily engineered traffic calming measures, and to reduce/ rationalise signing. Figure 3 shows an outline plan of the scheme and Figures 4-9 illustrate with photographs the effect of the scheme on the village's appearance.

The main elements are:

- Gateway features at the 30 miles/h speed limit terminal signs:
  - patch of sandy coloured surfacing;
  - new signing.
- 20 miles/h speed limit:
  - sandy coloured surfacing only;
  - no road markings.
- Removal of unnecessary warning signs.
- Replacement of direction signs with finger post signing (Bridge Street junction).
- Overrunable footway outside the village shop.
- Wooden posts replacing plastic marker posts.

3.2.1 30 miles/h speed limit

Once the 20 miles/h speed limit had been introduced, the remaining sections of the 30 miles/h speed limit became 'buffer zones' between the national 60 miles/h limit outside the village and the 20 miles/h limit.

The gateways are shown in Figure 4. The appearance of the gateway features at all three villages had to balance the requirements of conspicuity and environmental sensitivity. A length of contrasting surface dressing was laid, but instead of brightly coloured surfacing material widely used elsewhere in the UK, aggregate of a sandy colour sympathetic with the local buildings was formulated. The same dressing was laid at the gateways in Blakeney and Wiveton and within the 20 miles/h limit (section 3.2.2). The aggregate comprises 10mm pink dacite (a volcanic rock from Fife, Scotland) mixed with 6mm flint gravel from Cambridgeshire, applied with a polymer modified bitumen. SCRIM tests on the completed surface indicated a skidding resistance value, expressed as the Mean summer SCRIM Coefficient (MSSC) of 0.55 to 0.57, very similar to the value for the surfacing outside the village (based on data available only for west of Stiffkey).

At the west gateway, 30 miles/h internally illuminated signing on metal poles was replaced by reflective signing on wooden posts. A pair of 'road narrows' signs mounted below the speed limit signs was removed because it was felt that the degree of taper of the road here did not justify their retention. At the east gateway the original speed limit signing was still in place when monitoring was undertaken.

Just inside each gateway, an artistically designed village sign was installed (Figure 4 inset).

Modifications to signing within the 30 miles/h limit were:

- Removal of 'road narrows' warning signs on the western approach to the 20 miles/h limit because it was felt that the entry point highlighted the narrowed section of road there.
- Addition of 30 miles/h repeater signs on the sparsely developed western section of the speed limit to prevent drivers speeding up on approaching the 20 miles/h limit.
- Retention of the existing 'pedestrian' warning sign at the junction of Greenway (but subplate replaced to read '250yds') and provision of a similar sign for westbound traffic leaving the 20 miles/h limit. These changes cater for pedestrians going to the village centre from the properties at the western end of the village.

At the time of writing, a number of elements originally proposed have not been installed, i.e. verge-side features at the gateways such as timber fencing; environmental enhancement of the open area between houses in Camping Hill and the A149, and a gravel path between Camping Hill and the church.

Figure 2 Stiffkey – village layout (simplified)

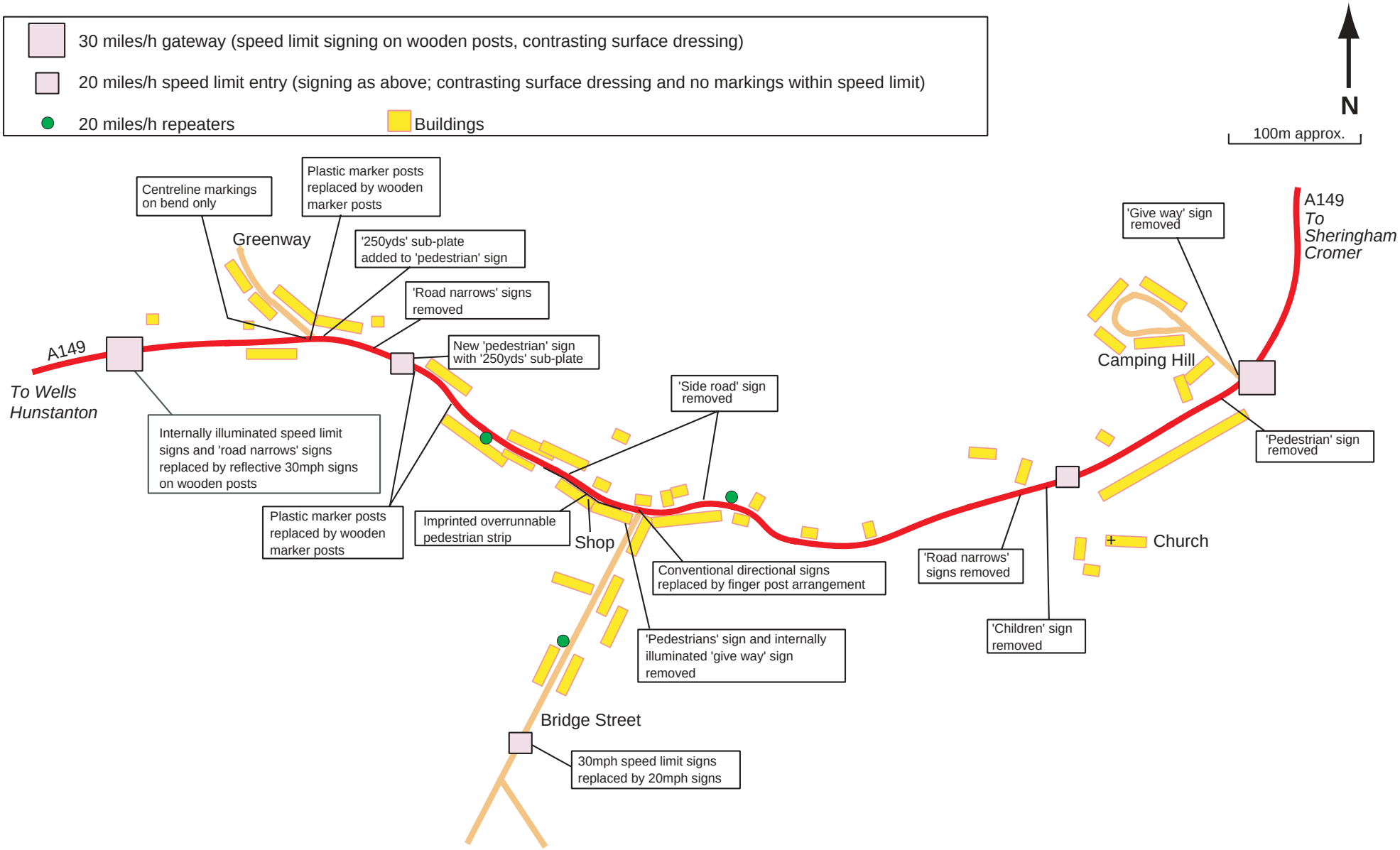

Figure 3 Stiffkey – outline plan of scheme

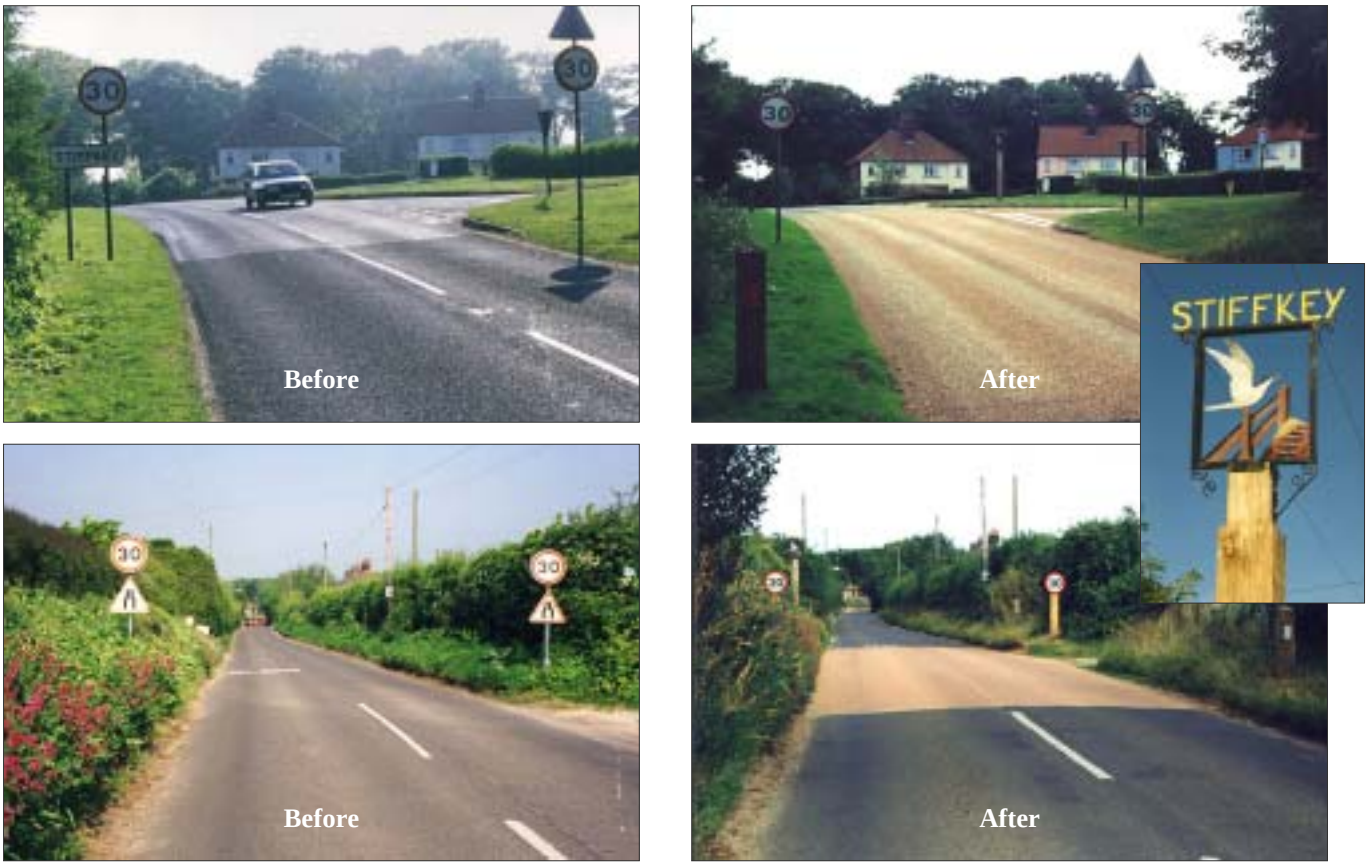

Figure 4 Stiffkey: East gateway (top) and west gateway (above). A wooden reflector post was installed on the verge and a village sign (inset) was erected just inside each gateway

Figure 5 Stiffkey: Western end of 20 miles/h speed limit. A 'pedestrian' warning sign is on the reverse of the right hand post

Figure 6 Stiffkey: Contrasting surface dressing and markings not reinstated within the 20 miles/h limit (looking east)

Figure 7 Stiffkey: Narrow section within 20 miles/h speed limit (eastern end just beyond the bend). Before scheme installation sections narrower than 5.5m had no centre markings. (inset: 20 miles/h repeater on wooden post.)

Figure 8 Stiffkey: Conventional direction signing replaced by finger post arrangement (arrowed; see inset), junction with Bridge Street, looking east

Figure 9 Stiffkey: Imprinted overrunable footway past the village ship within 20 miles/h speed limit (looking east)

3.2.2 20 miles/h speed limit

Because of the alignment and character of the central area of the village, the 20 miles/h speed limit was submitted for DETR approval without the need for additional traffic calming measures. The limit extends for 750m along the A149 between regarded natural gateways, i.e. a large tree outside the church, and a narrow section just west of the public house (Figure 5). It also extends along Bridge Street to where the 30 miles/h terminal signs were situated before replacement with 20 miles/h signs. The road is in a shallow cutting at this point also forming a natural gateway, obviating the need for verge-side features.

The sandy coloured surface dressing was laid throughout the 20 miles/h speed limit (Figures 6 and 7) to provide continued warning and advice to drivers of the change from normal highway. The County Council did not reinstate the centre line road markings in order to remove the impression of a traffic-dominated environment (Figure 6) and in view of the absence of footway along most of the length (Figure 7). Three 20 miles/h repeaters on low wooden posts were also installed (Figure 3, Figure 7 inset).

It was felt that the introduction of the 20 miles/h limit, and the message it and its features convey to drivers, offered the opportunity to reduce signing on this section. A number of warning signs ('children', 'pedestrians in road', 'road narrows' and 'give way' for Bridge Street traffic) regarded as no longer appropriate within this speed limit were removed (see Figure 3 for details). It was considered that in this situation drivers should be more aware of other road users, be prepared to give way to oncoming vehicles in narrow sections, and anticipate side roads, which can usually be seen at 20 miles/h approach speeds without the need for advance warning.

It was also considered that low speeds in the village centre would permit the replacement of standard direction signs at the Bridge Street junction with a finger post arrangement (Figure 8).

Along a wider section of the main road west of Bridge Street the surface dressed width was maintained at 5m to help constrain speeds. This allowed the provision of a short length of informal footway to particularly benefit access to the village shop (Figure 9). This overrunable strip, up to 1.5m wide, was formed of grey imprinted surfacing raised 10-15mm above the carriageway.

3.3 Scheme monitoring

Monitoring comprised:

- The collection of Before and After traffic flow and speed data.
- Before and After air quality measurements.
- After opinion surveys of residents and visitors.

3.3.1 Traffic flows and speeds

3.3.1.1 Data collection

Traffic flows and speeds were recorded before and after scheme installation at three positions (S1-S3 in Figures 10-12) - just inside each end of the 30 miles/h speed limit and within the 20 miles/h speed limit near the village shop. The latter position was away from bends and narrow sections. The data were collected using automatic traffic classifiers (ATCs) connected to tube detectors over a one-week period (this procedure was also used at Blakeney and Wiveton).

After monitoring was planned to be carried out during term-time at the same time of year (June 1999) as the Before monitoring (June 1998) but delays to scheme implementation, and adjacent roadworks, led to postponement until early October, about 3 months after scheme implementation ('After 1'). Subsequently, it was decided to repeat the monitoring in June 2000 ('After 2'). However, an ATC fault developed on day 5 of this survey at the within-village position necessitating a further repeat survey at this position during August 2000 ('After 3'). The results of all of these surveys are presented in Figures 10-12.

3.3.1.2 Results

Two-way flows are shown in Figure 10. Across all monitoring positions these averaged approximately 2,600 vehicles per day before scheme installation, 2,000 per day (October 1999: 'After 1') and 2,700 per day (June 2000: 'After 2'). Within the village, the repeat observations of August 2000 ('After 3') saw a flow of 4,100 per day. These differences are almost certainly due to seasonal variation. The proportion of HGV traffic averaged 4% before scheme installation and 5% during both After periods across the 3 positions.

Speed changes

Mean and 85th percentile speed changes are shown in Figures 11 and 12 respectively.

Gateways

Before *inbound* mean and 85th percentile speeds were respectively 33 miles/h and 39 miles/h at the west gateway, and respectively 29 miles/h and 34 miles/h at the east gateway. At both gateways, these speeds were little changed in both After periods with an average 1 miles/h reduction at the west gateway and no reduction at the east gateway. *Outbound* speeds were also little changed.

Village

Only westbound speeds saw meaningful reductions: the mean speed fell from 23 miles/h to 20-21 miles/h in the After 1 and After 2 periods and to 19 miles/h in the After 3 period. The 85th percentile speed fell from 29 miles/h (Before) to 26 miles/h (After 1 and 2) and 25 miles/h (After 3).

Eastbound mean speeds were 22 miles/h (Before), 21 miles/h (After 1 and 2) and 19 miles/h (After 3). 85th percentile speeds (Before: 27 miles/h) were unchanged in the After 1 and After 2 periods, but fell to 25 miles/h in the After 3 period.

The two-way averaged 85th percentile speed in the After 1 and After 2 periods was 7 miles/h above the 20 miles/h speed limit.

The lower After 3 speeds in the village were probably due to the higher traffic volumes in August (and possibly to tourists driving cautiously) rather than the scheme itself.

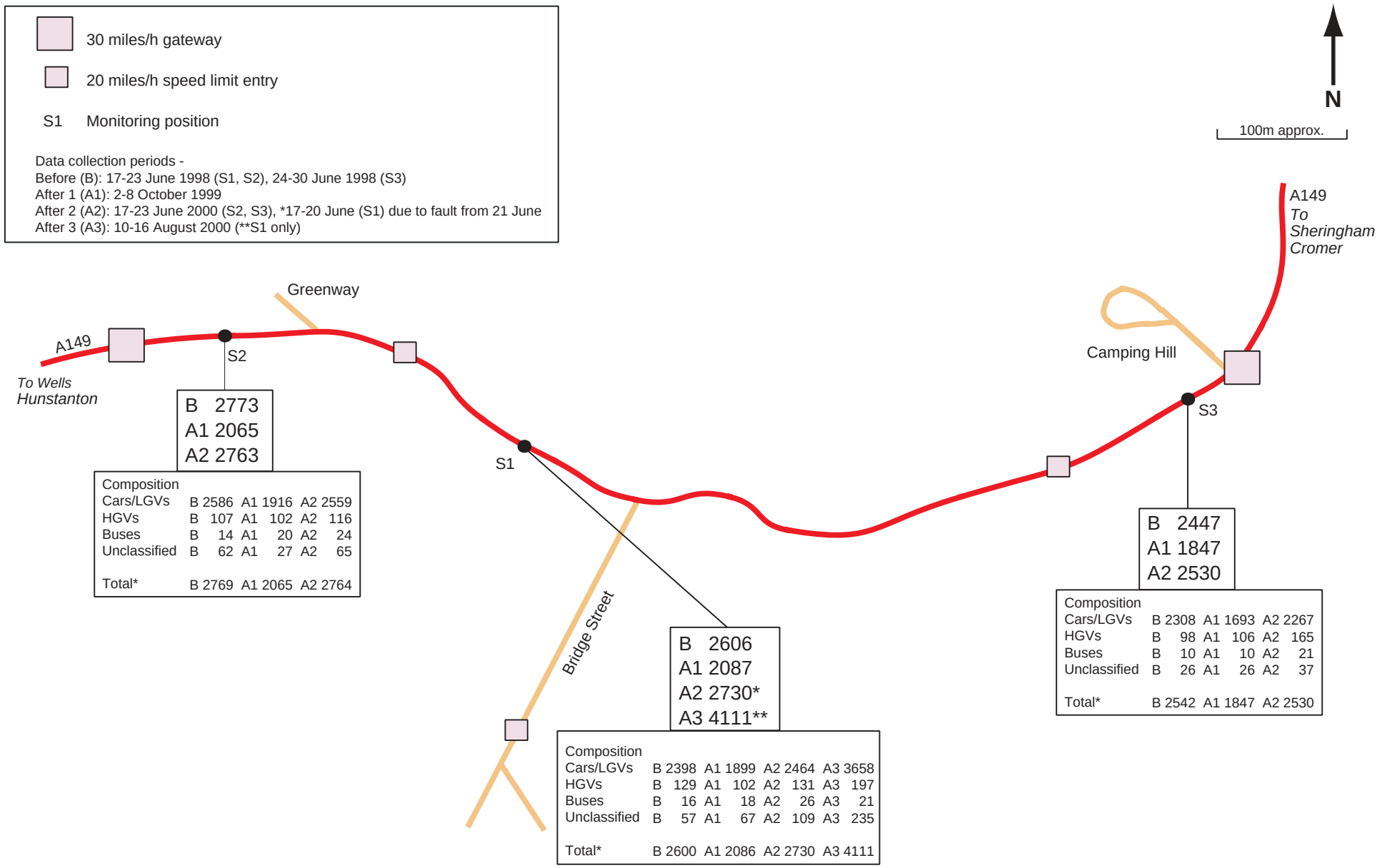

Figure 10 Stiffkey: Before and After 24 hour traffic flows – two-way, 7-day mean

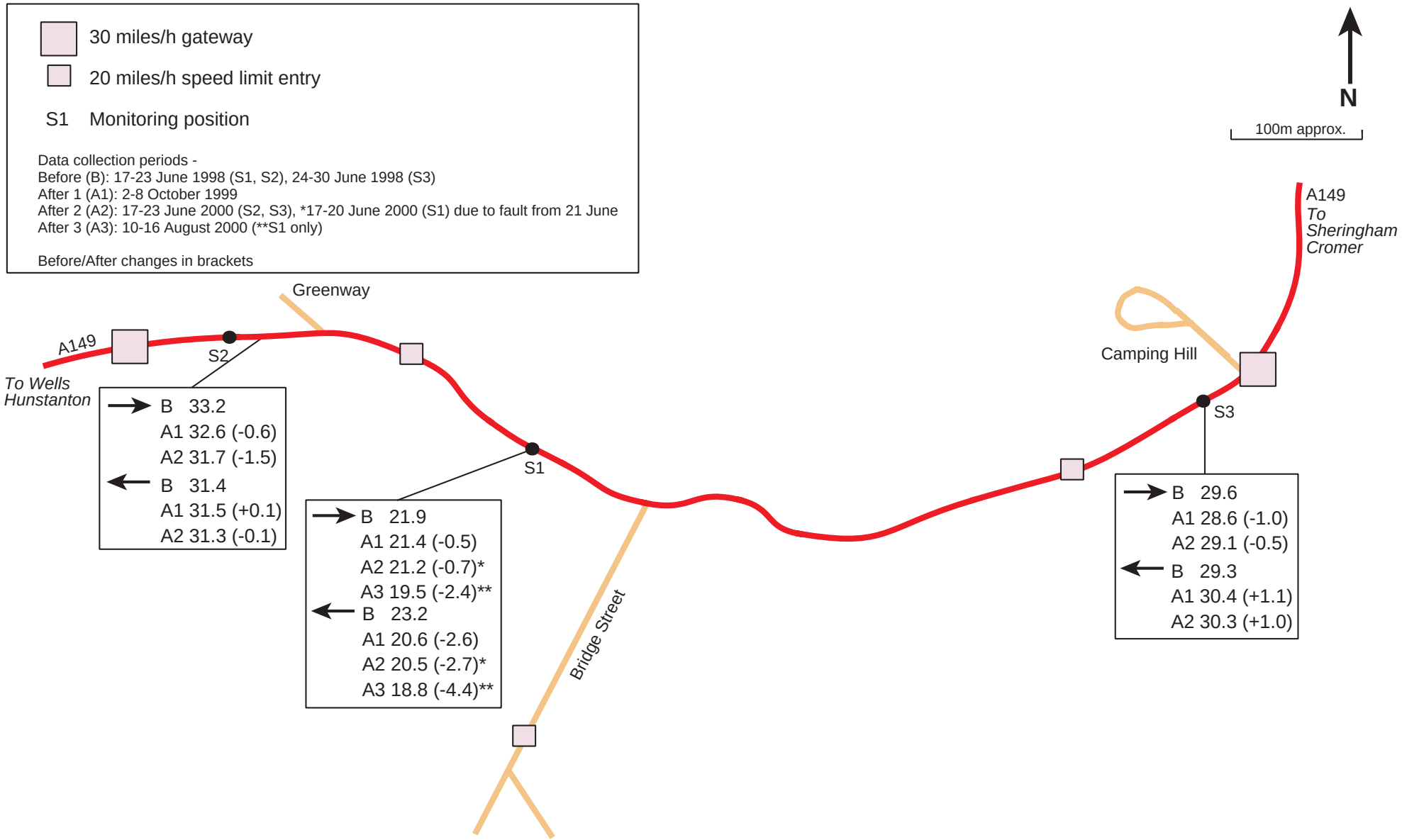

Figure 11 Stiffkey: Before and After 7-day mean speeds (miles/h)

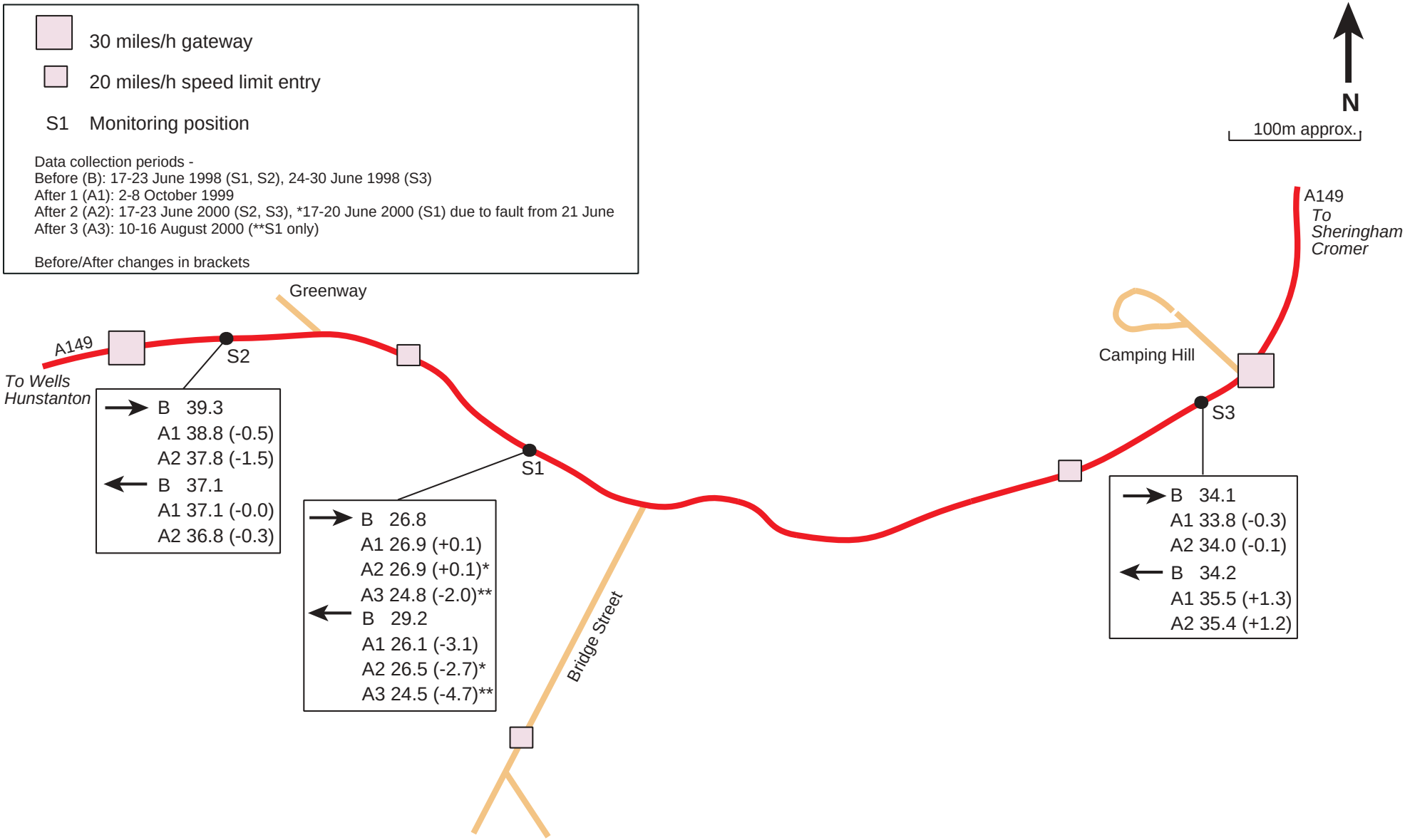

Figure 12 Stiffkey: Before and After 7-day 85th percentile speeds (miles/h)

3.3.2 Air quality measurements

For the UK as a whole, road traffic makes a large contribution to air pollution. This is illustrated in Table 1, which shows the percentage contribution from road traffic, along with commercial sources and domestic heating to the emissions of five of the pollutants of concern in the Air Quality Strategy for England, Scotland, Wales and Northern Ireland during 1998 (DTLR, 2000).

Table 1 Percentage emissions of pollutants by end user (AEA Technology plc, 1997)

End user	*NO_x*[1]	*CO*[1]	*SO_2*[1]	*PM_{10}*[1]	*Benzene**
Industry	21	17	34	19	16
Road transport	47	73	6	26	66
Other transport	6	<1	5	2	5
Domestic	13	7	28	23	9
Other	13	3	27	30	4

[1] *NO_x nitrogen oxides; CO carbon monoxide; SO_2 sulphur dioxide; PM_{10} particulate matter (size 10μm)*

* *End user categories defined differently in raw data*

At Stiffkey, which is in a rural area where there are no significant industrial sources, local traffic will be the largest contributor to emissions. The exhaust emissions from a stream of traffic are dependent principally on the volume of traffic, the types of vehicle present and their individual emission rates. Following scheme installation the changes in driving pattern may result in a change in exhaust emissions rates and this will in turn impact on the air quality of the local area and it is this effect that the following section of the report considers.

3.3.2.1 The surveys

Site considerations

To assess the impact of the scheme in Stiffkey on local air quality, the monitoring sites were located along the A149 at the kerbside close to the emissions source. This enabled any changes in air quality resulting from emissions changes caused specifically by traffic flow changes to be detected. Four sites (AQ1 – AQ4) were chosen, two on each side of the road, and were located as indicated in Figure 13.

A control site located away from the A149 was also required to enable a distinction to be made between changes in air quality due to the scheme (i.e. driver behaviour) and changes due to other effects such as a greater proportion of cleaner vehicles in the fleet and meteorological conditions. The control site chosen was on *Camping Hill*.

Measurement methods

The choice of sampling apparatus and pollutants to be measured was based on the contribution that traffic makes to emissions and also the availability of a relatively cheap but effective method. Of most interest in terms of the Air Quality Strategy (DTLR, 2000) is the pollutant nitrogen dioxide (NO_2). There is evidence in some areas, although not necessarily Stiffkey, that NO_2 concentrations regularly exceed the health related air quality standards adopted in the Air Quality (England) Regulations 2000, and may continue to do so in the future. NO_2 is formed both in the exhaust and from chemical reactions of nitric oxide, which is also produced by vehicles. Benzene was also included in the surveys as vehicle exhausts are one of the main sources and it is an important pollutant in terms of local air quality.

Sampling of NO_2 and benzene was carried out using diffusion tubes. The tubes were mounted on lamp posts approximately 2.5m above ground such that they were in the region where people are exposed to air pollution but were also relatively inconspicuous and less likely to be stolen. Positions where the samplers would be sheltered (e.g. by bushes or trees) were avoided.

The benzene diffusion tubes were analysed with a mass spectrometer using gas chromatography and the NO_2 diffusion tubes were analysed using an UV spectrophotometer. The analytical error on each procedure is ±5% and ±10% respectively.

Other pollutants associated with road traffic such as PM_{10} and CO are also important in terms of local air quality but were not included in the surveys. This was due to the high cost of the instrumentation required to achieve adequate coverage of the area.

Monitoring periods

Diffusion tubes are usually deployed for between one and four weeks depending on the ambient concentrations found at a site. For this study, the tubes were exposed for consecutive periods of two weeks. This was to allow as much detail on temporal variation as possible without the risk of levels being undetectable. Each monitoring period was continued for at least three months in order to be confident that the data were representative. The monitoring periods were as follows:

- Before survey

  7 December 1998 to 17 March 1999.

- After surveys

  6 July 1999 to 12 October 1999 (summer);

  6 December 1999 to 28 March 2000 (winter).

The summer After survey was undertaken to take account of the influx of holiday traffic during this period. The concern was that this increase in vehicles might lead to an increase in air pollution in the area and a subsequent breach of the air quality standards.

3.3.2.2 Results

Statistical analysis of air quality data

Below, concentrations at each of the monitoring sites and also between sampling periods are compared. To determine the statistical significance of the changes observed, t-tests were employed. The test assumed that concentrations at each of the sites were independent of each other. In each test the null hypothesis, that there is no difference between two means, was rejected at a probability of less than 0.05, i.e. the difference can be said to be significant at the 5% level.

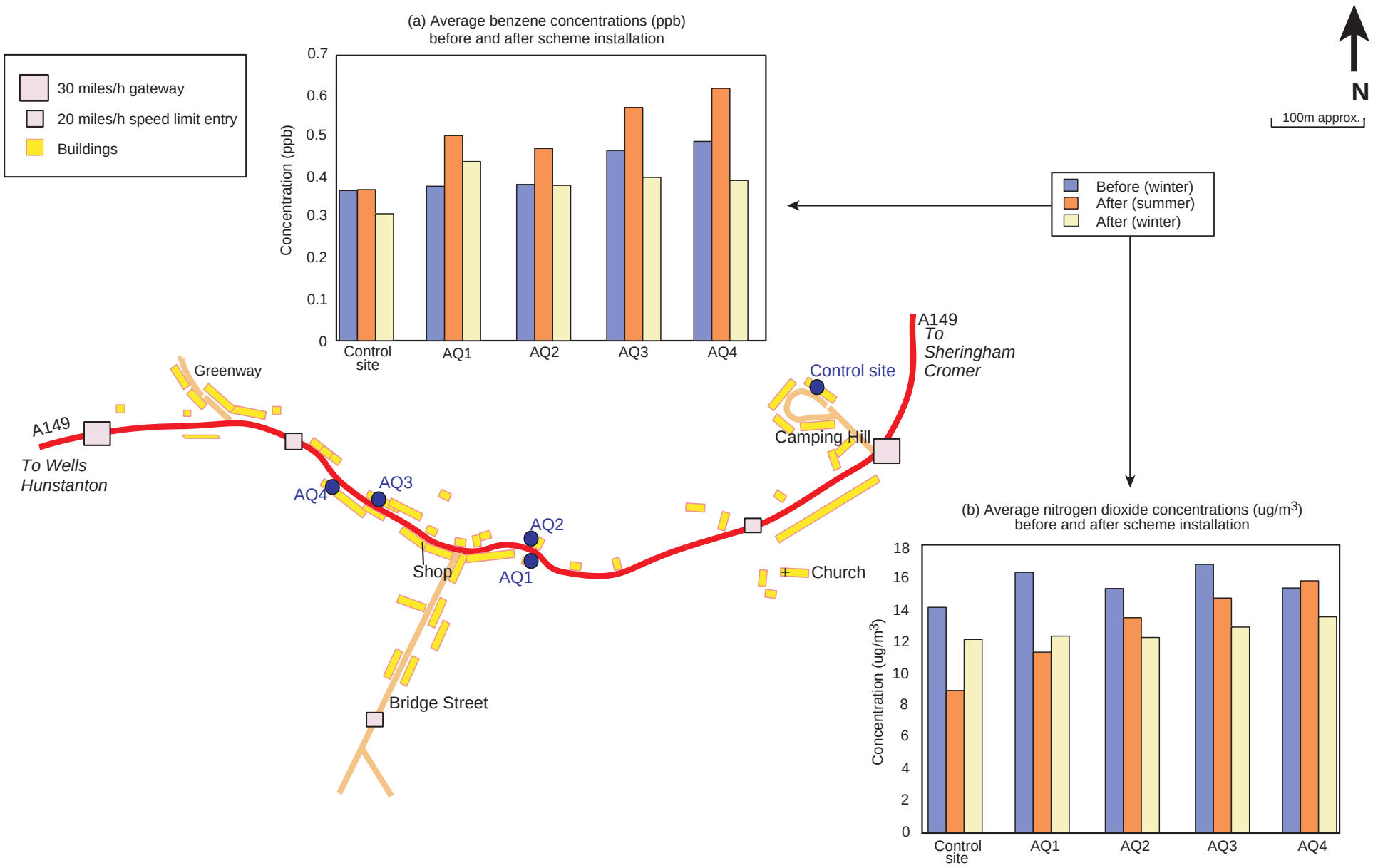

Figure 13 Stiffkey: Air quality monitoring positions and results

Benzene concentrations

Figure 13a shows the mean benzene concentrations (parts per billion) at the sites in the Before and two After surveys, with the raw data in Appendix A, Table A1. The values obtained were well below the Air Quality Standard of 5 ppb (which is for a running annual mean of hourly values).

Comparison between sampling sites

Mean benzene concentrations at each of the individual kerbside sites were compared with those at the control site (Appendix A, Table A2). It was found that during the Before survey, all mean kerbside site concentrations were higher, but statistically indistinguishable from the mean concentration measured at the control site. The same was true during the After (winter) survey. However, during the After (summer) survey, mean concentrations at sites AQ3 and AQ4 were significantly higher than those measured at the control site.

The mean combined kerbside concentrations in the Before, After (summer) and After (winter) surveys were higher (0.42, 0.54 and 0.40 ppb respectively) than the corresponding values at the control site (0.37, 0.37 and 0.31 ppb), but the difference was significant only for the After (summer) survey.

Comparison between sampling periods

Table A3 in Appendix A shows that the After (summer) mean concentrations of benzene at all the kerbside sites and at the control site were lower than the After (winter) mean concentrations, and these differences were statistically significant for sites AQ3 and AQ4. For this reason, it was not thought appropriate to combine the data from the two After surveys and therefore the Before and After comparisons were between the two winter periods.

Table 2 shows the differences in concentrations between the Before (winter) and After (winter) surveys. At the control site, there was a 17% decrease in benzene concentration between the two surveys. Effects at the kerbside sites varied, with some sites showing increases and some decreases in mean concentrations. None of the changes were statistically significant.

Table 2 Mean benzene concentrations (ppb) in winter before and after scheme installation

Site	*Before (Winter)*	*After (Winter)*	*Change (%)*	*Change statistically significant?*
Control site	0.37	0.31	-17	no
AQ1	0.38	0.44	+14	no
AQ2	0.38	0.38	0	no
AQ3	0.43	0.40	-9	no
AQ4	0.48	0.39	-18	no
Combined kerbside sites	0.42	0.40	-4	no

Nitrogen dioxide concentrations

Figure 13b shows the mean NO_2 concentrations measured during the Before and After surveys, with the raw data in Appendix A, Table A4. The values obtained were all well below the Air Quality Standard of 40 $\mu g/m^3$.

Comparison between sampling sites

Mean NO_2 concentrations at each of the individual kerbside sites were compared with the those at the control site for each survey period (Appendix A, Table A4). There were no significant differences between the kerbside sites during the Before survey or the After (winter) survey; during the After (summer) survey, however, site AQ1 (where the mean NO_2 concentration had fallen by 30%) was significantly different from the other kerbside sites.

It was found that, during the Before survey and the After (winter) survey, all mean kerbside site concentrations were higher than, but statistically indistinguishable from, the mean concentration at the control site. However during the After (summer) survey, mean concentrations at the kerbside sites were significantly higher than that at the control site.

The mean combined kerbside concentrations in the Before, After (summer) and After (winter) surveys were higher (16.04, 13.77 and 12.77 $\mu g/m^3$ respectively) than at the control site (14.17, 8.86 and 12.10 $\mu g/m^3$), but the differences were not statistically significant except in the After (summer) survey.

Comparison between sampling periods

There was no clear difference between the After (summer) and the After (winter) NO_2 mean concentrations. At three sites the concentration was higher in the summer, while at the other two sites it was higher in the winter (see Appendix A, Table A6). However, the differences at the control site and at AQ2 were statistically significant. For this reason, it was not thought appropriate to combine the NO_2 data from the two After surveys and Before and After comparisons were therefore between the two winter surveys.

The mean NO_2 concentrations in the Before (winter) and After (winter) surveys are given in Table 3. Also shown are the differences in concentrations between the surveys and their statistical significance. At the control site, there was a 15% decrease in NO_2 concentration between the two surveys. There was a similar reduction in concentrations at the kerbside sites, but these changes were not statistically significant except at site AQ1.

Table 3 Mean nitrogen dioxide concentrations ($\mu g/m^3$) in winter before and after scheme installation

Site	*Before (winter)*	*After (winter)*	*Change (%)*	*Change statistically significant?*
Control site	14.17	12.10	-15	no
AQ1	16.40	12.31	-25	yes
AQ2	15.32	12.22	-20	no
AQ3	16.86	12.87	-24	no
AQ4	15.57	13.66	-12	no
Combined kerbside sites	16.04	12.77	-20	no

3.3.2.3 Summary and discussion

The measurement of air quality both before and after scheme installation showed that concentrations of benzene and NO_2 are well below the Air Quality Standards of 5 ppb for benzene and 40 $\mu g/m^3$ for NO_2. Benzene concentrations are also below the provisional objective of 1 ppb for the year 2005.

Measured benzene concentrations were higher at both the control and the kerbside sites in the After (summer) survey than in the After (winter) survey. These differences were statistically significant for sites AQ3 and AQ4 and for the combined kerbside sites, but not for the control site, suggesting that the increase may arise from increased traffic during the summer months. For NO_2, the mean concentration in the After (summer) survey at the control site was significantly lower than that in the After (winter) survey, but the effects at the kerbside sites were mixed and were not statistically significant except at site AQ2. Because of these differences, Before and After comparisons of both benzene and NO_2 were between the two winter periods.

Measured concentrations at the control site decreased after scheme installation for both benzene and NO_2 by 17% and 15% respectively, suggesting a slight reduction of both pollutants in the ambient air of the local area. Measured concentrations at the kerbside showed a mixed effect; there was a decrease in the combined mean concentrations of 4% in benzene and 20% in NO_2. None of the changes were statistically significant, however.

In the After (winter) survey, comparison of the kerbside sites with the control site showed that the relative concentrations of benzene varied from -1% to +31% with an average of +13%, but the differences were not statistically significant. For NO_2, the relative concentrations were lower at all sites except AQ4, but the differences, which ranged from -10% to +3% were again not statistically significant.

Overall the scheme did not have a significant effect on air quality. The additional traffic in the summer months probably led to an increase in measured concentrations of benzene and NO_2 at the kerbside sites relative to the control site, but concentrations remained well below current air quality standards.

3.3.3 Public opinion surveys

3.3.3.1 Interviews

Surveys of residents and visitors were carried out in August 1999, about 10-12 weeks after scheme installation. The aim for the residents' survey was to interview 100 people who were both resident in the village before 1998 and aware of the scheme. In order to achieve this as many homes as possible in this fairly small village were visited, in the event yielding a sample of 77 respondents.

Many of the 101 visitors were interviewed in a local caravan park/campsite.

The aim of the surveys was to establish people's perceptions of the measures and their effectiveness, or otherwise, in reducing any traffic problems in the village. Views on the appearance of the scheme were also sought.

The questionnaires are reproduced in Appendix B (residents) and Appendix C (visitors), with the survey results (summarised below) incorporated.

3.3.3.2 Analysis – explanation of mean scores

Where appropriate, the results were also analysed to give 'mean' responses by allocating a score to each response. For questions with 3 comments, scores of 1 to 3 were given, where 3 was for the most positive reaction, 2 was for an intermediate response and 1 for the most negative reaction. For questions with 5 comments, scores of 1 to 5 were allocated, where 5 was for the most positive reaction, 3 was for no opinion either way and 1 for the most negative reaction.

Details of mean scores are shown in the Appendices and are summarised in the text.

3.3.3.3 Results (residents)

Of these, 53% were female and 64% were 45 years old or over with only 8% under 30. Fifty-eight per cent lived on the main road but only 29% had children under 16 in the household. Over one third of respondents were not working, the majority retired; 42% were in full-time employment or self-employed. 84% were drivers and 30% rode a bike, but 14% had no means of transport.

Problems in the village before the changes (Q.3)

The problems most mentioned were related to:

- Speeding traffic (51% of respondents).
- Danger to pedestrians, especially when walking along the road e.g. for the elderly and those with children/ pushchairs (46%).
- Volume of traffic, e.g. in the summer (33%).
- The number of large vehicles (17%).
- The narrowness of the carriageway (12%).

Nine per cent of respondents did not mention any problems.

Usefulness of the changes (Q.4)

Of the residents, 82% said that the *20 miles/h speed limit* was fairly/very useful, and 69% thought this about the *new footway outside the shop*. Opinions were somewhat more divided over the *sandy coloured surfacing* (at the gateways and within the 20 miles/h speed limit) - about one third saying it was of little use.

The mean scores for the overall level of perceived usefulness of the various measures were close to the 'fairly useful' category. The *20 miles/h limit* and the *new footway outside the shop* scored slightly above this rating and the *sandy coloured surfacing* at the gateways and in the village scored slightly below.

Satisfaction with the appearance of the village since the changes (Q.5)

Over three-quarters of the residents interviewed were satisfied with the appearance of the village since the changes, reflected in the mean score of 2.69 (out of 3) for the overall level of satisfaction.

Effect of individual changes on the village's appearance (Q.6, Q.6a)

Half to three-quarters of the residents, depending on the individual changes, thought that the village's appearance was improved. The most favourable reactions were towards

the *artistically designed village signs* on the approaches, the *wooden reflector posts and sign supports*, the *finger post signing* and the *new footway outside the shop*.

Opinion was more divided on *the sandy coloured road surfacing* and the absence of *road markings*. Just under half thought that these features had improved the appearance of the village and nearly 40% thought that they made no difference.

Mean scores were towards 'improves appearance' except for the *sandy coloured surfacing* and *road marking removal*, for which they were closer to 'makes no difference'.

The main concerns about the measures were:

- Sandy coloured surfacing: choice of colour; durability.
- Road marking removal: necessity of markings.
- Signing on wooden instead of metal posts: posts' size out of proportion with signs; waste of money; unnecessary.
- Wooden reflector posts: too big/bulky.
- Artistically designed village signs: wooden sign preferred; waste of money; unnecessary.
- Parking on the new footway outside the shop.
- Finger post signing: not clearly visible.

Agreement with statements about the changes (Q.7)

At least 70% of the residents interviewed agreed that the changes were necessary and improved the appearance of the village, and that the signing was less visually intrusive. Mean scores were close to 4 ('agree a little').

Opinion was more divided (mean score close to 'no opinion either way') as to whether:

- the measures made it safer for motorists and cyclists;
- speeds had been reduced;
- similar measures should be introduced in other villages;
- the environment in the village had been improved.

Three quarters of the respondents thought that speeds had not been reduced enough and over half thought that the scheme had not improved pedestrian safety. Mean scores lay between 2 ('disagree a little') and 3 ('no opinion either way').

Suggestions for improvements to the changes (Q.8)

Over one fifth of respondents considered improvements unnecessary.

Over a third made suggestions related to improving *signing.* A fifth each made suggestions related to the *speed limit* and *pedestrian facilities.* A number of similar suggestions came in more than one category and thus a number of percentages in the Appendix have been combined to summarise the results here.

The most popular suggestions were:

- Illuminated signs or signs with flashing lights on the approaches (25%).
- Additional/alternative measures to slow traffic e.g. road humps; rumble strips or traffic signals on approaches; contrasting surfacing with more visual impact; mini-roundabout (21%).
- Extension to the 20 miles/h limit (18%).
- More/continuous footway (17%).
- Enforcement e.g. speed cameras/signs, more policing, 'speed traps' (15%).

Overall satisfaction with the changes (Q.9)

Overall, over half of the residents interviewed were fairly/very satisfied with the scheme, but about one-third were fairly/very dissatisfied, equating to a mean score of 3.25 (slightly on the positive side of 'no opinion either way').

3.3.3.4 Results (visitors)

Equal numbers of visitors were male and female and almost equal numbers were under and over 45 years old. Nearly all were drivers but 40% rode a bike. Of the 101 visitors interviewed, 70% were on holiday and 30% were day visitors; 61% of those on holiday were staying for one week or less. Nearly all had driven through the village; 56% had walked and 35% had cycled through it at some time.

Usefulness of the changes (Q.3)

Of the visitors, 87% thought that the *20 miles/h speed limit* was fairly/very useful; 78% thought the same about the *sandy coloured surfacing within the 20 miles/h speed limit*, 75% about the *sandy coloured surfacing at the gateways* and 67% about the *new footway outside the shop.* The mean scores reflect that the measures were 'fairly useful' to 'very useful'.

Effect of individual changes on the village's appearance (Q.4, Q.4a)

More than three-quarters of the visitors thought that the village's appearance was improved by any one of the changes. The *finger post signing* drew the most favourable reaction. The use of wood for sign supports and the *artistically designed village signs* on the main road approaches drew criticism, though from no more than 10% of respondents. Overall, mean scores were towards 'improves appearance' (3).

There were few concerns about the measures; the main ones being:

- Wooden sign supports too big / out of proportion with signs.
- Artistically designed village signs: wooden sign preferred.
- Sandy coloured surfacing at gateways: untidy/messy.
- Footway outside village shop: used for parking on.
- Finger post signing: not clearly visible.

Rating of various aspects regarding the main road through the village (Q.5)

Since visitors will not necessarily have known about the situation before scheme installation, they were asked to rate the current effect of the scheme on pedestrians, drivers, cyclists and speed reduction (i.e. 'good', 'in-between' or 'bad'). Mean scores were not calculated because of the high proportion of 'don't knows' for some items.

The most positive comments were towards the effectiveness of the scheme in reducing speeds (67% rating it as 'good') and what it was now like for drivers (58% rating it as 'good'). Opinion was divided as to whether the scheme helped pedestrians. Over half of respondents were unsure whether the scheme had benefited cyclists.

Suggestions for improvements to the changes (Q.6)
Nearly half of the visitor respondents considered that improvements were unnecessary and 11% made no suggestions. Fourteen per cent of visitors made suggestions relating to *signing*, with 11% each to *pedestrian provision* and the *road surface* (11%).

The most popular suggestions were:

- Additional/alternative measures to slow traffic (e.g. road humps; rumble strips or traffic signals on approaches; sandy coloured surfacing with more visual impact) – 13%.
- More/continuous footway – 10%.
- Bigger/clearer signing - 6%.
- Limit size of/ban heavies/provide bypass for them – 5%.

Over three-quarters of respondents were in favour of similar changes in other villages (Q.7).

3.4 Accidents

Reported injury accidents on the A149 summarised from STATS19 details are as follows (the After period is too short for valid conclusions on the effect of the scheme to be drawn):

Before (31 December 1991 – 30 April 1999) – 3 accidents

Severity	*Weather/light conditions*	*Vehicle manoeuvre*
3 slight	1 icy 2 dark	2 loss of control[1] 1 overtake parked vehicle[2]

[1] *Motorcycle on icy bend at Greenway junction in dark; car on bend outside church in dark*

[2] *Car swerved round parked HGV and hit oncoming vehicle.*

After (1 May 1999 – 31 July 2000) – 2 accidents

Severity	*Weather/light conditions*	*Vehicle manoeuvre*
2 slight (both within 20 miles/h limit)	2 daylight	1 right turn from drive/entrance into vehicle head-on 1 HGV hit pedestrian on footway (not the imprinted footway)

4 Blakeney (Norfolk)

4.1 The village

The layout of Blakeney is shown in Figure 14. Prior to scheme installation, the speed limit on the A149 through the village was 40 miles/h. The village has straight approaches but a gently curved alignment within the speed limit. Lighting is limited to the occasional parish maintained lamp.

The centre of the village lies just to the north of the A149, which has frontage development along both sides, except for a short stretch east of the junction with B1156 (Langham Road). Much of the development is set back, imparting an open aspect. There are regular side road junctions (a number with poor visibility for emerging drivers) and frequent private drives. Other than with the B1156, the main junctions are with Saxlingham Road (C328A) and Wiveton Road (C599, formerly B1156) on the south side, and High Street, Westgate Street and Back Lane on the north side. The latter three roads link the A149 with the village centre and The Quay. Prior to scheme installation, the B1156/C328A/C599 had a 40 miles/h speed limit and the roads to the village centre/The Quay had a 30 miles/h limit.

The High Street and Westgate Street are densely built up, forming a conservation area with the immediate area around the church. Back Lane is less densely developed, with residential properties set well back from the road. These roads are very narrow, which helps to constrain speeds, and are congested with vehicles and pedestrians in the summer. These factors allowed the introduction, in tandem with the main road scheme, of a 20 miles/h speed limit in this area without the need for measures other than signing. This area was not, however, included in the monitoring.

4.2 The measures

An outline plan of the scheme is shown in Figure 15 and its main features are pictured in Figures 16-22.

The aims of the scheme were to:

- Reduce the speed limit to 30 miles/h on all 40 miles/h roads in the village with the use of low visual impact traffic calming measures, principally to benefit pedestrians crossing the A149.
- Reduce/rationalise signing.
- Deter non-essential traffic from the village centre (off the A149) as a result of implementing the 20 miles/h speed limit.

The scheme was designed within a budget of £76,000 (1998 prices) including £5,000 for the 20 miles/h speed limited area.

The County Council considered that the 30 miles/h speed limit was justified by the fairly built-up nature of the A149 and the other 40 miles/h roads in the village, in view of the frequent vehicular accesses and stretches where drivers could increase speed.

The main elements of the scheme are:

- Gateway features at the 30 miles/h speed limit terminal signs.
- A vehicle-actuated speed limit reminder sign at the western end of the village (set to trigger at 35 miles/h and intended to affect about half of drivers directly and be visible to those following).
- Removal of unnecessary warning signs.
- A length of overrunable median strip along a wider faster stretch of the A149.
- Signing at the entrances to the 20 miles/h zone.

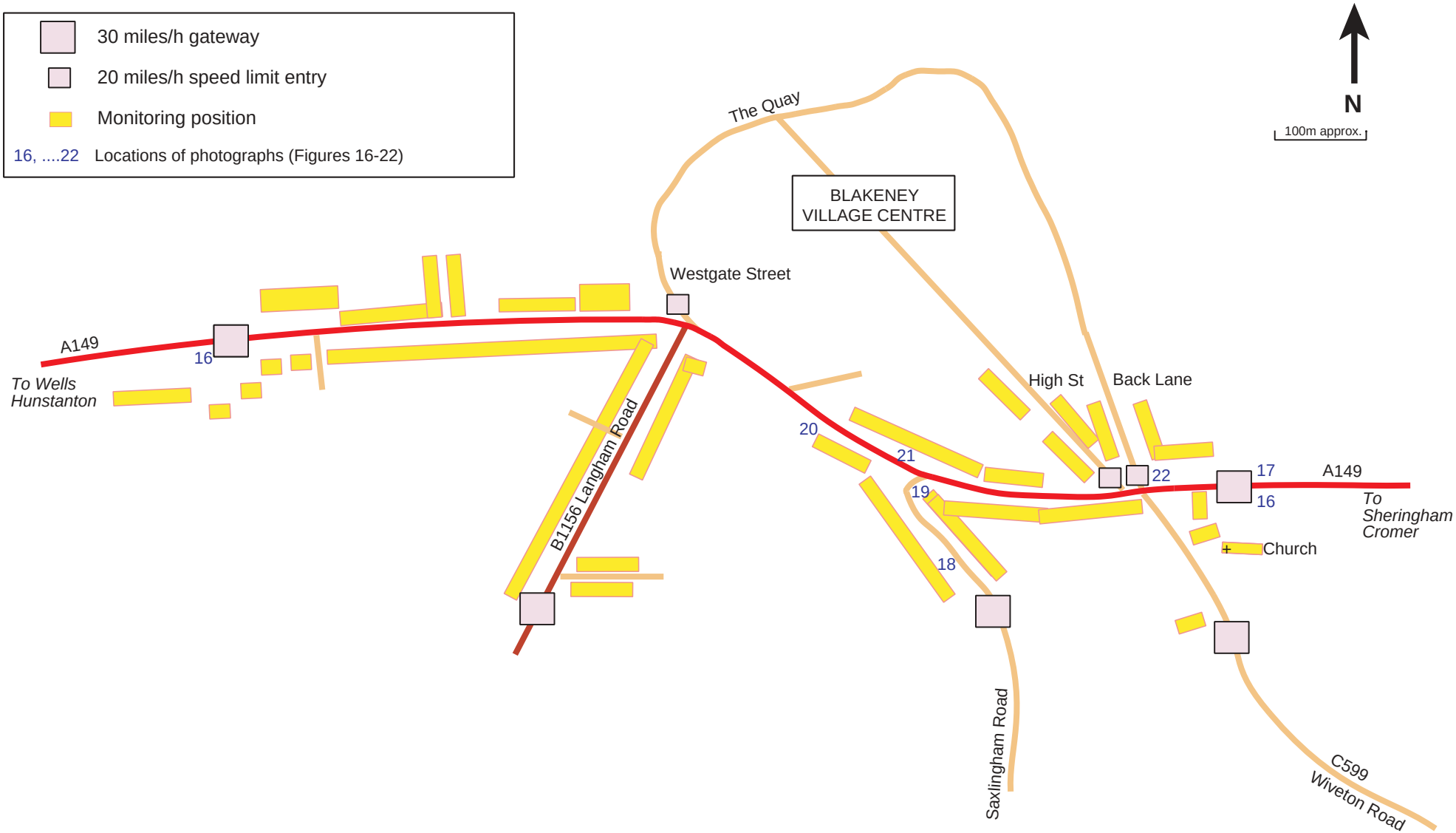

Figure 14 Blakeney: Village layout (simplified)

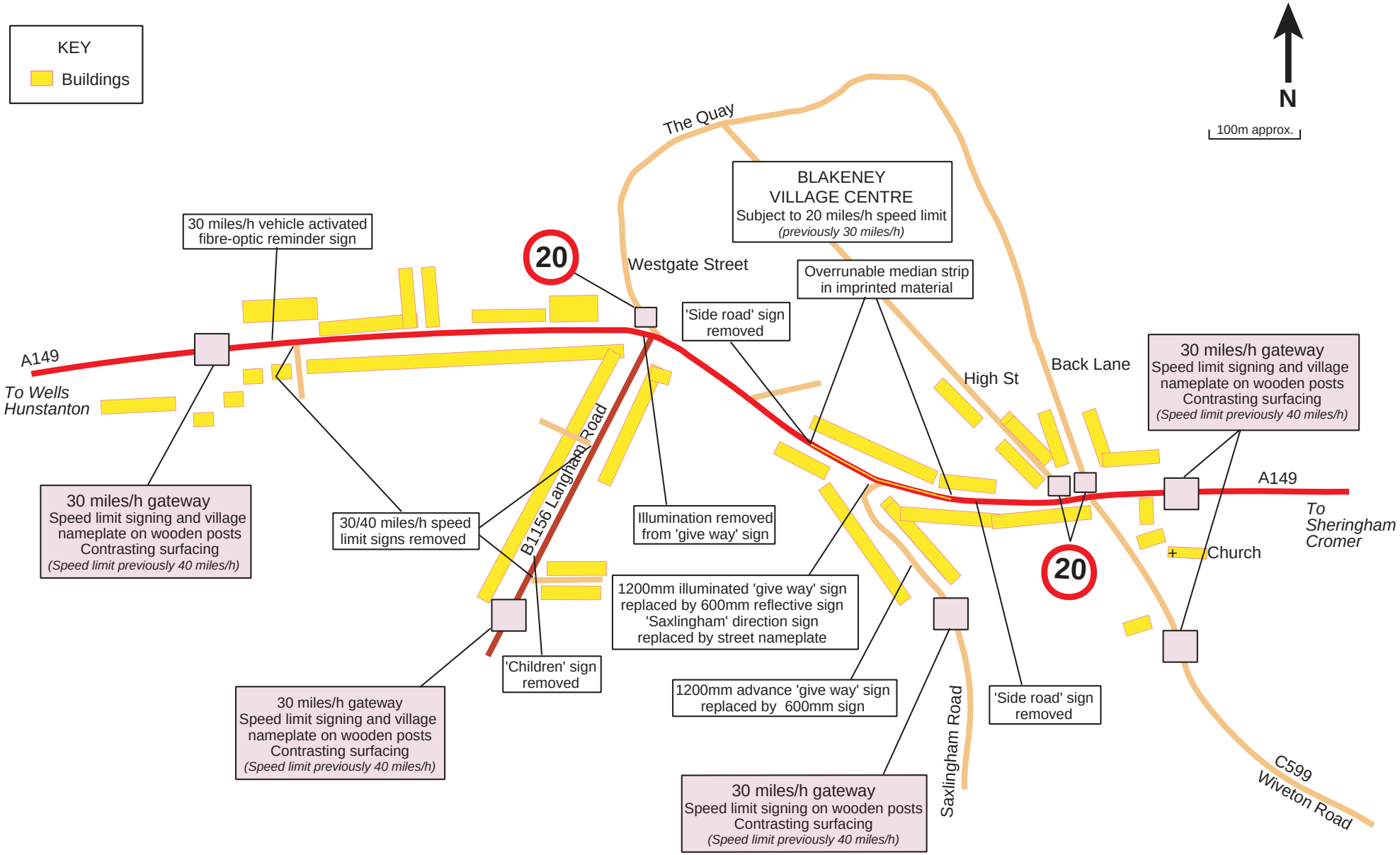

Figure 15 Blakeney: Outline plan of scheme

Figure 16 Blakeney: East gateway, A149 (top) and west gateway, A149 (above)

Figure 17a Village nameplate, east gateway, A149. At the west gateway, the nameplate was mounted on a separate post (see above)

Figure 17b Fibre-optic 30 miles/h reminder sign (arrowed) just inside west gateway, being triggered by car approaching it (looking towards village)

Figure 18 Blakeney: 1200mm advance 'give way' sign (left) replaced by 600mm sign, Saxlingham Road approacing A149

Figure 19 Blakeney: 1200mm illuminated 'give way' sign and 'Saxlingham' direction sign replaced by 600mm reflective 'give way' sign and road nameplate, junction of A149 with Saxlingham Road (looking west)

Figure 20 Blakeney: Overrunable median strip of imprinted material to constrain speeds, at/near junction with Saxlingham Road (looking east)

Figure 21 Imprinted material

Figure 22 Blakeney: Entry to 20 miles/h speed limit in village centre, looking into High Street from A149

Gateways were installed on five approaches: two on the A149 (east and west of the village), and one on each of the B1156, Saxlingham Road and Wiveton Road (C599). The A149 gateways are pictured in Figure 16. In addition to sandy coloured surface dressing, new 30 miles/h signs were mounted on wooden posts replacing metal ones (except at the west gateway on the A149) and new redesigned village nameplates were generally fixed beneath the 30 miles/h roundel (Figure 17). The speed limit reminder sign on the A149 was installed about 100m inside the west gateway (Figure 17a).

Sign changes (see Figure 15 for details) were:

- Removal of:

  Direction signing, and 'side road'/'junction' warning signs from the A149 approaches to the Saxlingham Road junction.

  'Children' warning signs from the B1156.

  'Bend' warning signs from within the 20 miles/h speed limit.

  30/40 miles/h speed limit signs from residential side road entrances.

- Smaller advance and at-junction 'give way' signs on Saxlingham Road (Figure 18).
- Removal of 'give way' sign illumination (e.g. Figure 19).

The overrunable median strip (Figures 20, 21) was installed on a wider, faster stretch of the A149 at the junction with Saxlingham Road, to make the running lanes appear narrower and thus reduce speeds. This is of imprinted material identical to that used for the footway outside the village shop in Stiffkey.

The 20 miles/h area in the village centre was designated by speed limit signing only (Figure 22) with repeaters installed on Back Lane.

4.3 Scheme monitoring

4.3.1 Traffic flows and speeds

4.3.1.1 Data collection

Monitoring was confined to the A149. Traffic flows and speeds were recorded using ATCs before and after scheme installation at 3 positions (S1 to S3 in Figures 23-25) - just inside the gateways and within the village near the junction with Saxlingham Road.

Before monitoring was carried out in June 1998 but After monitoring was delayed until September 1999 due to the late completion of the scheme.

4.3.1.2 Results

Flow changes

Two-way flows are shown in Figure 23. Two-way flows (averaged between sites) were approximately 3,700 vehicles per day before and 3,400 per day after scheme installation. As in Stiffkey, the differences are most likely due to seasonal variation. The proportion of HGV traffic across all positions averaged around 4.5% before and after scheme installation.

Speed changes

Mean and 85th percentile speed changes are shown in Figures 24 and 25 respectively.

Gateways

Inbound mean speeds reduced substantially from 32 miles/h to 27 miles/h, downstream of the west gateway and fibre-optic sign, but were little changed from 31 miles/h at the east gateway. Inbound 85th percentile speeds fell from 38 miles/h to 33 miles/h at the west gateway and from 38 miles/h to 37 miles/h at the east gateway. Outbound mean and 85th percentile speeds underwent similar changes, falling by 4 miles/h at the west gateway and 1 miles/h at the east gateway.

Village

Changes were modest: mean and 85th percentile speeds fell by 2 miles/h eastbound (from 34 miles/h and 41 miles/h respectively) but were little changed westbound from 32 miles/h and 37 miles/h respectively. The two-way average 85th percentile speed was 8 miles/h above the new 30 miles/h speed limit.

4.3.2 Public opinion survey

4.3.2.1 Interviews

A roadside survey of pedestrians (residents and non-residents) was carried out in August 1999, about 10-12 weeks after the installation of the scheme. A total of 69 residents (living within 5 miles of Blakeney), 29 visitors and one additional respondent (not recorded as resident or visitor) were interviewed.

Opinions on the effectiveness and the appearance of the measures were sought but with emphasis on whether there was any perceived benefit to pedestrians crossing the A149.

The questionnaire is reproduced in Appendix D with the survey results (summarised below) incorporated.

4.3.2.2 Results

Of all respondents, 54% were female and 60% were 45 years old or over; 82% were drivers and 51% rode a bike, but 9% had no means of transport.

Mean scores were used in the analysis, as described in Section 3.3.3.2.

Problems in the village before the changes (Q.3)

This question was aimed at local residents. The sum of the percentages shown in Appendix D for each response exceeds 100% because respondents could mention two or more problems. Those most mentioned were related to:

- Speeding traffic (58% of respondents).
- Congestion/traffic jams (21%);
- Volume of traffic (12%).
- A149/B1156 junction dangerous (10%).
- Danger to pedestrians, i.e. difficulty crossing the road (12%); problems for the elderly (4%) and children (1%); walking along the road and general danger to pedestrians (3%); lack of footways/crossing facilities (1%).

  Ten per cent of respondents said there were no problems.

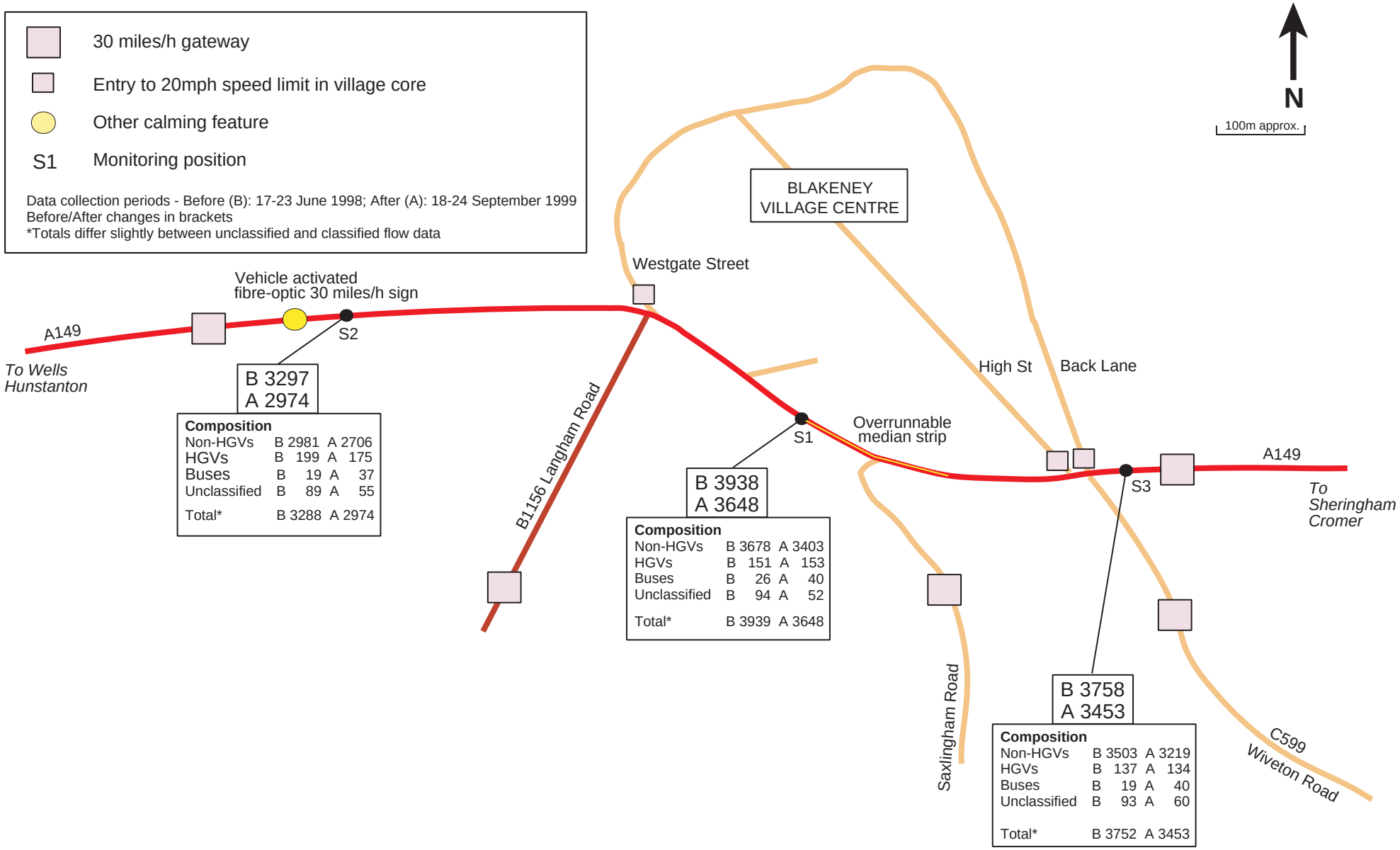

Figure 23 Blakeney: Before and After 24 hour traffic flows – two-way 7-day mean

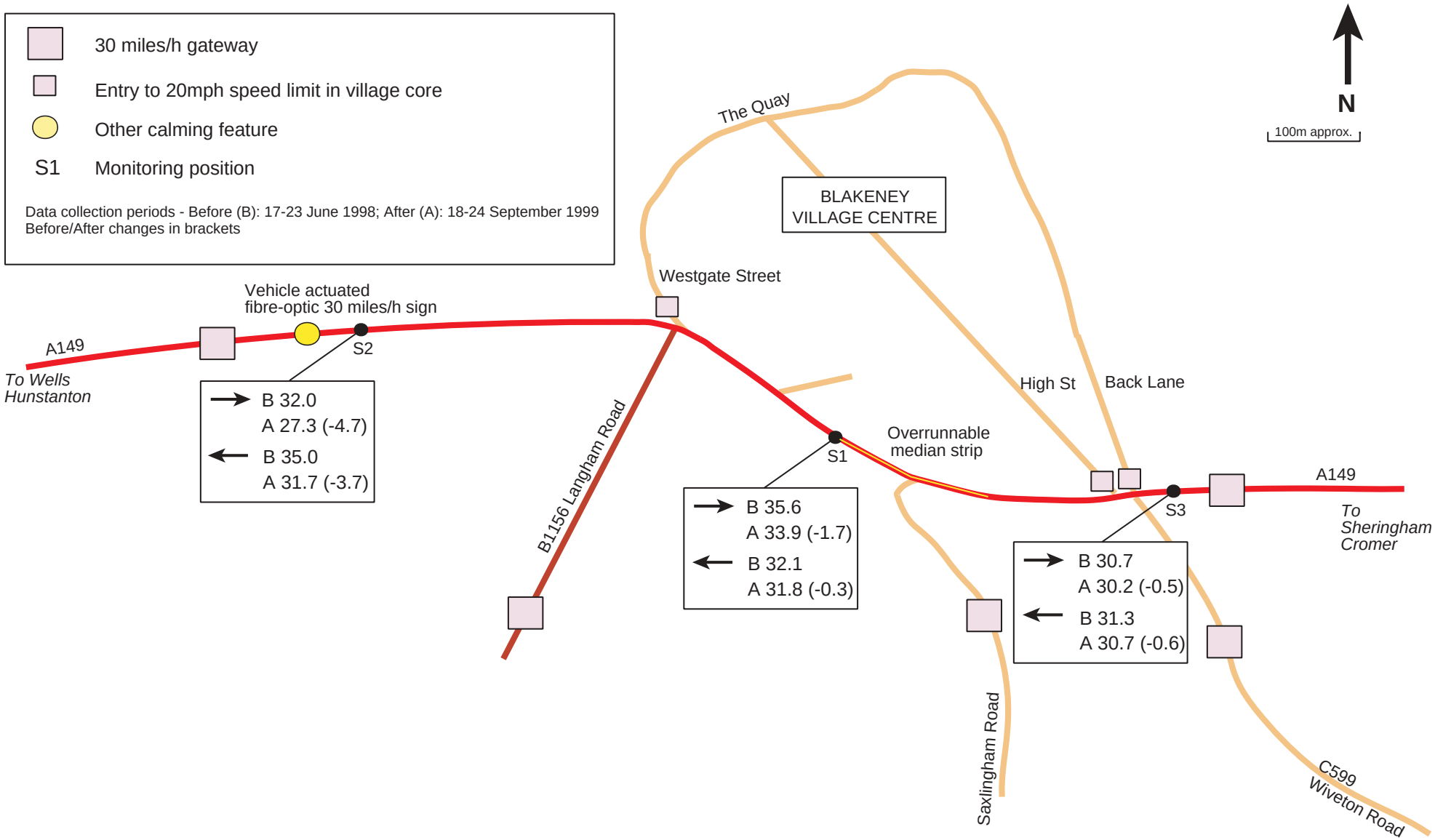

Figure 24 Blakeney: Before and After 7-day mean speeds (miles/h)

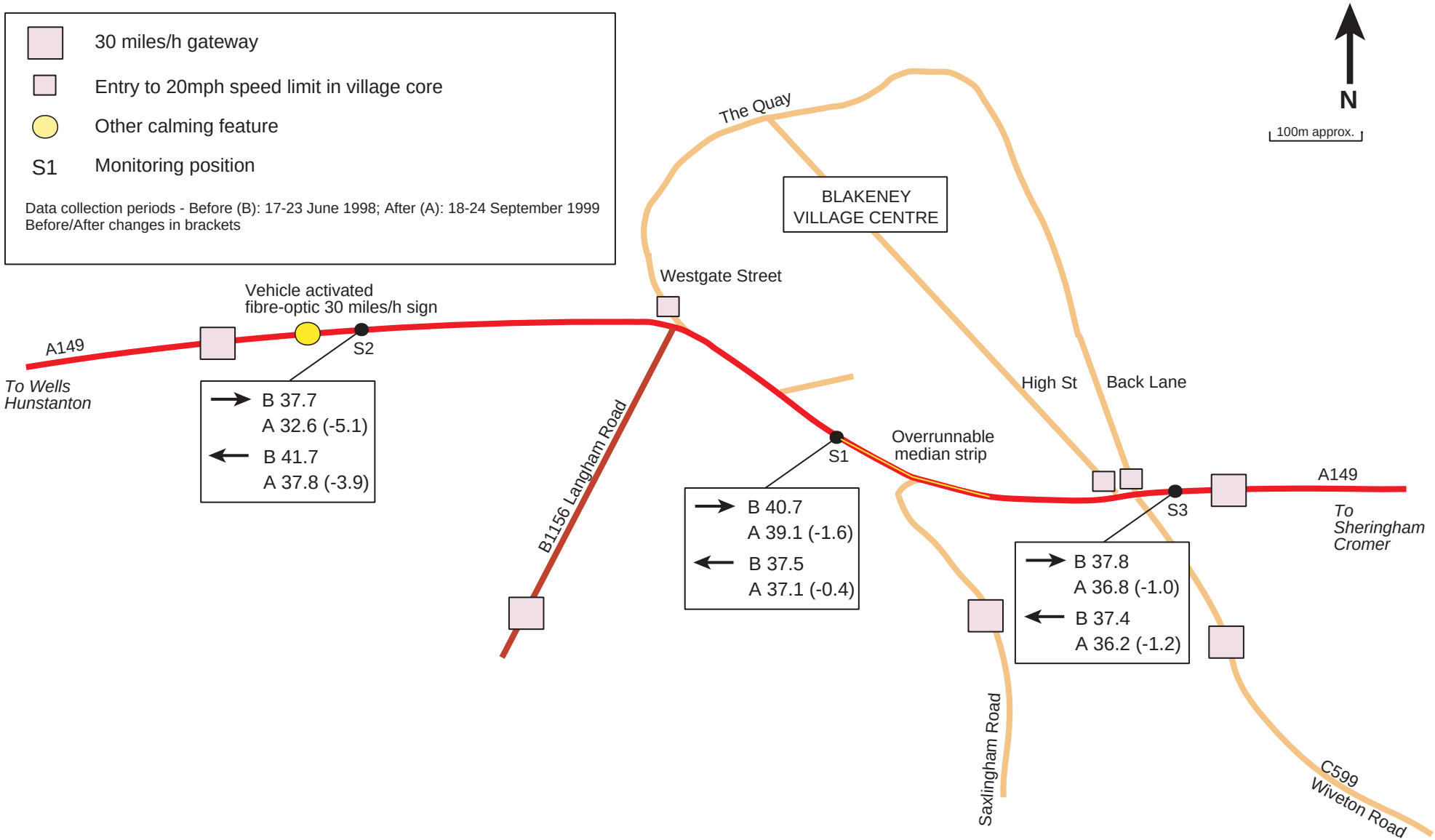

Figure 25 Blakeney: Before and After 7-day 85th percentile speeds (miles/h)

Usefulness of the changes (Q.4, Q.5)

Of the local residents, 84% said that the *flashing 30 miles/h speed limit reminder sign* on the western approach to the village was very/fairly useful but 51% said that the *imprinted median strip* near Saxlingham Road was of little use. Opinion was divided about the gateways. The mean scores for the overall level of perceived usefulness of the measures confirms that the *speed limit reminder sign* was the most useful and the *median strip* the least useful.

Visitor reactions were somewhat more favourable towards the measures – 97% said that the *speed limit reminder sign* was very/fairly useful; 79% and 62% said the same about the *gateways* and the *median strip* respectively. The mean scores suggest that overall, the *speed limit reminder sign* was thought to be 'very useful', and the *gateways* and *median strip* 'fairly useful'.

Crossing the main road (Q.6-Q.10)

Over three-quarters of the residents interviewed thought that the scheme had made no difference in crossing the A149 as a pedestrian; one-sixth thought it was easier.

Over half of the interviewed visitors thought that crossing the A149 was easy though nearly one-fifth thought not.

Perceived speed changes (Q.11)

Of the residents, 43% thought that speeds had reduced but 49% perceived no change.

Appearance of the village since the changes (Q.12)

Of the residents, 87% were satisfied with the appearance of the village since the changes.

Overall satisfaction with the scheme (Q.13)

Nearly 60% of residents were satisfied with the scheme overall, but over one third were not.

Whether respondents want changes elsewhere (Q.14)

Of all respondents (residents and visitors), 86% were in favour of similar changes in other villages.

Suggestions for improvements to the changes (Q.15)

Nearly two-thirds of respondents made suggestions relating to signing (23%), road layout (22%) and the speed limit (16%). Over one fifth, however, considered improvements unnecessary.

Aggregating similar comments listed in Appendix D, 14% of respondents wanted the speed limit emphasised (e.g. using speed limit signing which is larger, illuminated or with flashing lights) and 13% called for police enforcement of the speed limit.

The single most common suggestion was, however, unrelated to the changes on the main road, i.e. 14% wanted a one-way system along Westgate Street and the High Street.

4.4 Accidents

Reported injury accidents on the A149 summarised from STATS19 details are as follows (the After period is too short for valid conclusions on the effect of the scheme to be drawn):

Before (31 December 1991 – 30 April 1999) – 8 accidents

Severity	*Weather/ light conditions*	*Non-motorised road user involved*	*Vehicle manoeuvre*
3 slight	1 snow	2 pedal cycle	2 loss of control[1]
4 serious	2 dark	1 pedestrian	1 nose-to-tail[2]
1 fatal	1 raining/dark		4 failures to give way[3]

[1] One westbound near Saxlingham Road and one eastbound near church.

[2] On eastbound approach to A149/B1156 crossroads.

[3] From side roads – two by pedal cyclists, one by a motorcyclist and one by a car (the latter colliding with a motorcyclist on the main road at the B1156 junction, resulting in serious injury to the motorcyclist).

The fatal accident involved a pedestrian crossing the A149 in darkness at its junction with the B1156. The pedestrian was elderly, deaf and had been drinking.

After (1 May 1999 – 31 July 2000) – 1 accident

Severity	*Weather/light conditions*	*Vehicle manoeuvre*
1 slight	1 daylight	1 right turn off A149 in path of oncoming vehicle

This accident occurred at the A149/B1156 crossroads.

5 Wiveton (Norfolk)

5.1 The village

The layout of Wiveton, which lies east of Blakeney, is shown in Figure 26. Most of the village lies between the C599 Blakeney-Letheringsett road to the south and the A149 to the north. Prior to scheme installation, there was no local speed limit within the village. Until 1996 the C599 was classified B1156, and designated a main distributor route within the County Council's route hierarchy. The road is now a local access route. There is just scattered frontage development along 400m of the C599, on which the scheme was concentrated; the roads in the village centre are narrow and fairly tortuous, constraining speeds. The whole of the built-up area of the village lies within a conservation area, and is unlit.

The C599 passes the village green and the main feature of this stretch of road is a sharp right-angled bend adjacent to the green and the public house (see Figure 26). Otherwise, the road has a gently curved alignment within the village boundaries, and is mainly hedge-lined between frontages and away from the green. There are no footways except for a 100m stretch past council housing downstream of the west gateway. The carriageway width is mainly around 5m, increasing to 8.2m on the bend.

5.2 The measures

An outline plan of the scheme is shown in Figure 27. Its aims were to:

- Reduce speeds on the C599 through the village without the need for a formal speed limit;
- Reduce/rationalise signing, partially to reflect the downgraded status of the C599.

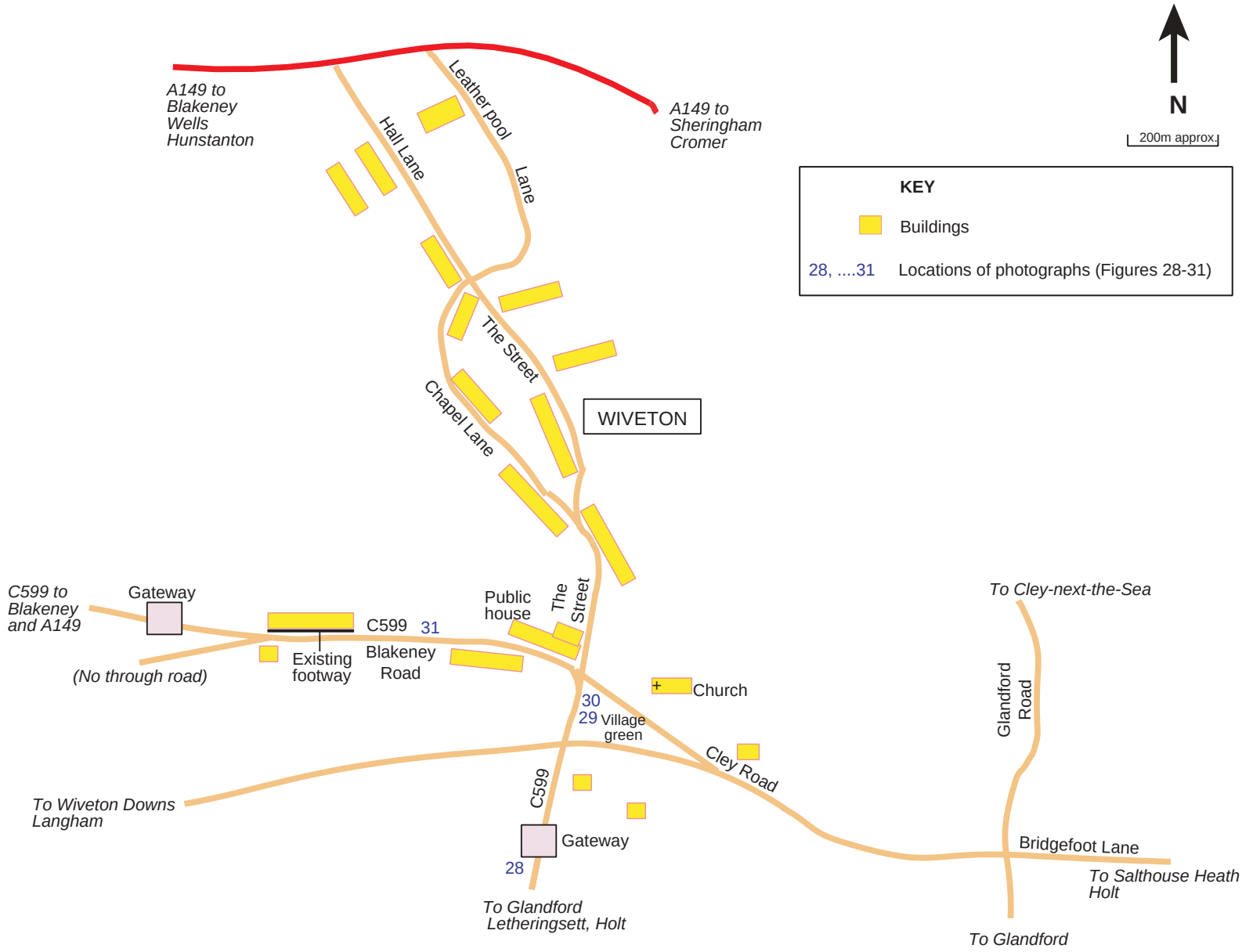

Figure 26 Wiveton: Village layout (simplified)

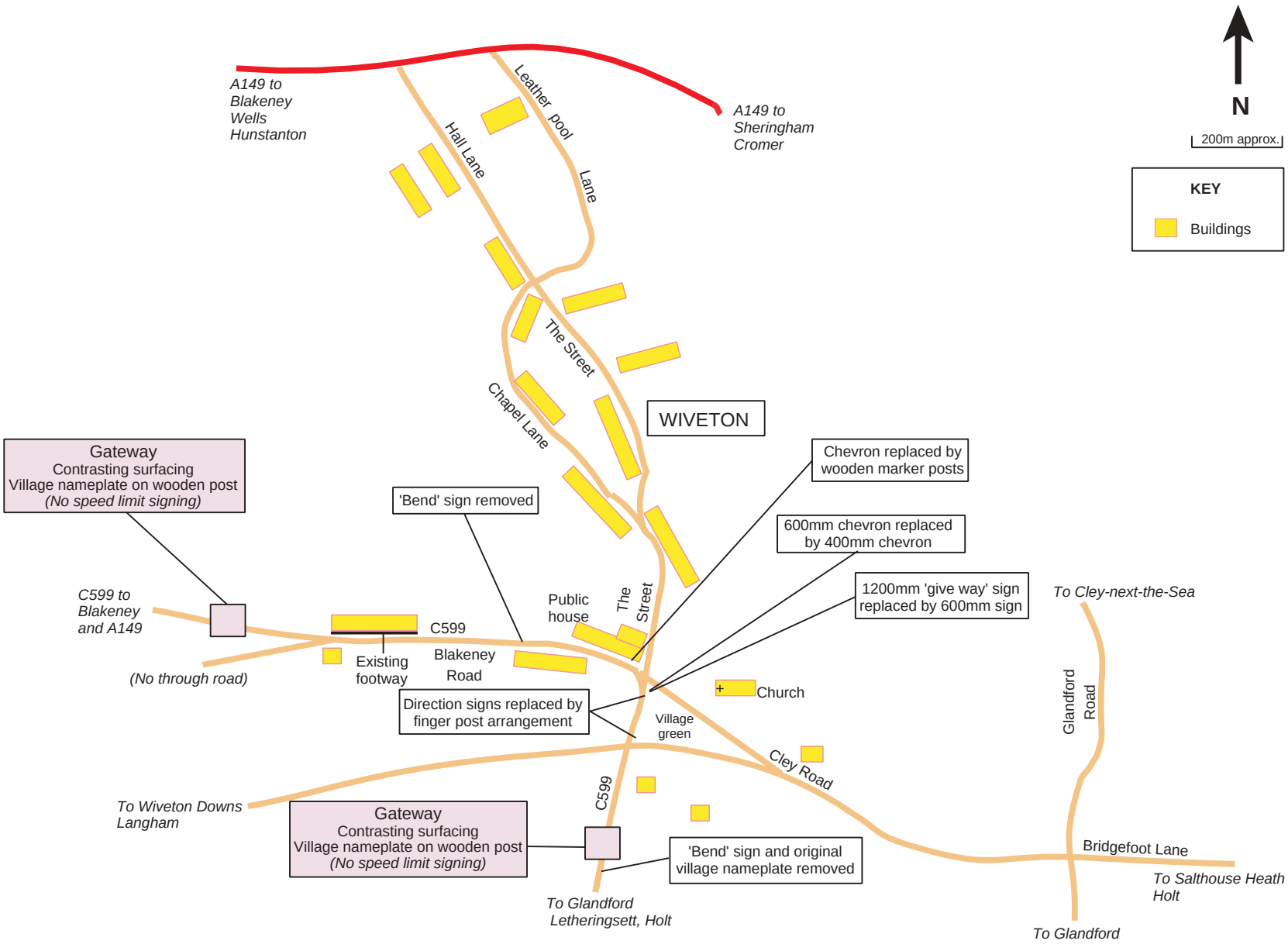

Figure 27 Wiveton: Outline plan of scheme

The budget for the scheme was £16,000 (1998 prices).

It was considered that introducing a 30 miles/h speed limit would mean the installation of additional signing – at the gateways, as repeater signs and as terminal signs on The Street, Bridgefoot Road and on the road to Wiveton Downs (see Figure 27). It was intended to introduce gateways and assess their speed reducing effect, before considering the need for a formal speed limit. Elsewhere in the village, the carriageway width and alignment appeared to keep speeds below 30 miles/h, and this, together with the rural appearance and mainly local use of these roads, precluded the need for a speed limit.

The main elements of the scheme are:

- Gateway features.
- Removal of unnecessary warning signs and reduction in the size of certain other signs.
- Replacement of conventional direction signs with finger post signing.

Figures 28-31 show Wiveton before and after scheme installation. The gateways are of similar appearance to those at Stiffkey and Blakeney except for the absence of speed limit signing (Figures 28, 29).

Other than the replacement of direction signs just mentioned, changes to signing were (see Figure 27 for details):

- Replacement of one set of chevron signs with wooden marker posts and reduction in size of another set (Figure 29).
- Smaller 'give way' signs (Figure 30).
- Removal of a 'bend' warning sign (Figure 31).

5.3 Scheme monitoring

5.3.1 Traffic flows and speeds

5.3.1.1 Data collection

Traffic flows and speeds were recorded for one week using ATCs before and after scheme installation at two positions – just inside the south gateway and about midway between the west gateway and the village green (S1 and S2 in Figures 32-34). Before and After monitoring was carried out in June 1998 and September 1999 respectively.

5.3.1.2 Results

Flow changes

Two-way flows are shown in Figure 32. The flows (averaged between sites) were 1,300 vehicles per day before and 1,100 per day after scheme installation. As in Stiffkey and Blakeney, the differences are probably due to seasonal variation. The proportion of HGV traffic at both positions was about 5% before and after scheme installation.

Speed changes

Mean and 85th percentile speeds are shown in Figures 33 and 34.

The inbound mean speed at the *south gateway* was little changed but the 85th percentile speed fell slightly from 43 miles/h to 41 miles/h. Outbound speeds were little changed.

Between the *bend and the west gateway*, the mean speed *increased* from a two-way average of 32 miles/h to 34 miles/h, with the corresponding 85th percentile speed up from 39 miles/h to 41 miles/h.

5.3.2 Public opinion survey

5.3.2.1 Interviews

A survey of 50 local residents and regular visitors was carried out in August 1999 in the public house and on the village green.

The questionnaire is reproduced in Appendix E with the survey results (summarised below) incorporated.

5.3.2.2 Results

Of the respondents, 60% were female and 68% were 45 years old or over; 88% were drivers, 60% rode a bike and 4% had no means of transport. Three-quarters of the respondents were resident in the village before 1998 and most of the rest were visitors

Mean scores were used in the analysis, as described in Section 3.3.3.2.

Problems in the village before the changes (Q.3)

The sum of the percentages shown in Appendix E for each response exceeds 100% because a number of respondents mentioned two or more problems. The problems most mentioned were related to:

- Speeding traffic (58% of respondents).
- Danger to pedestrians, e.g. walking along road/with children, to children generally (20%).
- Volume of traffic/summer congestion (12%).
- Narrow roads (8%).

24% of respondents mentioned no problems.

Usefulness of the changes (Q.4)

Opinion was fairly divided about this issue. About half of the respondents thought that the *gateways* and *marker posts replacing chevron signing* were very or fairly useful but only one-third of respondents thought that *reducing the number and size of signs* was useful. The division of opinion was reflected in the mean scores (maximum score 3), ranging from 2.0 for the *marker posts replacing chevron signing* to 1.6 for smaller signs.

Appearance of the village since the changes (Q.5)

Three-quarters of the respondents were satisfied with the appearance of the village since the changes.

Effect of individual changes on village appearance (Q.6, 6A)

Although many respondents did not think the signing alterations were useful, on average about 60% thought that they improved the village's appearance. The majority of the remainder thought that the other measures had no impact on the appearance of the village, though 10% thought that the marker posts were unsightly and 4% disliked the colour of the sandy coloured surfacing at the gateways.

Figure 28 Wiveton: South gateway, C599. Signing (left) replaced by village nameplate on wooden post (centre, right and inset)

Figure 29 Wiveton: Village green, looking north along C599 (bending left) towards The Street (going ahead). Direction signing replaced by finger post arrangement; one chevron reduced in size and the other replaced by wooden marker posts

Figure 30 Wiveton: Village green, looking west from Bridgefoot Road towards C599 (ahead). Direction signing replaced by finger post arrangement; smaller 'give way' sign; wooden marker posts replaceing chevron

Figure 31 Wiveton: C599 west of green looking east. 'Bend' sign removed

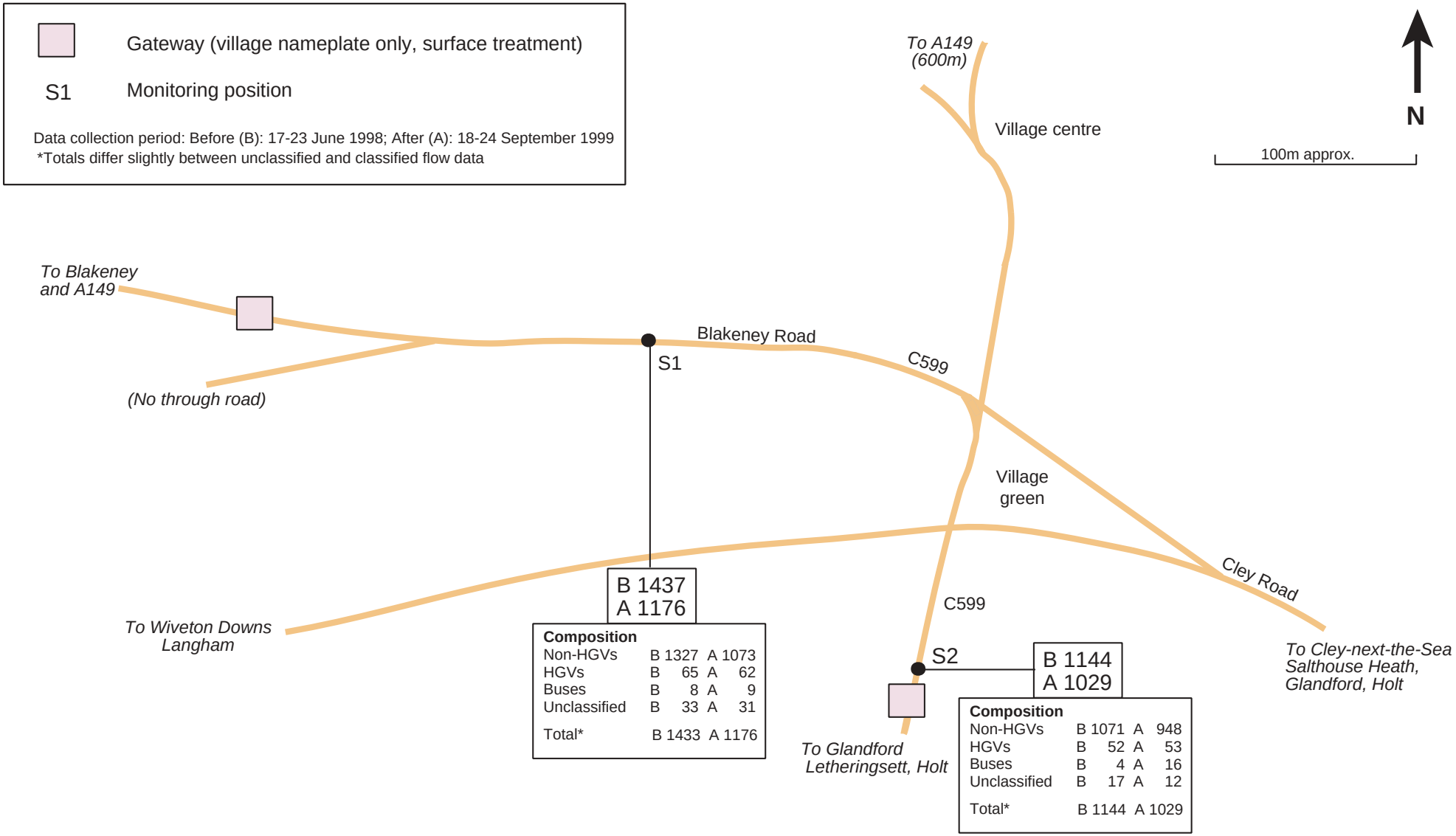

Figure 32 Wiveton: Before and After 24 hour traffic flows – two-way, 7-day mean

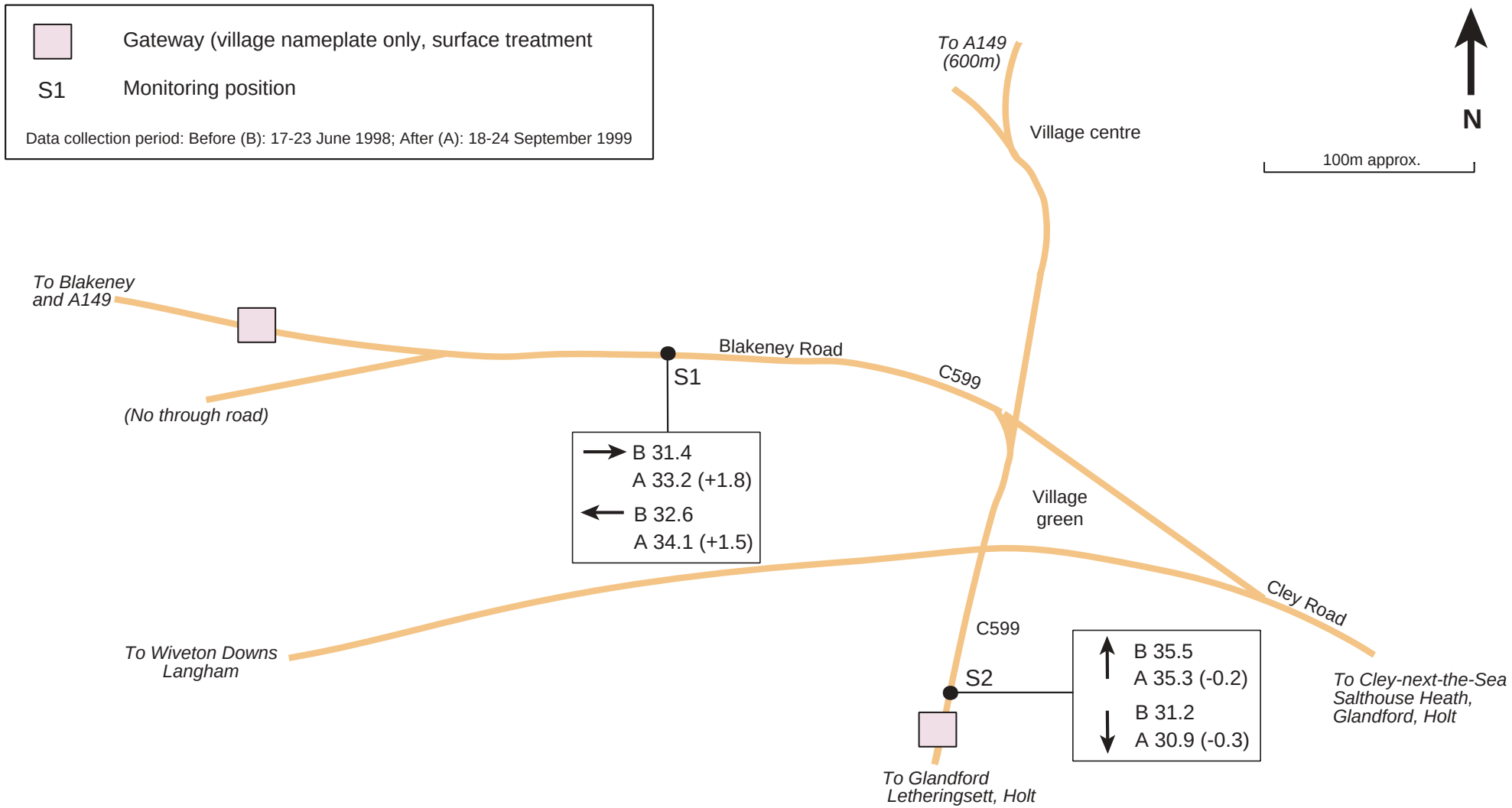

Figure 33 Wiveton: Before and After 7-day mean speeds (miles/h)

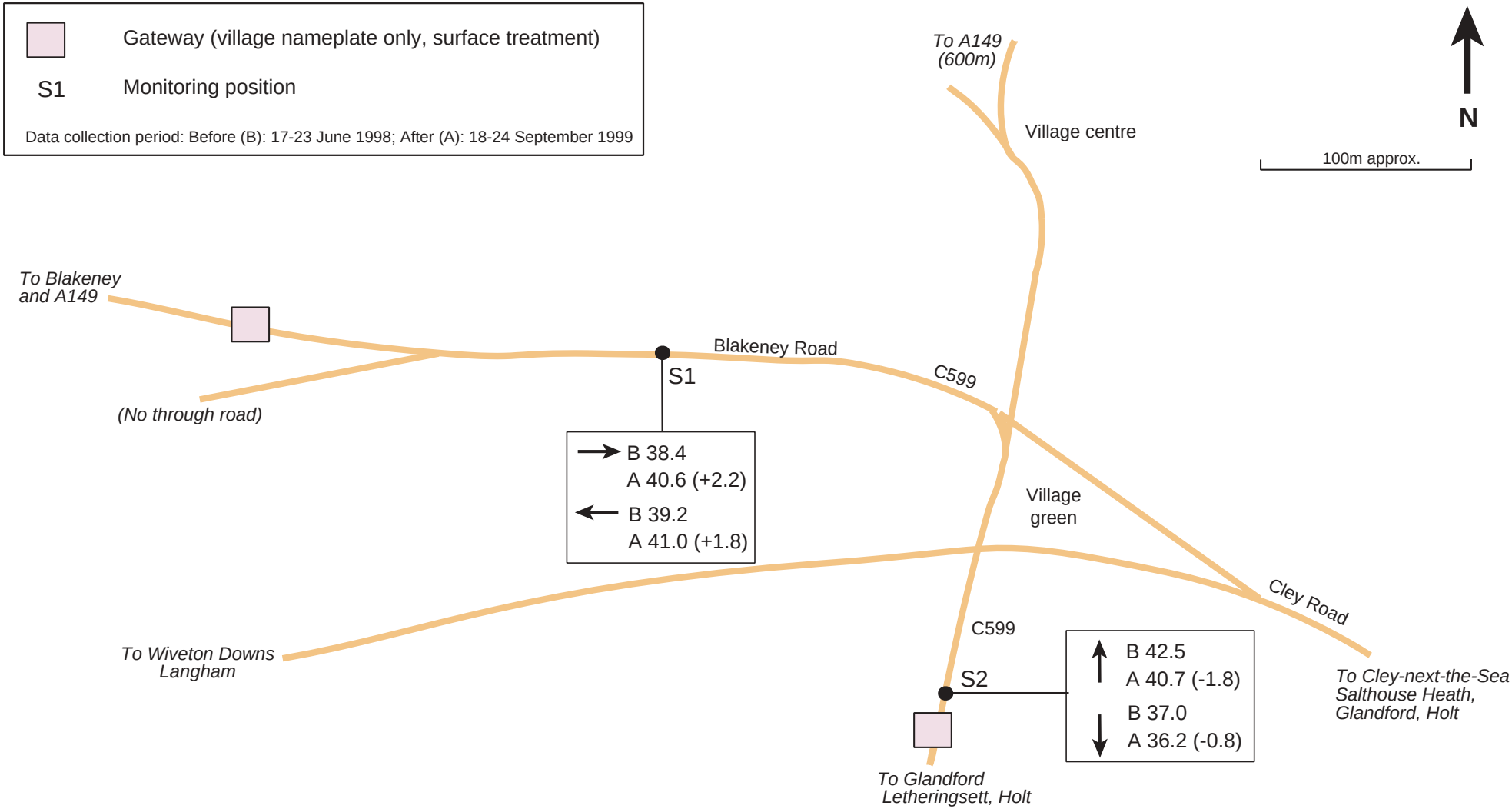

Figure 34 Wiveton: Before and After 7-day 85th percentile speeds (miles/h)

Effect on speeds (Q.7)

Eighty per cent of respondents did not perceive any change in speeds.

Suggestions for improvements to the changes (Q.8)

Over half of respondents made suggestions relating to the need for a speed limit and to signing generally. Over one fifth, however, did not suggest any improvements.

The most popular suggestions were:

- A 20 miles/h or 30 miles/h or lower speed limit (20%); a speed limit extending beyond the gateways (10%); bigger/clearer/more speed limit signing (10%).
- Better pedestrian provision i.e. footways (14%).
- Bigger signs (14%).
- Cut down grass bank opposite the pub to improve visibility (10%).

5.4 Accidents

Reported injury accidents on the C599 between the gateway sites summarised from STATS19 details are as follows (the After period is too short for valid conclusions on the effect of the scheme to be drawn):

Before (31 December 1991 – 30 April 1999)

2 accidents were reported and are classified as follows:

Severity	*Weather/light conditions*	*Vehicle manoeuvre*
2 slight	1 wet	1 head-on[1]
	1 dark	1 loss of control[2]

[1] *Where road narrows outside council houses – eastbound car hit bus head-on.*

[2] *Northbound motorcyclist on bend*

None has been recorded on this stretch of road since July 1995.

6 Occold (Suffolk)

6.1 The village

Occold lies about 4km south-east of Eye, just off the B1077 Ipswich-Debenham-Eye road on an unclassified road to Earl Soham (Figure 35). The layout of the village is shown in Figure 36. Prior to scheme implementation, the main road through the village (The Street/Mill Road) carried a two-way flow of 600-1,100 vehicles per day. The speed limit was 30 miles/h, extending well outside the village core, from the junction with the B1077 to the north-west to beyond the junction with a road linking with the B1077 south-east of the village (about 1.5km).

In the centre of the village is a Y-junction, where the main road, The Street, becomes Mill Road travelling south-east (Figure 36). The Street continues east from this junction as a side road to serve local housing as far as the junction with Redlingfield Road, from where a road leads ahead into farmland. Footways are absent except for a stretch on The Street east of the Y-junction.

In the acute angle of the Y-junction is the village primary school accommodating 60 children. Before scheme installation some children were driven to school; parking at the school was considered to be a problem, and extended to a pub car park opposite. Outside the school, there are parking restrictions in the form of yellow zigzag markings on The Street, and a bus stop on the corner between Mill Road and The Street.

There is a sweeping bend in the main road past the school and junction, but this has fairly straight approaches. The carriageway width is typically 5m, increasing to over 7m on the bend. Frontages are mostly well set back behind hedges, except in the village centre, and many of the properties have private drives. There is little footway provision in the village, but there are some grass verges, mostly north-west of the centre. A parking bay for residents/visitors is provided in The Street and on Mill Road. There are no shops.

Heavy goods vehicles access warehousing to the south-east of the village, but, as an alternative route is available, a 7.5 tonne weight limit was introduced in the village in 1998. A school bus, carrying secondary pupils, runs through the village, as do farm vehicles.

6.2 The measures

The purpose of the scheme is, as already mentioned, to implement a school safety zone, by reducing mean speeds to below 20 miles/h. The use of heavily engineered traffic calming measures usually associated with 20 miles/h zones was not considered appropriate in this location, thus the measures to be used required approval from the DETR. The scheme was designed for Suffolk County Council within a budget of £12,000, of which £4,000 came from Occold Parish Council.

The locations of the measures associated with the 20 miles/h zone are shown in Figure 37. The zone extends for nearly 1km on The Street/Mill Road and for about 200m along the section of The Street leading away from the main road.

Following consultation the scheme was enlarged from an original proposal which placed the northern 20 miles/h zone entry where the first traffic calming feature north of the village centre now lies (see Figure 37). Residents wanted the 20 miles/h limit to extend over the length of frontages along this section of The Street. The 30 miles/h speed limit was retained in the outer parts of the village.

The measures comprise the following:

- Gateway features comprising 20 miles/h zone signing, kerbed narrowing with one-way working, edge markings and light coloured surfacing (two gateways on The Street, one on Mill Road);
- Patches of light coloured surfacing with edge markings at regular intervals (one within a kerbed narrowing);
- Junction surface treatment incorporating horizontal deflection to the carriageway adjacent to the school (detail shown in Figure 37a).

The measures are pictured in Figures 38-47; a number are shown as Before and After photographs to show their effect, if any, on the appearance of the village.

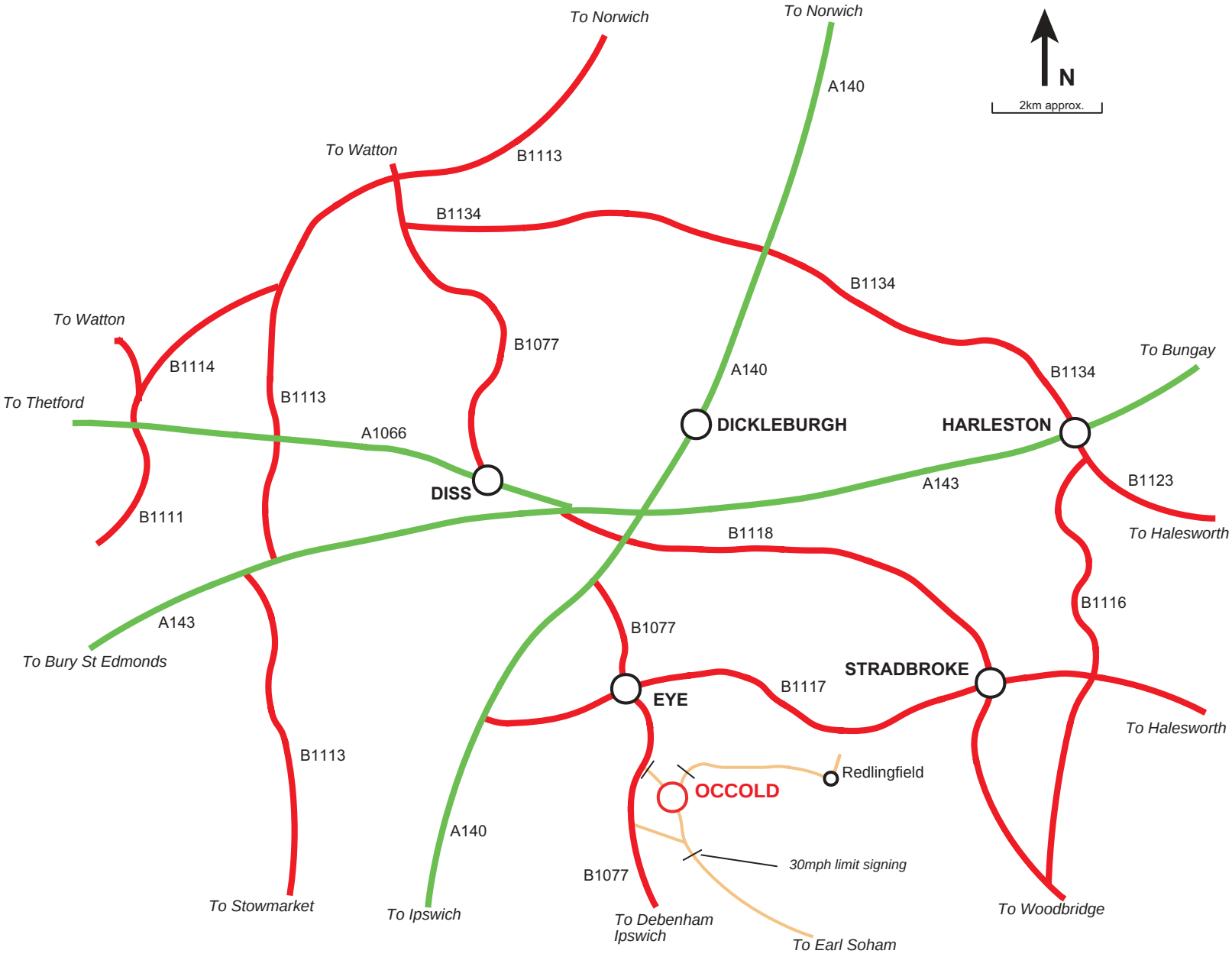

Figure 35 Location plan for Occold

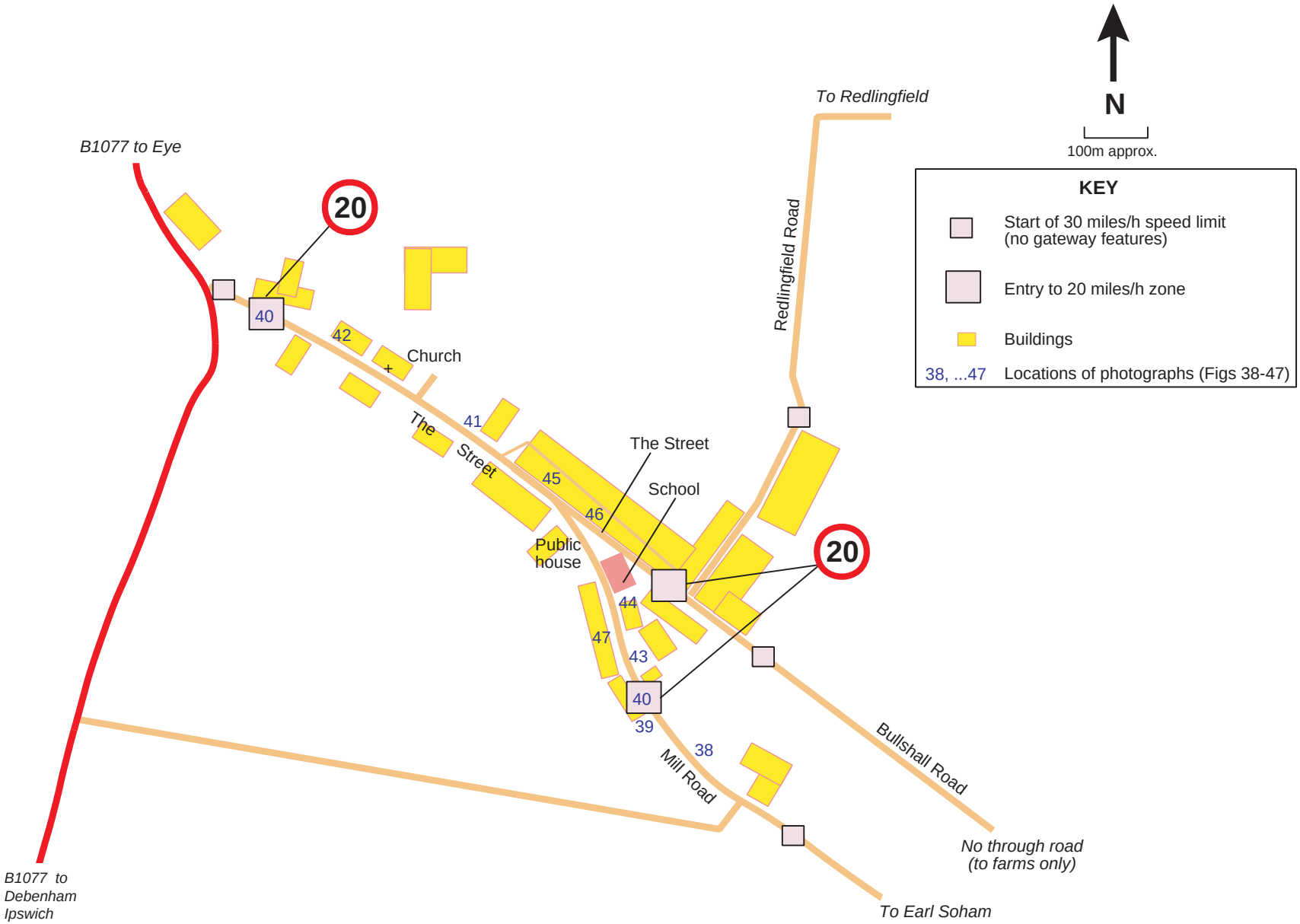

Figure 36 Occold: Village layout (simplified)

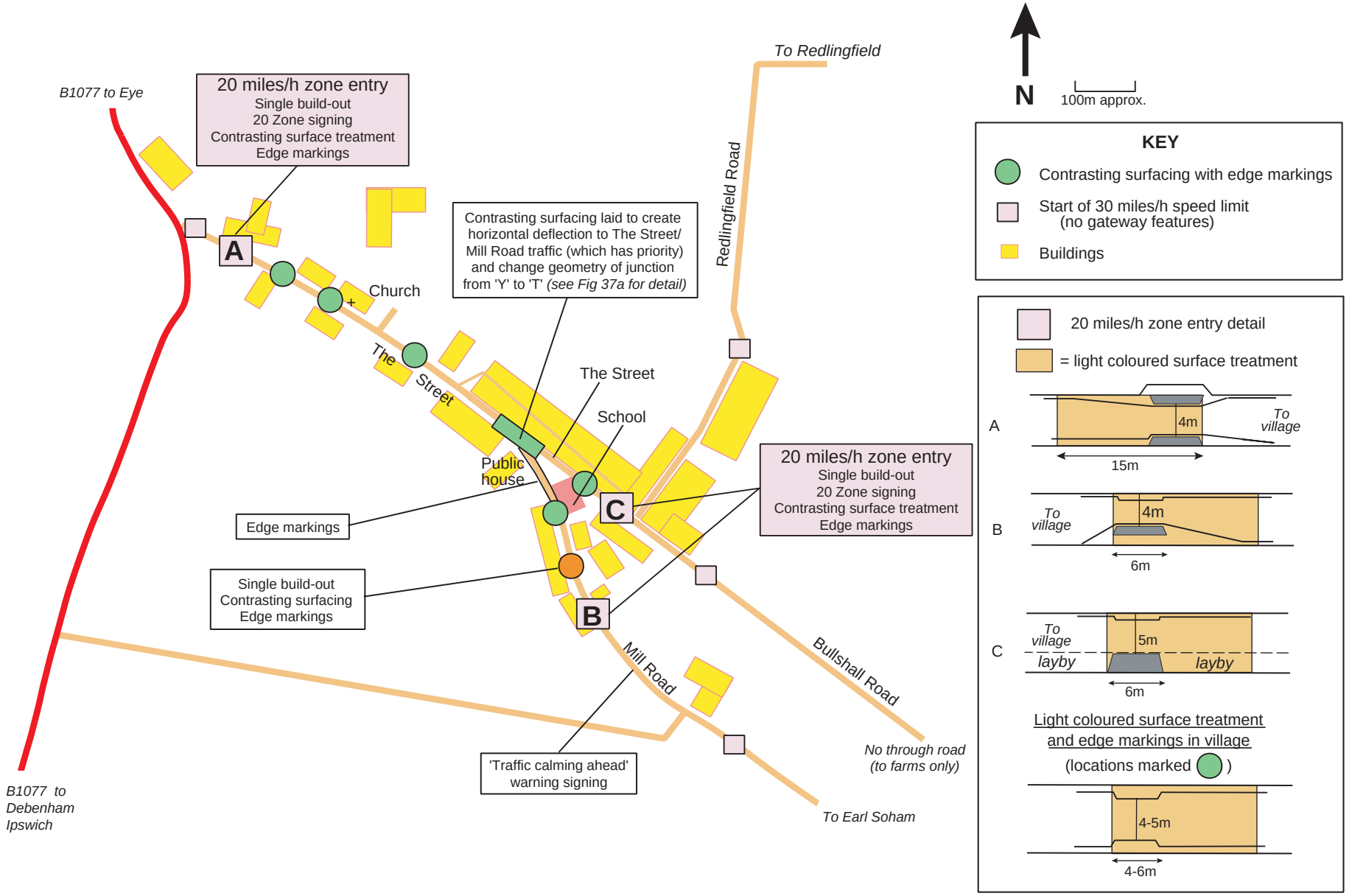

Figure 37 Occold: Outline plan of scheme

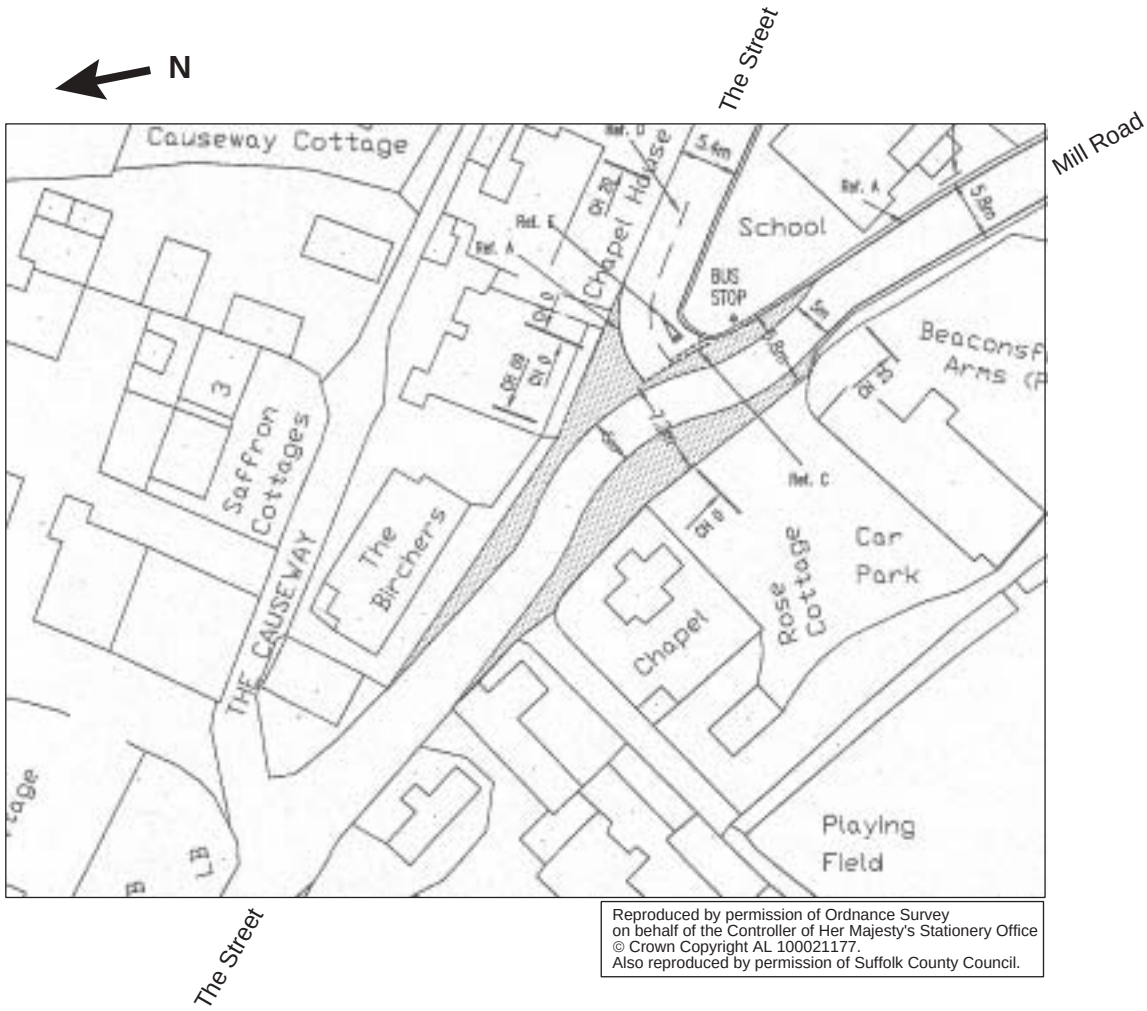

Figure 37a Layout of light coloured surfacing to create horizontal deflection to traffic, and to alter the geometry of the junction between The Street and Mill Road in the village centre

Figure 38 Advance warning signing for the scheme (Mill Road) with the 20 miles/h zone entry in the distance

Figure 39 The 20 miles/h zone entry on Mill Road. Left-hand picture shows view before scheme installation

Figure 40 Detail of signing and buildout at entry on Mill Road (left) and north-west of the village centre on The Street (right)

Figure 41 Patch of light coloured surfacing with edge markings on The Street to the north-west of the school (seen in distance)

Figure 42 The Street between the north-western entry to the 20 miles/h zone and the location shown in Figure 41, looking south-east. Another patch of light coloured surfacing is shown

Figure 43 Kerbed and grassed build-out and light coloured surfacing on Mill road south-east of the village centre (looking north-west). Residents' parking bay also shown. Left-hand picture shows view before scheme intallation

Figure 44 Light coloured surfacing laid towards e of the carriageway on Mill Road imparting horizontal deflection to traffic passing the school on the right (seen from south-east). The pub car park on the left is sometimes used for setting down and meeting children from the school

Figure 45 As Figure 44, showing the horizontal deflection feature viewed from the opposite direction, and the school. The Street continues round to the left, whereas Mill Road continues as the main road straight ahead. The surfacing was intended to reduce speeds of left-turning traffic but appears to have been cut across as illustrated by the tyre marks in the right-hand picture

Figure 46 Alterations to the geometry of the junction of The Street and Mill Road adjacent to the school The Street runs from the foreground to the right

Figure 47 Edge lining on Mill Road leading to the feature illustrated in Figures 44 and 45, looking north-west (school on right). The central village speed monitoring position was in the foreground

6.2.1 Entries to the 20 miles/h zone

The entries to the 20 miles/h zone are each preceded by a 'road narrows' / 'traffic calming ahead' sign (Figure 38). The entries are shown in plan in Figure 7 and are pictured in Figures 39 and 40. The main elements, as mentioned above, are light coloured surfacing across the road (carrying SLOW and edge markings), a kerbed narrowing (on both sides of the carriageway at the north-western entry), and 20 miles/h zone signing.

Quartzite chippings were used for the light coloured surfacing - red surfacing was considered to be too visually intrusive in the context of the scheme and the environment in which it was set. The concrete-kerbed build-outs for the narrowings were either asphalted or grassed depending on position, and carried reflectors and the 20 miles/h zone signing. The nearside build-outs (for entering traffic) on The Street/Mill Road were designed as islands to be passable on the inside by pedestrians because of the absence of footway. The build-outs reduced the carriageway width, by typically 1m, to 4m (5m at the east entry) which allows for the passage of wide farm vehicles. Further visual narrowing to 3.5m was achieved by the edge markings. Three school-produced designs (one for each entry) were chosen for the part of the 20 miles/h zone sign displaying the village name, and two examples can be seen in Figure 40.

6.2.2 Features within the village

The surface features of the 20 miles/h zone entries are repeated at intervals through the village. Edge markings were intended to give a visual impression of carriageway narrowing at these locations (examples are shown in Figures 41 and 42), though at one feature a kerbed build-out was installed (Figure 43).

In the centre of the village, further light coloured surfacing was laid as shown in Figures 44-46 to create horizontal deflection to traffic on the wider section of the main road. The horizontal deflections are overrunnable if necessary. The running width was reduced to 5m and followed a curved alignment. The scheme incorporates alterations to the geometry to the junction such that left turning traffic leaving the main road now makes a right-angled turn instead of the previous curved path, helping to reduce speeds in this manoeuvre (Figure 46).

Edge lining was installed between this feature and the next patch of light coloured surfacing to the south-east, to provide some protection to pedestrians along this section which has no grass verge in addition to no footway (Figure 47).

6.3 Scheme monitoring

Monitoring of the scheme's effectiveness was carried out through Before and After observations of traffic flows and speeds, together with a public opinion survey, which was carried out after time had been allowed for residents to get accustomed to the measures.

6.3.1 Traffic flows and speeds

6.3.1.1 Data collection

Traffic flows and speeds were recorded before and after scheme installation on the north-west (The Street) and south-east (Mill Road) approaches and at one position within the village (Figures 48-50). Sites S1 and S3 were just inside the north-west and south-east entries to the 20 miles/h zone and S2 was close to the school. The data were collected during term-time using automatic traffic classifiers (ATCs) connected to tube detectors over a one-week period. The data collection periods were 16-22 March 1999 (Before) and 15-21 September 1999 (After), the latter being about 6-7 weeks after scheme implementation.

From these data, mean speeds, 85th percentile speeds and traffic flows were calculated. Traffic composition data were collected over the same periods with an additional ATC at site S2.

6.3.1.2 Results

Flow changes

Before and After mean daily two-way flows over one week, together with the composition counts over the same period, are shown in Figure 48. After flows were little changed, up 2-3%. Before and After flows were in the range 1,100-1,200 per day on The Street north-west of the village centre and 500-600 per day on Mill Road to the south-east. It is estimated, therefore, that 500 per day left or joined the main road at the junction in the village centre. The flow composition was also little changed, with heavy goods vehicles making up 13% of the traffic before scheme installation and 12% after (as mentioned above, a 7.5 tonne weight limit had been imposed in the village prior to the Before survey).

Speed changes

The main results of the ATC speed measurements are shown in Figures 49 and 50, which show mean and 85th percentile speeds respectively over 7 days at each of the 3 monitoring positions.

At the 20 miles/h zone entries, inbound mean speeds fell from 29-30 miles/h to 24 miles/h. Outbound mean speeds and changes were very similar. In the village, there was a reduction from 25 miles/h to 21 miles/h in both directions.

Inbound 85th percentile speed reductions at the 20 miles/h zone entries fell from 35 miles/h to 29 miles/h at the north-west entry and from 37 miles/h to 31 miles/h at the south-east entry. On average, outbound 85th percentile speeds fell from 38 miles/h to 32 miles/h. In the village, there was a reduction from an average of 33 miles/h to 27 miles/h.

6.3.2 Public opinion survey

6.3.2.1 Interviews

People resident in Occold were interviewed in their homes during November 1999, about three months after the installation of the scheme. The requirement was for 100 people to be interviewed; in order to achieve this as many homes as possible in this fairly small village were visited, in the event yielding a sample of 84 respondents. Only those who had lived in the village prior to 1998 were eligible for interview.

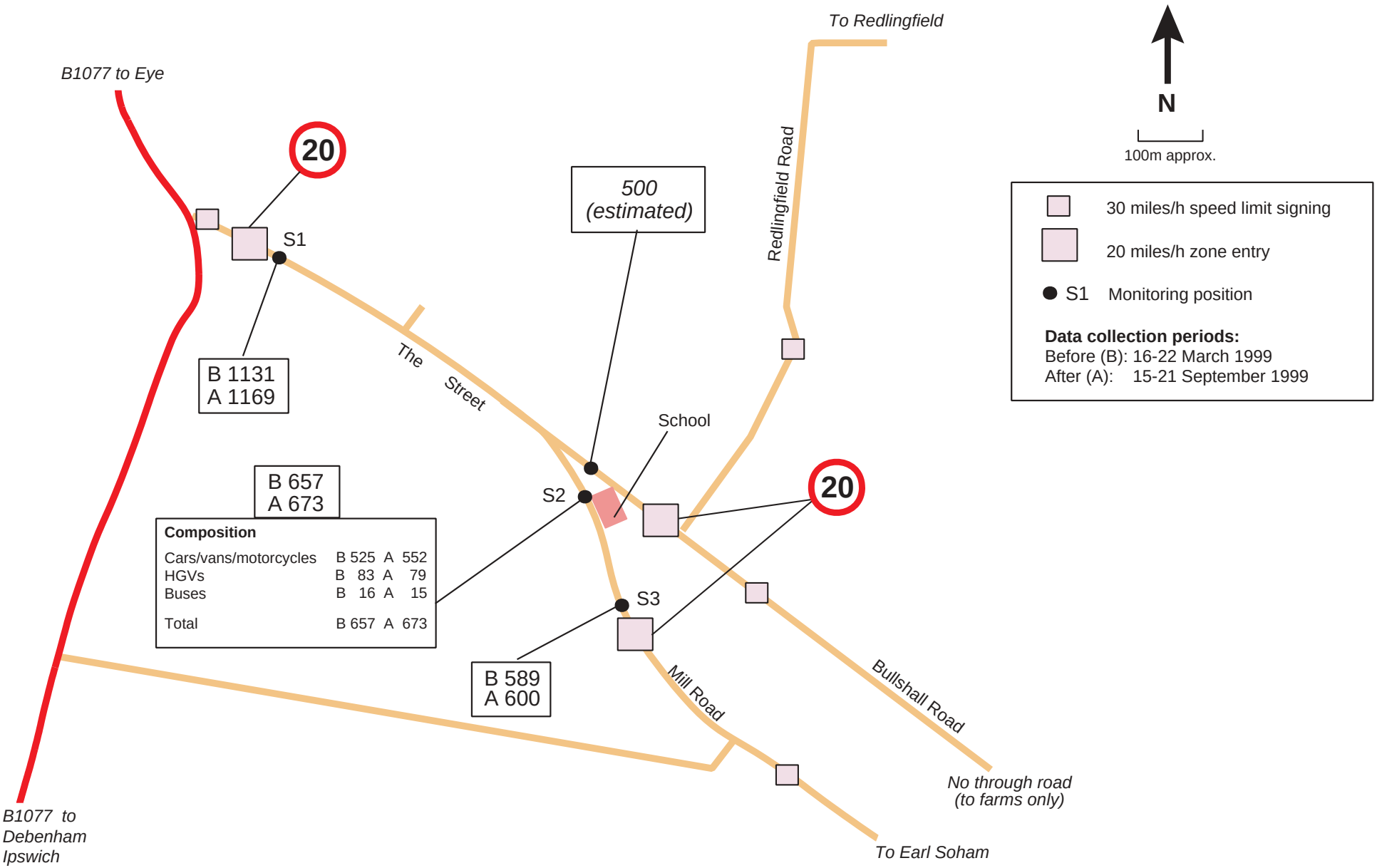

Figure 48 Occold: Before and After 24 hour traffic flows – two-way, 7-day mean

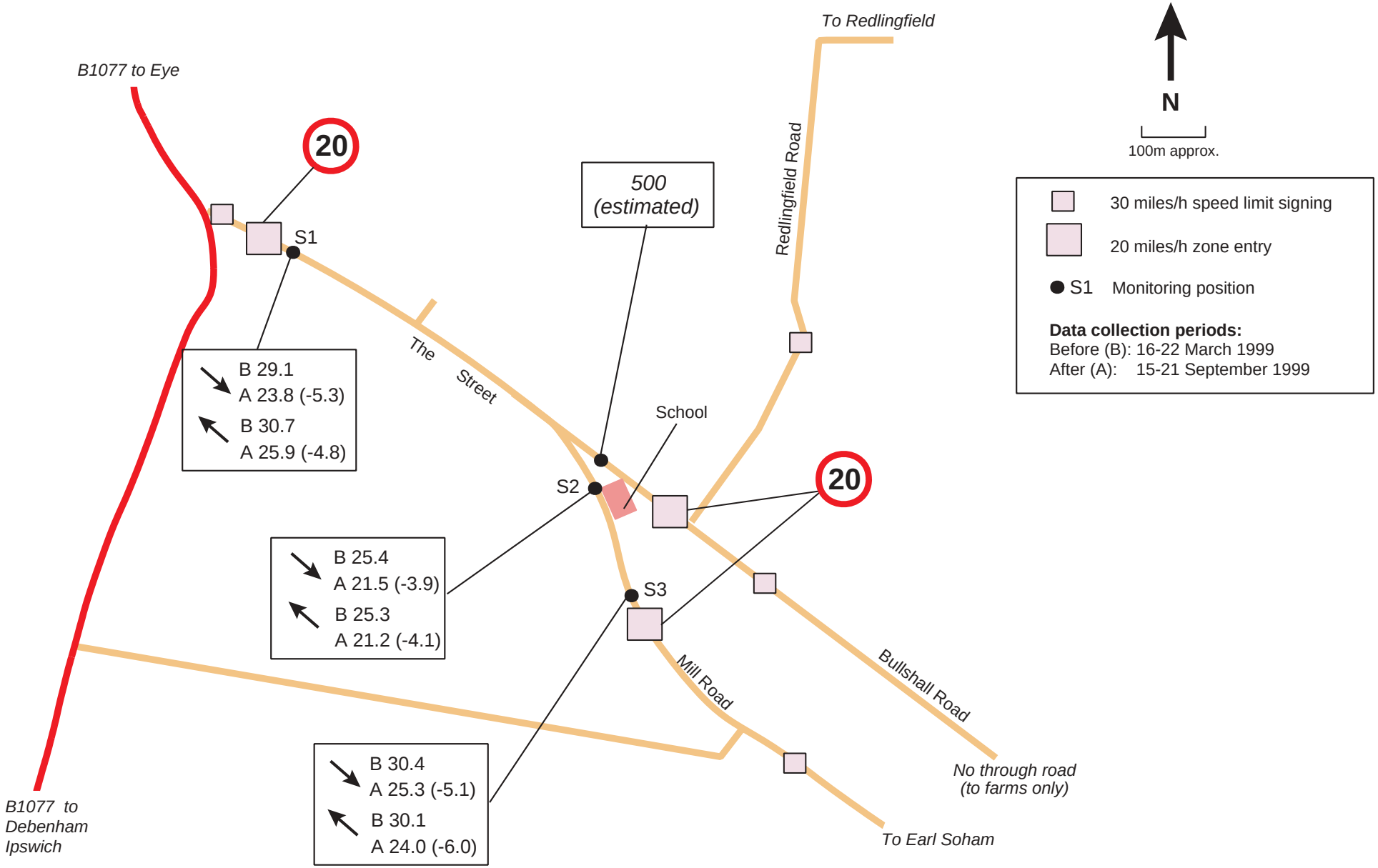

Figure 49 Occold: Before and After 7-day mean speeds (miles/h)

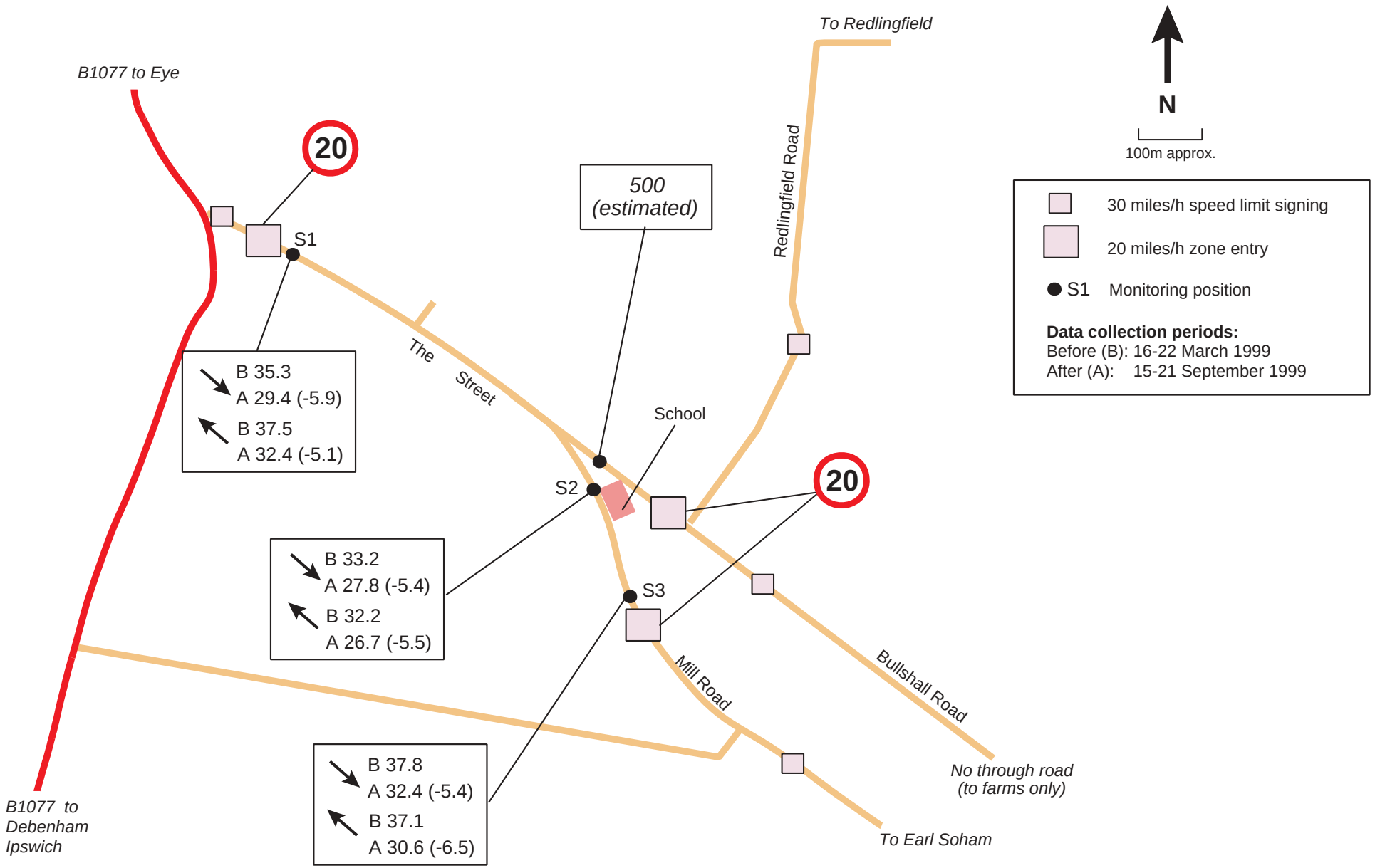

Figure 50 Occold: Before and After 7-day 85th percentile speeds (miles/h)

The aim was to establish people's perceptions of the measures and their effectiveness, or otherwise, in reducing any traffic problems in the village. A number of questions were included to seek people's views on the scheme's effectiveness as a school safety scheme, and as part of this a number of teachers at the village school were included in the survey, using a modified questionnaire. Views on the appearance of the scheme were also sought.

Both questionnaires are reproduced in Appendices F and G (residents and teachers respectively), with the survey results incorporated. The results are summarised below in Section 6.3.2.2.

6.3.2.2 Results

Equal numbers of respondents were male and female. Sixty-seven per cent of those questioned were over 45 years of age and only 8% were under 30.

Fifty-eight per cent of the respondents lived on the main road (The Street). Only 21% of all respondents had children under 16, over half of those with children living on the main road. Nearly half of respondents were not working, the majority retired. About one-third were in full-time employment or self-employed. Of those interviewed, 88% were drivers or motorcycle riders and 31% rode a pedal cycle, but 10% had no means of transport.

Mean scores were used in the analysis, as described in Section 3.3.3.2.

All respondents were resident in Occold before 1998 and aware of the scheme (Q.1, Q.2).

Problems in the village before the changes (Q.3)

By far the most oft-mentioned problem in the village before the changes was speeding traffic, cited by 56% of the respondents. The other main problem mentioned was the passage of heavy goods vehicles (by 9%). Five per cent mentioned the absence of footways and 4% the volume of traffic (some saying that drivers were using the village as a short cut). Only 2% mentioned problems outside the school and danger to children crossing the road.

Nearly one third of respondents, however, could not recall any problems.

Usefulness of the changes (Q.4)

The most positive reaction was towards the *'traffic calming ahead' signs*, with nearly three-quarters of respondents saying that they were useful or very useful. About two-thirds felt the same about the *20 miles/h zone entries, the 20 miles/h zone* itself, and the *kerbed narrowings.*

Opinion was divided about the *horizontal deflection* created by the use of light coloured surfacing outside the school, with almost equal numbers of respondents thinking that the feature was fairly/very useful or of little use.

The measures perceived as least useful were the *patches of light coloured surfacing* across the road (though it is not clear whether those at the 20 miles/h zone entries are included) and the *edge markings* (on the patches of light coloured surfacing) to make the road look narrower.

Mean scores for the responses were also calculated (based on 3 = 'very useful', 2 = 'fairly useful' and 1 = 'of little use'). The 'traffic calming ahead' signs, the kerbed narrowings, the entries to the 20 miles/h zone and the zone itself were seen as 'fairly useful' (mean scores all 2.0). The *patches of light coloured surfacing* with *white edge markings* attracted the lowest scores (mean scores each 1.3, close to the 'of little use' category).

Satisfaction with the village's appearance since the changes (Q.5)

Just over half of the respondents were satisfied with the appearance of the village since the changes, the mean score being 2.2 out of 3 (based on 3 = 'satisfied', 2 = 'no opinion either way' and 1 = 'dissatisfied').

Effect of individual changes on the village's appearance (Q.6, Q.6a)

No more than a quarter of the respondents thought that any one measure improved the appearance of the village. Half to two-thirds of the respondents (depending on the measure) said that no difference had been made to the look of the village. The *patches of light coloured surfacing* came in for the most criticism, followed by the *edge markings*; about one-third of respondents said that these features spoilt the appearance of the village.

The *kerbed narrowings* attracted the highest score of 2.1 out of 3 (based on 3 = 'improves appearance', 2 = 'makes no difference' and 1 = 'spoils appearance'). The other measures attracted scores less than 2, the lowest score of 1.7 assigned to the *patches of light coloured surfacing.*

The main concerns about the *patches of light coloured surfacing* were that they were unsightly (mentioned by 10 of the 32 respondents stating that these spoilt the appearance of the village) and that they looked messy or untidy (mentioned by 8 of these respondents). Five respondents said that they were unnecessary, 4 said that they had no effect or were ignored, 3 considered that they were out of keeping with the village and 2 said that they were wearing away. (On a site visit 2 months after scheme implementation, it was observed that some of the chippings had come up, which might have been implied in the comments about the patches looking messy or untidy.)

The *edge markings* to make the carriageway appear narrower were considered to be ineffective and ignored by drivers, 8 of the 26 respondents saying that they spoilt the appearance of the village; there was also doubt about their purpose. Four each said that they were unsightly, unnecessary and not in keeping with the village. Three respondents said they looked messy/untidy. The following comments (not apparently related to appearance) were each made by 3 respondents - that kerbs were needed; that the markings were seen as a safe area with children using them to walk in (thus were thought to be potentially dangerous); and that they were used for parking.

Fifteen of the 22 respondents concerned about the effect of the *new signing* on the look of the village said that there were too many. Two or three respondents said that they were too large, unsightly and not in keeping with the rural image of the village.

Of the 24 respondents concerned about the look of the light coloured surfacing used to create *horizontal deflection* outside the school, 7 said it looked messy or untidy. Other comments (made by three respondents each) were that the surfacing was parked on, that the feature had no effect on speeds or the line taken by drivers through it, and that the 'bends' were too sharp and that drivers cut across them. (On a site visit, a left turning vehicle into Mill Road was seen cutting straight across the surfacing laid to alter the geometry of the junction.)

Of the 12 respondents concerned about the *kerbed narrowings*, 5 said that they were not in keeping with the rural image of the village, 4 said that they were unsightly and 2 said that they were unnecessary and did not understand why they were there.

Agreement with statements about the changes (Q.7)

Respondents were asked whether or not they agreed about various statements regarding the changes.

In spite of some negative reaction to parts of the scheme already described, 68% of residents concluded that the changes were necessary. The mean score was 3.6 out of 5 (based on the range 5 = 'agree a lot' to 1 = 'disagree a lot').

However, the level of agreement with other statements is not so encouraging. 66% of respondents disagreed that the scheme had improved the appearance of the village (mean score 2.3). Opinion was divided on the other issues.

Over half of respondents thought that there had been a reduction in speeds, but 45% did not. Only 34% thought that they had been reduced enough (mean score 2.6).

Forty-three per cent of respondents agreed that the road was now safer to cross (mean score 2.8) and a similar proportion thought that it was now safer for children (3.0). Somewhat fewer, however, agreed that the main road was safer to walk along (37%), safer for motorists (31%) or safer for cyclists (26%) - mean scores 2.7.

Suggestions for improvements to the changes (Q.8)

The most popular suggestion (by 30% of respondents) was for the installation of road humps, followed by more policing (by 18%). Other main suggestions were for footway provision (13%), kerbs or bollards to replace the edge lines (11%) and speed cameras (10%).

Overall satisfaction with the changes (Q.9)

Respondents were divided over their overall level of satisfaction with the scheme (mean score 2.8 out of 5, based on the range 5 = 'very satisfied' to 1 = 'very dissatisfied').

Opinions of those with children at the village school (Q.10-Q.16)

The village school was attended by children aged 5-11. Eighteen respondents, who were also all those with children in the household, had a child or children in this school (Q.10). Twelve respondents had children aged 7-9, and 7 each had children aged 6 and under or 10 and over (Q.11).

Of the 18 respondents, 13 lived very close to the school (under ¼ mile) and the remaining 5 lived within 10 minutes walk (¼ to ½ mile) (Q.12).

Before the changes, the children of 16 respondents walked to school and those of 2 respondents were driven (Q.13). Of those whose children walked, 11 had children aged 7-9, 6 had children aged 6 or under and 7 had children aged 10 or over. All 16 of these respondents were drivers. Nine respondents lived on the main road. Of those who drove their children to school, one did it to save time and the other was 'going that way anyway'. Both were employed, one full-time.

One respondent said that the scheme had affected the way her child(ren) travelled to school but did not say how (Q.15 and Q.16). The remainder was unaffected.

Teachers' responses

Five teachers at the village school were questioned about the scheme. Their responses are detailed in Appendix G.

Problems prior to scheme installation were thought to be HGVs, speeding past the school, inappropriate parking and the absence of footway provision for the children.

The responses of the teachers were broadly in line with the residents. All thought that changes were necessary. Four of the teachers thought that the scheme had improved safety for pedestrians and cyclists. They were divided over whether speeds had been reduced enough.

Suggestions for improving the scheme were installing road humps (including outside the school) and footways, and provide road narrowings using physical measures instead of markings. There was still concern about HGVs.

None thought that the scheme had affected how the children got to and from the school. The majority were satisfied overall with the changes outside the school and the scheme overall.

6.4 Accidents

There were no reported accidents within the 30 miles/h speed limit during the 5 years prior to scheme installation.

7 Summary (All schemes)

7.1 The schemes

The main elements of the Norfolk schemes were:

- Gateway treatment:
  - sandy coloured surfacing (all schemes)
  - reduction in speed limit from 40 miles/h to 30 miles/h (Blakeney)
  - vehicle-activated fibre-optic 30 miles/h reminder sign (Blakeney)
- Changes to signing (all schemes):
  - rationalisation of signs (Norfolk schemes)
  - new village name plates (Blakeney, Wiveton)
  - artistically designed village sign (Stiffkey)
  - speed limit signs mounted on wooden posts (Stiffkey and Blakeney)
  - finger post signs (Stiffkey, Wiveton)
  - replacement of bend chevrons by wooden reflector posts (Wiveton)

- 20 miles/h speed limit with sandy coloured surfacing and no road markings (Stiffkey).
- Overrunable footway outside village shop (Stiffkey).
- Median strip on bend (Blakeney).

The main elements of the Occold scheme were:

- A 20 miles/h zone comprising:
  - Kerbed narrowing with light coloured surfacing and white edge lines at the zone entries and at one point within the zone.
  - Simulated narrowings with patches of light coloured surfacing and edge lines.
  - Light coloured surfacing to impart horizontal deflection outside a school.
  - Edge lines to narrow the carriageway on approach to the school.
- Advance signing of scheme.

It was intended in the Occold 20 miles/h zone to avoid the use of road humps and chicanes normally associated with more urban schemes of this type. The patches of light coloured surfacing were repeated at intervals within the village, carrying white edge markings simulating a narrowing. In the village centre, where a primary school and a Y-junction between the two main roads are situated, the light coloured surfacing was laid on the edges of the carriageway to impart horizontal deflection to traffic. The layout incorporated a realignment of the Y- junction to a T-junction.

7.2 Monitoring

Monitoring comprised automatic speed/flow measurements at the gateways/20 miles/h zone entries and within the villages over a period of 7 days before and after scheme installation. Also carried out were public opinion surveys of residents (and visitors in Norfolk) on the installed schemes about three months after implementation, together with air quality monitoring at Stiffkey.

7.3 Results

Traffic flow

There appeared to be little change in traffic flow levels (or in the proportion of heavy vehicles) following scheme installation.

Vehicle speeds

The *gateway features* mostly had little effect on speeds in Stiffkey and Wiveton, where there was no change in speed limit (Stiffkey had a 30 miles/h limit whilst Wiveton remained at the national speed limit). The *sandy coloured surfacing* in Stiffkey should alert drivers to the presence of the village even if they do not slow down.

At Blakeney, the speed limit was reduced from 40 to 30 miles/h. There was little change in speed at the east gateway (which already had a mean speed of 30 miles/h), but a reduction of 5 miles/h inbound and 4 miles/h outbound occurred at the vehicle-activated *fibre-optic speed limit reminder sign* located 100m inside the west gateway. The sign was set to trigger at 35 miles/h, intended to affect about half of drivers directly and also be visible to those following. It is not entirely clear why this feature is effective, but it is likely that it increases drivers' awareness; outbound drivers in particular may believe that the box contains a camera.

Speeds on the A149 closer to the centre of Blakeney were little changed; the introduction of further reminder signs or mini-roundabouts at the junctions might have helped pedestrians crossing. The *median strip* on the bend had little effect on speeds; at this point, the A149 is relatively wide with wide verges and the bend is sweeping.

In Occold, speeds fell by 6 miles/h at the entries to the 20 miles/h zone and by 4-5 miles/h in the village centre, where the mean speed became 21 miles/h.

Air quality

The scheme in Stiffkey did not have a statistically significant effect on air quality. Measured concentrations of benzene and NO_2 were well below the current Air Quality Standards.

Public opinion surveys

In the Norfolk villages, the opinion surveys showed that the *rationalisation of signs* was widely seen as improving the villages' appearance. Those interviewed were generally in favour of the use of wooden posts for speed limit signs, although a few saw them as being out of proportion to the signs. *Finger post signs* were also considered to improve the appearance of the villages, although a small minority said they were hard to see. They are appropriate when speeds are low, and therefore make sense as part of an overall strategy to reduce speeds, but strangers may require advance warning of a junction.

The *20 miles/h speed limit* in the centre of Stiffkey was seen as effective by over 80% of those interviewed and the *sandy coloured surfacing and absence of road markings* by almost two-thirds. However the mean speed within the 20 miles/h limit hardly changed in one direction and reduced by only 3 miles/h in the other, probably because it was already constrained by the narrow carriageway; it remained above 20 miles/h (except in August 2000). Only about 20% of residents thought speeds had been reduced enough. The sandy coloured surfacing was thought to improve the appearance of the village by only about half the residents. In Blakeney, over 80% of those interviewed found the *speed limit reminder sign* effective.

The *overrunable footway* (composed of imprint surfacing) in Stiffkey is intended for use by pedestrians, but can also be used by cyclists and by vehicles when they do not have sufficient space to pass each other. It was considered effective by two-thirds of those interviewed. One drawback was that vehicles tended to park on it. That aside, it seems an excellent method of providing a footway where a road is too narrow for a kerbed pavement. It could ideally have been extended to provide for pedestrians along the length of the village rather than just outside the shop.

In Wiveton, speeds were already constrained by a sharp bend and were therefore considerably below the national

speed limit. However, 20% of those interviewed were concerned about pedestrian safety and 40% thought that the speed limit should be reduced. There was no footway provision. The replacement of one set of bend chevrons by wooden reflector posts was considered to improve the appearance of the village.

Public reaction to the Occold scheme was somewhat unfavourable, albeit two-thirds of respondents thought changes were necessary. The patches of light coloured surfacing were particularly disliked, mainly because they were considered to be out of keeping with the appearance of the village, untidy looking and ineffective in reducing speed. Only half of the residents interviewed were satisfied with the appearance of the scheme. The concept of a 20 miles/h zone, however, did have support, though people still felt that speeds had not been reduced enough, in spite of the encouraging reductions measured. Less than half of residents thought that the main road was now safer for pedestrians (including children) and cyclists. About one-third of residents wanted to see road humps installed and others called for more policing, and the provision of footways and speed cameras. Overall, only two-fifths of the people interviewed were satisfied with the scheme.

Almost all the respondents' children in Occold walked to school, and mostly had not changed their travelling habits since the introduction of the scheme. Teachers' opinions largely echoed those of the residents, and none of them thought that the scheme had affected the way children went to school.

7.4 Conclusions

Overall, the success of the schemes in meeting CTMG objectives has been mixed. Measured speed reductions were small except at the fibre-optic sign in Blakeney and in the 20 miles/h zone in Occold. Mean speeds in Stiffkey and Occold remained above the 20 miles/h limit; the reductions were not considered sufficient by residents.

The Norfolk schemes were generally popular with the efforts to improve the appearance of the villages particularly appreciated by residents and visitors alike.

At Occold, the residents' dislike of the patches of light coloured surfacing and their perceived ineffectiveness at reducing speeds, contributed towards the scheme not achieving full public acceptability. Nevertheless, the scheme was inexpensive, and had a substantial effect on speeds.

More extensive physical measures would be required to reduce speeds further. For example, in Occold, road humps would have had to be closely spaced to achieve a greater speed reduction and would not have been appropriate without street lighting. Mini-roundabouts could possibly have been used in some of the schemes.

The trade-off between the effectiveness of a scheme in reducing speeds and increasing safety and visual intrusiveness needs to be explored more fully – for example, by greater use of appropriate colour and more experimentation with different sizes / types of sign.

8 Acknowledgements

The work described in this report was carried out by TRL under a contract placed by the Charging and Local Transport Division of the Department of the Environment, Transport and the Regions. The authors are grateful to Mr E H E Wyatt for his guidance and support.

The authors would also like to thank the staff of Norfolk and Suffolk County Councils for providing plans and background information.

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Appendix A: Air quality monitoring at Stiffkey

Table A1 Benzene concentrations (ppb) for each two-week exposure

Control site			*AQ1*			*AQ2*			*AQ3*			*AQ4*		
B	*AS*	*AW*	*B*	*AS*	*AW*	*B*	*AS*	*AW*	*B*	*AS*	*AW*	*B*	*AS*	*AW*
0.31	0.35	0.30	0.27	0.57	0.44	0.26	0.45	0.31	0.40	0.56	0.47	0.49	0.48	0.38
0.50	0.44	0.39	0.42	0.57	0.45	0.41	0.46	0.43	0.45	0.47	0.57	0.54	0.57	0.58
0.32	0.44	0.42	0.39	0.71	0.50	0.32	0.73	0.52	0.43	0.48	0.45	0.46	0.68	0.48
0.46	0.38	0.34	0.54	0.63	0.50	0.53	0.62	0.52	0.53	0.66	0.45	0.59	0.78	0.48
0.21	0.41	0.26	0.32	0.31	0.28	0.37	0.31	0.31	0.35	0.74	0.26	0.38	0.66	0.31
0.33	0.21	0.23	0.41	0.22	0.30	0.37	0.23	0.30	0.38	0.62	0.38	0.38	0.62	0.32
0.49	0.36	0.25	0.33	0.46	0.27	0.39	0.48	0.24	0.49	0.48	0.22	0.53	0.55	0.25
		0.29			0.76			0.40			0.36			0.35

B = Before Survey (07/12/98 to 17/03/99)
AS = After Survey (summer) (06/07/99 to 12/10/99)
AW = After Survey (winter) (06/12/99 to 28/03/00)

Table A2 Comparison between benzene concentrations at kerbside sites and the control site

	P–Value	*Difference statistically significant?*
Before Survey		
Control – AQ1	0.875	No
Control – AQ2	0.936	No
Control – AQ3	0.245	No
Control – AQ4	0.059	No
After Survey (Summer)		
Control – AQ1	0.111	No
Control - AQ2	0.190	No
Control – AQ3	0.002	Yes
Control – AQ4	<0.001	Yes
After Survey (Winter)		
Control – AQ1	0.059	No
Control - AQ2	0.144	No
Control – AQ3	0.094	No
Control – AQ4	0.088	No

Table A3 A comparison between summer and winter average benzene concentrations (ppb)

	After (Summer)	*After (Winter)*	*P-Value*	*Difference statistically significant?*
Control site	0.37	0.31	0.138	No
AQ1	0.50	0.44	0.516	No
AQ2	0.47	0.38	0.234	No
AQ3	0.57	0.40	0.008	Yes
AQ4	0.62	0.39	0.001	Yes

Table A4 NO_2 concentrations (mg/m^3) for each two-week exposure

Control Site			*AQ1*			*AQ2*		
B	*AS*	*AW*	*B*	*AS*	*AW*	*B*	*AS*	*AW*
11.35	7.99	12.71	16.55	10.54	12.64	16.70	13.08	13.57
12.15	7.45	10.37	11.65	13.60	9.10	9.95	13.88	10.65
12.55	8.06	12.57	15.60	11.99	13.00	14.45	13.79	11.99
21.35	6.57	12.61	18.50	12.71	13.04	19.05	14.16	12.03
18.75	9.08	12.23	21.40	11.23	13.78	18.65	14.00	12.88
7.65	13.84	(7.58)	12.20	10.69	(8.32)	11.45	13.07	(9.75)
15.40	9.06	(7.10)	18.90	9.38	(8.10)	17.00	13.38	(9.55)
		(6.96)			(7.64)			(9.06)

AQ3			*AQ4*		
B	*AS*	*AW*	*B*	*AS*	*AW*
19.80	13.99	15.28	17.55	19.28	14.35
11.60	15.09	10.77	8.55	14.67	11.50
12.80	14.95	12.51	11.85	16.00	13.72
22.20	15.41	12.55	16.15	16.16	13.76
20.20	17.87	13.26	19.15	14.52	14.97
15.05	13.04	(9.71)	12.80	13.24	(9.04)
16.40	12.90	(8.84)	22.50	12.94	(9.78)
		(9.67)			(9.93)

B = Before Survey (07/12/98 to 17/03/99)

AS = After Survey (Summer) (06/07/99 to 12/10/99)

AW = After Survey (Winter) (06/12/99 to 28/03/00)

Values in brackets were excluded from analysis due to purchase of tubes made to a different specification.

Table A5 Comparison between NO_2 concentrations at kerbside sites and the control site

	P–Value	*Difference statistically significant?*
Before survey (Winter)		
Control – AQ1	0.336	No
Control – AQ2	0.608	No
Control – AQ3	0.269	No
Control – AQ4	0.613	No
After survey (Summer)		
Control – AQ1	0.029	Yes
Control – AQ2	<0.001	Yes
Control – AQ3	<0.001	Yes
Control – AQ4	<0.001	Yes
After survey (Winter)		
Control – AQ1	0.825	No
Control – AQ2	0.853	No
Control – AQ3	0.380	No
Control – AQ4	0.066	No

Table A6 A comparison between summer and winter average NO_2 concentrations ($\mu g/m^3$)

	After (Summer)	*After (Winter)*	*P-Value*	*Difference statistically significant?*
Control site	8.86	12.10	0.017	Yes
AQ1	11.45	12.31	0.380	No
AQ2	13.62	12.22	0.012	Yes
AQ3	14.75	12.87	0.084	No
AQ4	15.26	13.66	0.174	No

Appendix B: Questionnaire incorporating results (Stiffkey residents)

COUNTRYSIDE TRAFFIC MEASURES GROUP: QUESTIONNAIRE FOR RESIDENTS

Scheme: **Stiffkey (A149, Norfolk)**

Good morning/afternoon/evening. I am from the Transport Research Laboratory. We are carrying out a survey for the Department for Transport, Local Government and the Regions about people's opinions of the traffic calming scheme in this village.

Q.1 Were you living in the village before 1998? *BASE: 77*	CODE	ROUTE
Yes	100%	Q.2
No	-	Discontinue Interview

Q.2 Recently some changes were made on the main road to slow traffic going through the village. Are you aware of this? *BASE: 77*	CODE	ROUTE
Yes	100%	Q.3
No	-	Discontinue Interview

Q.3 Thinking back before these changes were made, did the main road through the village and its traffic cause any problem in the village? *BASE: 77*

Speeding traffic: 51%
Dangerous walking along road/for pedestrians: 22%
Lots of big lorries/too big for road: 14%
Volume of traffic: 14%
Narrow roads/too narrow for car to pass/too narrow for volume of traffic: 12%
Congestion/traffic jams: 10%
Volume of traffic in summer: 9%
Difficulty walking along/narrow stretches of road: 8%
Lack of footpaths / pavements / provision for pedestrians: 8%
Dangerous for children to walk / dangerous walking with children/pushchairs/prams: 5%
Problems getting in and out of driveway: 4%
No consideration/courtesy for pedestrians: 4%
Lots of accidents: 4%
Difficulty for elderly to cross/walk along roads: 3%
Lots of buses: 3%
Difficulties crossing road: 1%
No/none: 8%
Other: 5%
Don't know/not stated: 1%

ROUTE:
Q.4

Q.4 How useful do you consider the following changes that have been made in the village?
BASE: 77
Mean scores in brackets (based on: very useful = 3; fairly useful= 2; of little use = 1)

	Very useful	Fairly useful	Of little use	Don't know/ No opinion
Different road surface on each main road approach (1.91)	27%	35%	36%	1%
20mph speed limit (2.25)	42%	40%	17%	1%
Different surfacing through the middle of the village within 20mph limit (1.87)	26%	38%	31%	5%
New footway outside post office/shop (2.13)	42%	27%	29%	2%

ROUTE
Q.5

Q.5. Are you satisfied with the appearance of the village since the changes?
BASE: 77
Mean score (based on: yes = 3; no opinion either way = 2; no = 1): 2.69

	CODE	ROUTE
Yes	78%	
No	9%	
No opinion either way	12%	
Don't know/not stated	1%	Q.6

Q.6 What effect do you think the following changes have on the appearance of the village? Do they improve it, spoil it or do they make no difference?
BASE: 77
Mean scores in brackets (based on: improves appearance = 3; makes no difference = 2; spoils appearance = 1)

ITEM NUMBER SHOWN AS [1], [2] etc	Improves appearance	Makes no difference	Spoils appearance	Don't know*
[1] Different road surface on each main road approach (2.35)	47%	38%	13%	2%
[2] Different surfacing through the middle of the village (2.43)	51%	35%	8%	6%
[3] No white lines on the different surfacing (2.41)	49%	39%	9%	2%
[4] Signing on wooden posts instead of metal poles (2.67)	74%	14%	9%	2%
[5] Ordinary direction signs replaced by finger post signing (2.79)	69%	17%	5%	9%
[6] Some other signs taken away to reduce number in village (2.65)	57%	21%	4%	18%
[7] New footway outside post office/shop (2.67)	68%	26%	5%	1%
[8] Wooden reflector posts instead of plastic ones (2.72)	74%	13%	6%	6%
[9] Artistically designed village sign on main road approaches (2.75)	78%	10%	6%	5%

**Includes 'not stated'*

ROUTE:
For each item ringed '3' in Q.6, ask Q.6A
If none, go to Q.7

Q.6A What is it about the.... that spoils the appearance of the village?
READ OUT FIRST ITEM RINGED '3' IN Q.6, PROBE FULLY AND WRITE IN ANSWER AGAINST THAT ITEM NUMBER IN BRACKETS SHOWN BELOW. REPEAT FOR ALL ITEMS RINGED '3' IN Q.6

[1] *BASE: All stating 'different road surface on each main road approach' spoils appearance (10)*
Colours don't match / don't like pink, orange and blue colour schemes: 40%
Breaking up: 30%
Untidy/messy: 10%
Other: 30%

Continued on next page

[2] *BASE: All stating 'different surfacing through the middle of the village' spoils appearance (6)*

Don't like the colour: 67%
Breaking up: 33%

[3] *BASE: All stating 'no white lines on the different surfacing' spoils appearance (7)*

Should have white lines: 43%
White lines keep traffic on correct side of road: 43%
Other: 14%

[4] *BASE: All stating: 'signing on wooden posts instead of metal posts' spoils appearance (7)*

Out of proportion / posts too big for signs: 29%
Too big: 29%
Waste of money / unnecessary: 29%
Other: 29%
Don't know / not stated: 14%

[5] *BASE: All stating 'ordinary direction signs replaced by finger post signing' spoils appearance (4)*

Not clearly visible: 50%
Other: 25%
Don't know / not stated: 25%

[6] *BASE: All stating 'some other signs taken away to reduce number in village' spoils appearance (3)*

Other: 33%
Don't know/not stated: 67%

[7] *BASE: All stating 'new footway outside shop' spoils appearance (4)*

People use it to park on: 25%
Other: 50%
Don't know/not stated: 25%

[8] *BASE: All stating 'wooden reflector posts instead of plastic ones' spoil appearance (5)*

Too big/bulky: 80%
Don't know/not stated: 20%

[9] *BASE: All stating ' artistically designed village sign on main road approaches' spoils appearance (5)*

Prefer wooden sign / wooden signs look better / unnecessary / waste of money: 80%
Don't know/not stated: 20%

Q.7 Now I am going to read out some things people have said about the changes. For each one please tell me whether you agree a little, agree a lot, disagree a little, or disagree a lot.
BASE: 77
Mean scores in brackets (based on: agree a lot = 5; agree a little = 4; no opinion = 3; disagree a little = 2; disagree a lot = 1)

	Agree a lot	Agree a little	No opinion	Disagree a little	Disagree a lot	Don't know*
The changes were necessary (4.07)	51%	29%	3%	5%	10%	2%
They have improved the village appearance (3.84)	38%	32%	10%	8%	9%	3%
Signing is less visually intrusive (3.85)	36%	34%	10%	10%	6%	3%
The changes make it safer/easier to cross the road (2.71)	14%	21%	5%	36%	21%	3%
They make it safer to walk along the road (2.66)	13%	22%	3%	36%	22%	4%
They make it safer for motorists (3.14)	19%	30%	5%	27%	14%	4%
They make it safer for cyclists (2.64)	10%	17%	9%	13%	26%	25%
They have reduced speeds (3.25)	17%	42%	4%	19%	16%	3%
They have reduced speeds enough (2.15)	12%	9%	3%	32%	42%	3%
They should be introduced in other villages (3.56)	26%	27%	30%	4%	10%	3%
The environment in the village has been improved (3.32)	26%	16%	31%	13%	12%	3%

**Includes not stated*

ROUTE: Q.8

Q.8 Would you suggest any improvements to the changes in the village? **WRITE IN**
BASE: 77

ALL RELATING TO SIGNAGE: 35%
Illuminated sign /flashing lights as village is entered: 14%
Speed limit / 20mph sign set back/extended to further outside village: 9%
Illuminated speed limit/speed limit sign with flashing lights: 8%
Police trap / police camera signs: 3%
Bigger/clearer speed limit signs easier to see: 3%
Bigger signs/signposts: 1%
Other signage comments: 4%

ALL RELATING TO SPEED LIMIT: 21%
20mph speed limit throughout village: 9%
Police enforcement of speed limit: 5%
Reduce traffic speed: 3%
Slow traffic earlier: 3%
Speed traps / speed cameras: 1%
Other speed limit comments: 1%

ALL RELATING TO PEDESTRIAN PROVISION: 21%
Footpath from Greenway to pub: 5%
Not safe to walk on road / dangerous with children: 5%
More footpaths: 4%
Extended footpath / continuous path: 3%
Other pedestrian provision: 10%

ALL RELATING TO ROAD SURFACE: 17%
Speed humps to slow traffic: 9%
Rumble strips coming into village: 4%
Brighter / different coloured / red road surface: 3%
Other road surface comments: 4%

ALL RELATING TO ROAD LAYOUT: 7%
One way traffic system through village / Westgate St / High St: 4%
By-pass: 3%
Mini-roundabout to slow traffic: 1%

OTHER: 14%
Permanent policing / more police: 6%
Traffic lights at each end of village: 4%
Flashing lights at each end of village: 3%
Put back to how it was before: 1%

No improvements necessary: 22%
Other comments: 6%
Don't know / not stated: 3%

ROUTE:
Q.9

Q.9. How satisfied are you overall with the changes that have been made in the village? *BASE: 77*	CODE	ROUTE
Very satisfied	14%	
Fairly satisfied	42%	
No opinion either way	10%	
Fairly dissatisfied	17%	
Very dissatisfied	14%	
Don't know	3%	Q.10
Mean score 3.25*		
*Based on very satisfied = 5; fairly satisfied = 4; no opinion = 3; fairly dissatisfied = 2; very dissatisfied = 1		

Q.10 CLASSIFICATION
BASE: 77

	CODE		CODE
(A) Sex **(BY OBSERVATION)**		**(D)** Do you have any children in the household?	
Male	47%	Yes	29%
Female	53%	No	70%
		Not stated	1%
		If yes, how old are they? *BASE: 22* **(RING ALL THAT APPLY)**	
		Under 5	50%
		5-10	45%
		11-16	32%
(B) What age group do you come in?		**(E)** Do you do any of the following? **(RING ALL THAT APPLY)**	
18-29	8%	Drive a car or van	84%
30-44	18%	Drive a lorry	-
45-59	39%	Ride a motorcycle	-
60+	35%	Ride a pedal cycle	30%
		None of these	14%
(C) Live on or off the main road? **(BY OBSERVATION)**		**(F)** What is your working status?	
		Employed full time	19%
On main road	58%	Employed part-time	12%
Elsewhere	42%	Self-employed	23%
		Unemployed	4%
		Housewife	10%
		Retired	31%

THANK AND CLOSE

Time_____

Interviewer_____

Appendix C: Questionnaire incorporating results (Stiffkey visitors)

COUNTRYSIDE TRAFFIC MEASURES GROUP: QUESTIONNAIRE FOR VISITORS

Scheme: **Stiffkey (A149, Norfolk)**

Good morning/afternoon/evening. I am from the Transport Research Laboratory. We are carrying out a survey for the Department for Transport, Local Government and the Regions about people's opinions of the traffic calming scheme that was recently introduced in this village.

Q.1A *(Street interview)* Are you: *BASE: 101*	CODE	ROUTE
A local resident	-	Discontinue interview
A day visitor	30%	Q.2
Here on holiday	70%	Q.1B

Q.1B *(Caravan park/campsite occupants and those who answered '3' to Q.1A)* How long are you staying here? *BASE: 71*	CODE	ROUTE
Up to one week	61%	
Up to two weeks	30%	
Longer	10%	Q.2

Q.2 Have you gone about the village as a: *BASE: 101*

	Yes	No
(RING ALL THAT APPLY)		
Pedestrian	56%	44%
Motor vehicle user	96%	4%
Cyclist	35%	65%
Other **(State which below)**	-	-

ROUTE: Q.3

Q.3 I would like to show you some photos taken before and after changes made on the main road to slow traffic going through the village and make it safer for pedestrians. Can you tell me how useful each of the changes might be?
BASE: 101
Mean scores in brackets (based on: very useful = 3; fairly useful = 2; of little use = 1)

	Very useful	Fairly useful	Of little use	Don't know/ No opinion*
Different road surface on each main road approach (2.53)	53%	22%	11%	14%
20mph speed limit (2.72)	71%	16%	5%	8%
Different surfacing through the middle of the village within 20mph limit (2.59)	57%	21%	7%	15%
New footway outside post office/shop (2.81)	61%	6%	4%	29%

**Also includes 'not stated'*

ROUTE: Q.4

Q.4 What effect do you think the following changes have on the appearance of the village? Do they improve it, spoil it or do they make no difference?

BASE: 101

Mean scores in brackets (based on: improves appearance = 3; makes no difference = 2; spoils appearance = 1)

ITEM NUMBER [1], [2], etc	Improves appearance	Makes no difference	Spoils appearance	Don't know
[1] Different road surface on each main road approach (2.77)	79%	19%	2%	-
[2] Different surfacing through the middle of the village (2.79)	79%	17%	2%	2%
[3] No white lines on the different surfacing (2.79)	77%	18%	1%	4%
[4] Signing on wooden posts instead of metal poles (2.72)	76%	11%	8%	5%
[5] Ordinary direction signs replaced by finger post signing(2.93)	85%	4%	1%	10%
[6] New footway outside post office/shop (2.87)	76%	7%	2%	15%
[7] Artistically designed village sign on main road approaches (2.83)	78%	3%	9%	4%

ROUTE:
For each item ringed '3' in Q.4, ask Q.4A
If none, go to Q.5

Q.4A What is it about the.... that spoils the appearance of the village?
READ OUT FIRST ITEM RINGED '3' IN Q.3, PROBE FULLY AND WRITE IN ANSWER AGAINST THAT ITEM NUMBER IN BRACKETS SHOWN BELOW. REPEAT FOR ALL ITEMS RINGED '3' IN Q.3

[1] *All stating 'different road surface on each main road approach' spoils appearance (2)*

Untidy / messy: 50%
Other: 50%

[2] *All stating 'different surfacing through the middle of the village' spoils appearance (2)*

No specific comments

[3] *All stating 'no white lines on the different surfacing' spoils appearance (1)*

No specific comments

[4] *All stating 'signing on wooden posts instead of metal poles' spoils appearance (8)*

Out of proportion / posts too big for signs: 50%
Too big: 25%
Other: 38%

[5] *All stating 'ordinary direction signs replaced by finger post signing' spoils appearance (1)*

Not clearly visible

[6] *All stating 'new footway outside post office / shop' spoils appearance (2)*

People use it to park on: 50%
Other: 50%

[7] *All stating 'artistically designed village sign on main road approaches' spoils appearance (6)*

Prefer wooden sign / wooden signs look better: 33%
Other: 33%
Not stated: 33%

Q.5 What do you think of the following as far as the main road through the village is concerned - is each good, bad or somewhere in-between?
BASE: 101

	Good	In-between	Bad	Don't know*
Safety and convenience crossing the road	23%	32%	24%	22%
Ease of walking along the road	29%	23%	28%	21%
What it's like for drivers	58%	26%	11%	5%
What it's like for cycling	13%	13%	20%	54%
Effectiveness of changes to reduce speeds	67%	23%	3%	7%

**includes 'not stated'*

ROUTE: Q.6

Q.6 Would you suggest any improvements to the changes in the village? *BASE: 101*

ALL RELATING TO SIGNAGE: 14%
Bigger signs / signposts: 3%
Bigger / clearer speed limit signs / that are easier to see: 2%
More speed limit signs: 2%
Illuminated speed limit / speed limit signs with flashing lights: 2%
Speed limit / 20mph signs set back / extended to further outside village: 1%
Signs warning of narrow roads: 1%
Bigger / clearer sign to warn motorists of sharp corner: 1%
Other signage comments: 7%

ALL RELATING TO ROAD SURFACE: 11%
Speed humps: 8%
Rumble strips coming into village: 2%
Brighter / different coloured / red road surface: 1%
Other road surface comments: 1%

ALL RELATING TO PEDESTRIAN PROVISION: 11%
More footpaths: 4%
Footpath from Greenway to pub: 2%
Footpath / pavement generally: 1%
Pelican crossing / pedestrian crossing: 1%

ALL RELATING TO ROAD LAYOUT: 5%
By-pass: 2%
One-way traffic through village: 1%
Widen road: 1%
Narrow road: 1%

ALL RELATING TO SPEED LIMIT: 3%
20mph limit throughout village: 2%
Reduce traffic speed: 1%

OTHER: 7%
Limit size of lorries / no lorries / bypass for larger vehicles/lorries: 5%
Traffic lights at each end of village: 2%

No improvement necessary: 47%
Other comments: 3%
Don't know / not stated: 11%

ROUTE: Q.7

Q.7 Would you like to see these changes in other villages? *BASE: 101*	CODE	ROUTE
Yes	77%	
No	5%	
Don't know / not stated	19%	Q.8

Q.8 CLASSIFICATION
BASE: 101

	CODE		CODE
(A) Sex **(BY OBSERVATION)** Male Female	 50% 50%	**(C)** Do you: **(RING ALL THAT APPLY)** Drive Cycle Neither	 96% 40% 1%
(B) What age group do you come in? 18-29 30-44 45-59 60+	 11% 40% 41% 9%		

THANK AND CLOSE

Time _____ Interviewer_____

Appendix D: Questionnaire incorporating results (Blakeney)

COUNTRYSIDE TRAFFIC MEASURES GROUP: QUESTIONNAIRE

Scheme: **Blakeney (A149, Norfolk)**

Good morning/afternoon/evening. I am from the Transport Research Laboratory. We are carrying out a survey for the Department for Transport, Local Government and the Regions about people's opinions of the traffic calming scheme on the main road through the village.

Q.1 Are you: *BASE: 99*	CODE	ROUTE
A local resident (living within 5 miles)	70%	Q.2
A visitor	29%	Q.5
Not stated	1%	

Q.2 *(Local residents)* Recently some changes were made on the main road to slow traffic through the village. Are you aware of them? *BASE: 69*	CODE	ROUTE
Yes	100%	Q.3
No	-	Discontinue interview

Q.3 Thinking back before these changes were made, did the main road through the village and its traffic cause any problem in the village? *BASE: 69 local residents*

Speeding / traffic going too fast: 58%
Volume of traffic: 12%
Congestion / traffic jams: 12%
Difficulties crossing the road: 12%
Crossroads are dangerous (referring to A149/B1156 junction): 10%
Congestion / traffic jams in summer / volume of traffic in summer: 9%
Parking in village: 6%
Lots of accidents: 4%
Difficulty for elderly to cross / walk along roads: 4%
People driving badly / no courtesy: 3%
Dangerous walking along road / dangerous for pedestrians: 3%
Lots of big lorries / too big for road: 1%
Reduced visibility (due to hedges): 1%
Lack of footpaths / pavements / provision for pedestrians: 1%
Dangerous for children to walk / dangerous walking with children / pushchairs/ prams: 1%

No/none: 10%
Other: 1%
Don't know / not stated: 3%

ROUTE: Q.4

Q.4 *(Local residents)* I would like to show you some photos taken before and after the changes. Can you tell me how useful you think the changes are? *BASE: 69 local residents*

Mean score in brackets (based on: very useful = 3; fairly useful = 2; of little use = 1)

	Very useful	Fairly useful	Of little use	Don't know/ No opinion*
New signing and different road surface on village approach (1.81)	20%	38%	38%	4%
Flashing 30mph sign triggered by drivers exceeding 30mph (2.51)	61%	23%	12%	4%
Coloured strip in middle of main road midway through village (1.50)	4%	38%	51%	7%

** includes 'not stated'*

ROUTE: Q.6

Q.5 *(Visitors)* Recently some changes were made on the main road to slow traffic through the village. I would like to show some photos taken before and after the changes. Can you tell me how useful you think the changes might be?

BASE: 29 Mean score in brackets (based on: very useful = 3; fairly useful = 2; of little use = 1)

	Very useful	Fairly useful	Of little use	Don't know/ No opinion
New signing and different road surface on village approach (2.14)	34%	45%	6%	-
Flashing 30mph sign triggered by drivers exceeding 30mph (2.79)	83%	14%	3%	-
Coloured strip in middle of main road midway through village (1.79)	21%	41%	34%	1%

ROUTE: Q.8

Q.6 *(Local residents)* As a pedestrian did you cross the main road before the changes? *BASE: 69*	CODE	ROUTE
Yes	93%	Q.7
No	3%	Q.11
Not stated	4%	

Q.7 *(Local residents)* Have you crossed the main road since the changes? *BASE: 64*	CODE	ROUTE
Yes	97%	Q.9
No	3%	Q.11

Q.8 *(Visitors)* As a pedestrian, have you crossed the main road since you've been here? *BASE: 29*	CODE	ROUTE
Yes	59%	Q.10
No	41%	Q.14

Q.9 *(Local residents)* Is crossing the road: *BASE: 62 who crossed before and after scheme installation*	CODE	ROUTE
Mean score (based on: easier than before = 3; about the same = 2; harder than before = 1): 2.10		
Easier than before	16%	
About the same as before	77%	
Harder than before	6%	
(Don't know)	-	Q.11

Q.10 *(Visitors)* Was crossing the road: *BASE: 17 who had crossed the road*	CODE	ROUTE
Easy	53%	
In-between	29%	
Hard	18%	
(Don't know)	-	Q.14

Q.11 *(Local residents)* Do you think that vehicle speeds have changed since the scheme was introduced? *BASE: 69*	CODE	ROUTE
Yes - gone up	4%	
Yes - gone down	43%	
No - stayed the same	49%	
Don't know / not stated	2%	Q.12

Q.12 *(Local residents)* Are you satisfied with the appearance of the village since the changes? *BASE: 69* *Mean score (based on: yes = 3; no opinion either way = 2; no = 1): 2.81*	CODE	ROUTE
Yes	87%	
No opinion either way	4%	
No	7%	
Don't know / not stated	1%	Q.13

Q.13 *(Local residents)* Are you satisfied overall with the scheme? *BASE: 69* *Mean score (based on: yes = 3; no opinion either way = 2; no = 1): 2.57*	CODE	ROUTE
Yes	59%	
No	36%	
No opinion either way	3%	
Don't know	1%	Q.14

Q.14 *(All respondents)* Would you like to see these changes in other villages? *BASE: 99*	CODE	ROUTE
Yes	86%	
No	8%	
Don't know / not stated	6%	Q.15

Q.15 Can you think of any improvements to the changes in the village?
BASE:99

ALL RELATING TO SIGNAGE: 25%
Illuminated speed limit / speed limit sign with flashing lights: 8%
Bigger / clearer speed limit signs easier to see: 3%
More speed limit sgns: 2%
Bigger signs / signposts: 2%
Illuminated sign / flashing lights as enter village: 1%
Signs warning of narrow roads: 1%
Bigger / clearer sign to warn motorists of sharp corner: 1%
Other signage comments: 7%

ALL RELATING TO ROAD LAYOUT: 22%
One-way traffic system through village / Westgate St / High St: 14%
Narrow the road: 2%
Widen road: 1%
Other road layout comments: 5%

ALL RELATING TO SPEED LIMIT: 18%
Speed traps / speed cameras: 8%
Police enforcement of speed limit: 5%
20mph speed limit throughout village: 3%
Reduce traffic speed (not further specified): 1%
Other speed limit comments: 3%

ALL RELATING TO CALL FOR PHYSICAL MEASURES: 6%
Chicanes: 4%
Mini-roundabout (to reduce speeds): 2%

OTHER: 8%
Stop parking on Westgate St: 7%
Limit size of lorries / no lorries / bypass for larger vehicles / lorries: 1%
Permanent policing / more police: 1%

No improvements necessary: 22%

Other comments: 6%
Don't know / not stated: 1%

ROUTE: Q.16

Q.16 CLASSIFICATION
BASE: 99

	CODE
(A) Sex **(BY OBSERVATION)**	
Male	46%
Female	54%
(B) What age group do you come in?	
18-29	19%
30-44	20%
45-59	30%
60+	30%

	CODE
(C) Do you: **(RING ALL THAT APPLY)**	
Drive	82%
Cycle	51%
Neither	9%

THANK AND CLOSE

Time _____ Interviewer_____

Appendix E: Questionnaire incorporating results (Wiveton)

COUNTRYSIDE TRAFFIC MEASURES GROUP: QUESTIONNAIRE

Scheme: **Wiveton (Norfolk)**

Good morning/afternoon/evening. I am from the Transport Research Laboratory. We are carrying out a survey for the Department for Transport, Local Government and the Regions about people's opinions of the traffic calming scheme in this village.

Q.1A Do you live in Wiveton? *BASE: 50*	CODE	ROUTE
Yes	72%	Q.1B
No	24%	Q.1C
Not stated	4%	

Q.1B Were you living in Wiveton before 1998? *BASE: 36 (all answering 'yes' to Q.1A)*	CODE	ROUTE
Yes	75%	Q.2
No	14%	Q.2
Not stated	11%	

Q.1C But did you regularly visit Wiveton before 1998? *BASE: 12 (all answering 'no' to Q.1A)*	CODE	ROUTE
Yes	100%	Q.2
No	-	Q.2

Q.2 Recently some changes were made on this road to slow traffic and reduce signing. Are you aware of this? *BASE: 50*	CODE	ROUTE
Yes	100%	Q.3
No	-	Discontinue Interview

Q.3 Thinking back before these changes were made did this road and its traffic cause any problem here? *BASE: 50*

Speeding / traffic going too fast: 58%
Narrow roads / too narrow for car to pass / too narrow for volume of traffic: 8%
Volume of traffic / too much traffic (not further specified): 6%
Dangerous walking along road / dangerous for pedestrians: 6%
Dangerous for children to walk / dangerous walking with children / pushchairs / prams: 6%
Lack of footpaths / pavements / provision for pedestrians: 4%
Difficulties crossing the road: 4%
Volume of traffic in summer: 4%
Problems getting in and out of driveway: 4%
Lots of accidents: 2%
Lots of big lorries / too big for road: 2%
Parking in village: 2%
Lots of buses: 2%
Reduced visibility (due to hedges): 2%
Congestion / traffic jams (not further specified): 2%
No/none: 14%
Other: 12%
Don't know / not stated: 10%

ROUTE: Q.4

Q.4 How useful do you consider the following changes that have been made in this part of the village?
BASE: 50
Mean scores in brackets (based on: very useful = 3; fairly useful = 2; of little use = 1)

	Very useful	Fairly useful	Of little use	Don't know/ No opinion*
New signing and different road surface on village approaches (1.81)	28%	22%	46%	4%
Smaller direction signs (1.62)	22%	16%	58%	4%
Smaller chevron and give way signs (1.60)	20%	18%	58%	4%
Fewer signs (1.78)	22%	12%	64%	2%
Marker posts instead of chevron sign outside pub (1.96)	32%	26%	36%	6%

**Also includes 'not stated'*

ROUTE
Q.5

Q.5 Are you satisfied with the appearance of this part of the village since the changes? *BASE: 50* *Mean score (based on: yes = 3; no opinion either way = 2; no = 1): 2.66*	CODE	ROUTE
Yes	74%	
No	8%	
No opinion either way	18%	
Don't know	-	Q.6

Q.6 What effect do you think the following changes have on the appearance of the village? Do they improve it, spoil it or do they make no difference?
BASE: 50
Mean scores in brackets (based on: improves appearance = 3; makes no difference = 2; spoils appearance = 1)

ITEM NUMBER [1], [2] etc	Improves appearance	Makes no difference	Spoils appearance	Don't know
[1] New signs/different road surface on village approaches (2.44)	48%	48%	4%	-
[2] Smaller direction signs (2.58)	60%	38%	2%	-
[3] Smaller chevron and give way signs (2.62)	64%	34%	2%	-
[4] Fewer signs (2.59)	58%	40%	-	2%
[5] Marker posts instead of chevron sign outside pub (2.51)	60%	28%	10%	2%

ROUTE:
For each item ringed '3' in Q.6, ask Q.6A
If none, go to Q.7

Q.6A What is it about the.... that spoils the appearance of the village?
READ OUT FIRST ITEM RINGED '3' IN Q.6, PROBE FULLY AND WRITE IN ANSWER AGAINST THAT ITEM NUMBER IN BRACKETS SHOWN BELOW. REPEAT FOR ALL ITEMS RINGED '3' IN Q.6

[1] *All stating 'new signing and different road surface on village approaches' spoils appearance (2)*
Don't like colour of road surfaces: 100%
Other: 50%

[2] *All stating 'smaller direction signs' spoil appearance (1)*
Unspecified

[3] *All stating 'smaller chevron and give signs' spoil appearance (1)*
Unspecified

[5] *All stating 'marker posts instead of chevron sign outside pub' spoils appearance (5)*
Ugly / unsightly / an eyesore: 100%
Not necessary: 20%

Q.7 Do you think that vehicle speeds have changed since the scheme was introduced? *BASE: 50*	CODE	ROUTE
Yes - gone up	4%	
Yes - gone down	10%	
No - stayed the same	80%	
Don't know	6%	Q.8

Q.8 Would you suggest any improvements to the changes in this part of the village?
BASE: 50

ALL RELATING TO SPEED LIMIT: 38%
30mph speed limit throughout village: 12%
Extend speed limit to further outside village: 10%
Reduce speed limit in village (not further specified): 4%
20mph speed limit throughout village: 4%
Reduce traffic speed (not further specified): 4%
Slow traffic earlier: 2%
Other speed limit comments: 2%

ALL RELATING TO SIGNAGE: 24%
Bigger signs / signposts (not further specified): 14%
Bigger / clearer sign to warn motorists of sharp corner: 10%
Bigger / clearer speed limit signs easier to see: 6%
More speed limit signs: 4%
Signs warning of narrow roads: 2%
Other signage comments: 12%

ALL RELATING TO PEDESTRIAN PROVISION: 14%
Not safe to walk on road / dangerous with children: 8%
Extended footpath / continuous path: 4%
Footpath / pavement (not further specified): 4%
More footpaths: 2%
Footpath to pub: 2%

ALL RELATING TO ROAD SURFACE: 10%
Rumble strips coming into village: 4%
Road humps: 2%
Other road surface comments: 4%

ALL RELATING TO ROAD LAYOUT: 6%
One-way traffic through village: 2%
'Narrow road': 2%
Close section of road across green: 2%

ALL RELATING TO PHYSICAL MEASURES: 4%
Mini-roundabout to reduce speeds: 2%
Other: 2%

OTHER: 10%
Cut down grass bank opposite pub to improve visibility: 10%

No improvement necessary: 22%
Other comments: 6%
Don't know / not stated: 2%

ROUTE: Q.9

Q.9. How satisfied are you overall with the changes that have been made in the village? *BASE: 50* *Mean score (based on 'very satisfied = 5, through 'no opinion..' = 3 and 'very dissatisfied = 1) = 3.61*	CODE	ROUTE
Very satisfied	18%	
Fairly satisfied	48%	
No opinion either way	14%	
Fairly dissatisfied	12%	
Very dissatisfied	6%	
Don't know	2%	Q.10

Q.10 CLASSIFICATION

	CODE
(A) Sex **(BY OBSERVATION)**	
Male	40%
Female	60%
(B) What age group do you come in?	
18-29	12%
30-44	20%
45-59	20%
60+	48%

	CODE
(C) Do you: **(RING ALL THAT APPLY)**	
Drive	88%
Cycle	60%
Neither	4%

THANK AND CLOSE

Time _____ Interviewer_____

Appendix F: Questionnaire incorporating results (Occold residents)

COUNTRYSIDE TRAFFIC MEASURES GROUP: QUESTIONNAIRE FOR RESIDENTS

Scheme: **Occold, Suffolk**

Good morning/afternoon/evening. I am from the Transport Research Laboratory. We are carrying out a survey for the Department for Transport, Local Government and the Regions about people's opinions of the traffic calming scheme in this village.

Q.1 Were you living in the village before 1998? *BASE: 84* **RING CODE NUMBER**		CODE	ROUTE
	Yes	100%	Q.2
	No	-	Discontinue Interview

Q.2 Recently some changes were made to slow traffic going through the village. Are you aware of this? *BASE: 84*		CODE	ROUTE
	Yes	100%	Q.3
	No	-	Discontinue Interview

Q.3 Thinking back before these changes were made, did the main road through the village and its traffic cause any problem in the village? *BASE: 84*
PROBE FULLY AND WRITE IN BELOW

Speeding traffic/going too fast: 56%
Problems with HGVs/too many HGVs: 9%
No footway: 5%
Volume of traffic: 4%
Problems outside school/dangerous for children crossing road: 2%
Used as bypass/short cut: 2%
Other: 8%
No/none: 29%
Don't know/not stated: 4%

ROUTE Q.4

Q.4 How useful do you consider the following changes that have been made in the village? *BASE: 84*
SHOW CARD 'A' *Mean score in brackets (based on: very useful = 3; fairly useful = 2; of little use = 1)*

	Very useful	Fairly useful	Of little use	Don't know/ No opinion
'Traffic calming ahead' signs (1.98)	23%	51%	25%	-
Entrances to the 20mph zone (1.95)	26%	42%	31%	1%
The 20mph zone itself (1.95)	27%	40%	32%	-
Kerbed road narrowings in village (1.98)	32%	32%	35%	1%
Patches of light coloured surfacing across road (1.34)	6%	21%	70%	2%
Road markings to make road look narrower (1.28)	6%	15%	77%	1%
Road made more bendy to slow traffic past school (1.63)	14%	31%	50%	5%

ROUTE Q.5

Q.5. Are you satisfied with the appearance of the village since the changes? *Mean score (based on: yes = 3; no opinion either way = 2; no = 1): 2.18*	CODE	ROUTE
Yes	52%	
No	35%	
No opinion either way	13%	Q.6
Don't know	-	

Q.6 What effect do you think the following changes have on the appearance of the village? Do they improve it, spoil it or do they make no difference? *Mean score in brackets (based on: improves appearance = 3; makes no difference = 2; spoils appearance = 1)*
SHOW CARD 'B'

	Improves appearance	Makes no difference	Spoils appearance	Don't know
New road signs (1.77)	4%	68%	26%	2%
Kerbed road narrowings (2.11)	25%	60%	14%	1%
Patches of light coloured surfacing across road (2.33)	6%	54%	38%	2%
Road markings to make road look narrower (1.73)	5%	63%	31%	1%
Road made more bendy to slow traffic past school (1.83)	12%	53%	29%	2%

ROUTE:
For each item ringed '3' in Q.6, ask Q.6A
If none, go to Q.7

Q.6A What is it about the.... that spoils the appearance of the village?
READ OUT FIRST ITEM RINGED '3' IN Q.6 AND WRITE ITEM NUMBER IN BOX PROVIDED
PROBE FULLY AND WRITE IN ANSWER
REPEAT FOR ALL ITEMS RINGED '3' IN Q.6, REMEMBERING TO ENTER THE ITEM NUMBER EACH TIME

☐ **All those stating *new road signs* spoil appearance – *BASE: 22***
Too many signs: 68%
Too big/high: 14%
Ugly/unsightly/an eyesore: 9%
Not in keeping with the rural image of the village: 9%
Other: 9%

☐ **All those stating *kerbed road narrowings* spoil appearance – *BASE: 12***
Not in keeping with rural village/spoil the image of the village: 42%
Ugly/unsightly: 33%
Don't understand why they're there/not needed: 17%
Other: 33%

☐ **All those stating *patches of light coloured surfacing across road* spoil appearance – *BASE: 32***
Looks ugly/unsightly/an eyesore: 31%
Looks messy/untidy: 25%
Unnecessary: 16%
No effect/no-one takes notice/pays any attention: 13%
Not in keeping with the village/spoil the appearance of the village: 9%
Wearing off: 6%
Other: 16%

☐ **All those stating *road markings to make road narrower* spoil appearance – *BASE: 26***
Ineffective/nobody takes notice/nobody knows what they're for/people just drive over them: 31%
Not in keeping with the village/spoils the image of the village: 15%
Unnecessary: 15%
Looks ugly/unsightly/an eyesore: 15%
Looks messy/untidy: 12%
Need kerbs: 12%
Dangerous/children use them to walk in/seen as safe area: 12%
Used for parking: 12%
Other: 19%

Q.6A CONT'D – All those stating *road made more bendy to slow traffic past school* spoils appearance – *BASE: 24*

Looks messy/untidy: 29%
Dangerous/people park on them: 13%
Has no effect/people drive as normal/don't slow down: 13%
Dangerous for pedestrians/bends too sharp/cars cut across: 8%
Other: 46%

Q.7 Now I am going to read out some things people have said about the changes. For each one please tell me whether you agree a little, agree a lot, disagree a little, or disagree a lot. **SHOW CARD 'C1'** – *BASE: 84*
READ OUT ITEMS BELOW AND SHOW CARD 'C2'

Mean scores in brackets (based on: agree a lot = 5; agree a little = 4; no opinion = 3; disagree a little = 2; disagree a lot: 1)

	Agree a lot	Agree a little	No opinion	Disagree a little	Disagree a lot	D/K
The changes were necessary (3.60)	32%	36%	-	24%	8%	-
They have improved the village appearance (2.32)	-	21%	13%	42%	24%	-
They make it safer to cross the road (2.83)	7%	36%	2%	36%	15%	4%
They make it safer to walk along the road (2.67)	6%	31%	5%	35%	20%	4%
They make it safer for motorists (2.66)	4%	27%	12%	36%	15%	6%
They make it safer for cyclists (2.66)	5%	21%	15%	24%	18%	17%
They make it safer for children (3.00)	10%	35%	7%	25%	14%	10%
They have reduced speeds (2.99)	8%	45%	1%	27%	18%	-
They have reduced speeds enough (2.55)	4%	30%	4%	44%	19%	-
They should be introduced in other villages (2.90)	6%	24%	36%	21%	12%	1%
The environment in the village has been improved (2.64)	2%	26%	17%	35%	15%	5%

ROUTE: Q.8

Q.8 Would you suggest any improvements to the changes in the village? – *BASE: 84*
WRITE IN

More road humps: 30%
More policing: 18%
Footway: 13%
Kerbs/bollards instead of edge lines: 11%
Install speed cameras: 10%
Start again/remove it all: 7%
20mph speed limits *(may be referring to other villages)*: 6%
Bend/junction outside school is dangerous/needs altering/difficult to turn left: 6%
Remove white lines: 5%
Reduce large vehicles – lorries/agricultural vehicles: 4%
Flashing warning lights coming into village: 2%
More street lighting: 2%
No/none: 15%
Other: 29%
Don't know/not stated: 6%

ROUTE: Q.9

Q.9. How satisfied are you overall with the changes that have been made in the village?
SHOW CARD 'D' AND READ OUT – *BASE: 84*
Mean score (based on: very satisfied =5; fairly satisfied = 4; no opinion either way = 3; fairly dissatisfied = 2; very dissatisfied = 1) = 2.75

	CODE	ROUTE
Very satisfied	2%	
Fairly satisfied	37%	
No opinion either way	11%	
Fairly dissatisfied	33%	
Very dissatisfied	17%	
Don't know	-	Q.10

Q.10 Do you have a child / children attending the village school? – *BASE: 84*	CODE	ROUTE
Yes	21%	Q.11
No	76%	Q.17
(not stated)	2%	

Q.11 If yes, of what age? – *BASE: 18* **RING ALL THAT APPLY**	CODE	ROUTE
6 years or under	39%	
7-9 years	67%	
10 years or over	39%	Q.12

Q.12 How far do you live from the school? – *BASE: 18* **SHOW CARD 'E'**	CODE	ROUTE
Close (under quarter mile)	72%	
10 minutes walk (quarter to half-mile	28%	
15-20 minutes walk (half-mile to 1 mile)	-	
More than 20 minutes walk (over 1 mile)	-	Q.13

Q.13 Before the changes, how did your child / how did your children usually travel to and from the school? – *BASE: 18*	CODE	ROUTE
Walk	89%	Q.15
Cycle	-	Q.15
Were driven	11%	Q.14

Q.14 Would you mind telling me why they were driven? – *BASE: 2* **DO NOT READ OUT**	CODE	ROUTE
Roads too dangerous	-	
Personal security	-	
Live too far away	-	
To save time	50%	
"I went that way anyway"	50%	
Other **(WRITE IN BELOW)**	-	
		Q.15

Q.15 Have the changes affected the way they travel to the school? – *BASE: 18* **RING CODE NUMBER**	CODE	ROUTE
Yes	6%	Q.16
No	94%	Q.17

Q.16 If yes, how? – *BASE 1*
WRITE IN

Don't know/not stated

ROUTE
Q.17

CLASSIFICATION

Q.17

	CODE		CODE
(A) Sex **(BY OBSERVATION)**		**(D)** Do you do any of the following? **(RING ALL THAT APPLY)**	
Male	50%	Drive a car or van	86%
Female	50%	Drive a lorry	-
		Ride a motorcycle	2%
		Ride a pedal cycle	31%
		None of these	10%
(B) What age group do you come in?		**(E)** What is your working status?	
		Employed full time	20%
18-29	8%	Employed part-time	21%
30-44	25%	Self-employed	14%
45-59	30%	Unemployed	1%
60+	37%	Housewife	6%
		Retired	37%
(C) Live on or off the main road? **(BY OBSERVATION)**			
On main road	58%		
Elsewhere	42%		

THANK AND CLOSE.

Time _____

Interviewer_____

COUNTRYSIDE TRAFFIC MEASURES GROUP: QUESTIONNAIRE FOR SCHOOLTEACHERS

Scheme: **Occold, Suffolk**

Good morning/afternoon/evening. I am from the Transport Research Laboratory. We are carrying out a survey for the Department for Transport, Local Government and the Regions, to enable us to seek opinions of the traffic calming scheme in this village.

FIVE TEACHERS WERE INTERVIEWED (results presented as totals out of 5)

Q.1 Were you teaching at the village school before 1998? **RING CODE NUMBER**	CODE	ROUTE
Yes	5	Q.2
No	-	Discontinue Interview

Q.2 How do you normally travel to the school? **RING CODE NUMBER**	CODE	ROUTE
Car	5	
Motor cycle	-	
Pedal cycle	-	
Walk	-	
Use public transport	-	Q.3

Q.3 Thinking back before the traffic calming measures were introduced, did the main road through the village and its traffic cause any problem outside the school or in the village generally?
PROBE FULLY AND WRITE IN BELOW

VERBATIM ANSWERS
"Lorries were a worry"
"They should have looked into things before"
"I think some of the cars go through quite quickly which I notice when I am on playground duty"
"Sometimes inappropriate parking"
"Yes, traffic was too fast and there aren't any pavements to walk on"
"Only at certain times. Same with the heavy traffic that used to come through and also at lunchtime when we are crossing the children, the traffic used to belt along there"

ROUTE Q.4

Q.4 How useful do you consider the following changes to be that have been made in the village?
SHOW CARD 'A'

	Very useful	Fairly useful	Of little use	Don't know/ No opinion
'Traffic calming area ahead' signs	2	2	1	-
Entrances to the 20mph zone	1	3	1	-
The 20mph zone itself	-	3	2	-
Kerbed road narrowings in village	1	2	2	-
Patches of light coloured surfacing across road	-	1	4	-
Road markings to make road look narrower	1	1	3	-
Road made more bendy to slow traffic past school	-	3	1	1

ROUTE Q.5

Q.5 Now I am going to read out some things people have said about the changes. For each one please tell me whether you agree a little, agree a lot, disagree a little, or disagree a lot. **SHOW CARD 'B1'**

READ OUT ITEMS BELOW AND SHOW CARD 'B2

	Agree a lot	Agree a little	No opinion	Disagree a little	Disagree a lot	D/K
The changes were necessary	3	2	-	-	-	-
The changes make it safer to cross the road	4	-	-	1	-	-
They make it safer to walk along the road	3	1	-	1	-	-
They make it safer for cyclists	1	3	-	1	-	-
They make it safer for children	3	-	-	1	-	-
They have reduced speeds	-	3	-	2	-	-
They have reduced speeds enough	-	2	1	1	-	-
They should be introduced in other villages	-	3	1	1	-	-
The environment in the village has been improved	-	2	1	2	-	-

ROUTE: Q.6A

Q.6A Would you suggest any improvements to the changes outside the school?
WRITE IN

VERBATIM COMMENTS
"No - if drivers stick to 20 it would work"
"I don't think there is much you can do"
"No, nothing else that can be done – possibly speed bumps/sleeping policemen"
"I think zigzag lines would have more effect"
"No"

ROUTE: Q.6B

Q.6B Would you suggest any improvements to the other changes in the village?
WRITE IN
VERBATIM COMMENTS
"Stop large lorries"
"It would help if you could have a pavement"
"No, possibly sleeping policemen"
"If you are going to narrow the road it needs to be done with proper fixtures"
"No"

ROUTE: Q.7A

Q.7A Do you think the scheme has affected how the children get to the school? **RING CODE NUMBER**	CODE	ROUTE
Yes	-	Q.7B
No	5	Q.8A
Don't know	-	Q.8A

Q.7B If yes, how? **WRITE IN** No answers ROUTE: Q.8A

Q.8A. How satisfied are you overall with the changes that have been made outside the school? **SHOW CARD 'C' AND READ OUT**	CODE	ROUTE
	-	
Very satisfied	1	
Fairly satisfied	4	
No opinion either way	-	
Fairly dissatisfied	1	
Very dissatisfied	-	
Don't know	-	Q.8B

Q.8B. How satisfied are you overall with the changes that have been made in the village? **SHOW CARD 'C' AND READ OUT**	CODE	ROUTE
Very satisfied	-	
Fairly satisfied	3	
No opinion either way	1	
Fairly dissatisfied	1	
Very dissatisfied	-	
Don't know	-	Q.9

CLASSIFICATION

Q.9

	CODE	**(B)** What age group do you come in?	CODE
		18-29	-
(A) Sex		30-44	2
(BY OBSERVATION)		45-59	3
		60+	-
Male	1		
Female	4		

THANK AND CLOSE.

Time _____

Interviewer _____

Abstract

In summer 1999, traffic calming schemes were implemented in the villages of Stiffkey, Blakeney and Wiveton on the A149 corridor within the North Norfolk Area of Outstanding Natural Beauty, and in the village of Occold, near Eye in Suffolk. The schemes were installed under the Countryside Traffic Measures Group, a joint initiative of the Countryside Agency and the Department for Transport, Local Government and the Regions. The initiative aimed to support the planning and implementation by local authorities of innovative rural traffic schemes designed to integrate sensitively into the local environment.

The aim of the schemes, which comprised gateway features and measures within the villages, was to achieve lower speeds in a rural village environment whilst avoiding the use of visually intrusive measures often found elsewhere. In the Norfolk villages, sandy coloured surface dressing of a colour matching local building materials was laid at the gateways and in the centre of Stiffkey, and more visually attractive signing was installed with other signing removed and rationalised. A 20 miles/h speed limit was introduced in Stiffkey and a fibre-optic speed limit reminder sign was installed in Blakeney inside one gateway on the A149. In Occold, a 20 miles/h zone was implemented, but avoiding the use of road humps and chicanes normally associated with more urban schemes of this type.

The report describes the schemes in detail and presents the results of monitoring undertaken to assess the effectiveness of the schemes in terms of vehicle speeds, air quality and public opinion surveys.

Related publications

TRL504 *Norfolk Quiet Lanes Scheme: 'Before' monitoring* by J V Kennedy and A H Wheeler. 2001 (price £35, code H)

TRL503 *Kent Quiet Lanes Scheme: 'Before' monitoring* by J V Kennedy and A H Wheeler. 2001 (price £35, code H)

TRL502 *Countryside Traffic Measures Group: Demonstration schemes* by A H Wheeler, J V Kennedy, G Harris, R E Stait, G J Davies and J M Green. 2001 (price £35, code H)

TRL501 *Countryside Traffic Measures Group: A traffic calming scheme at Charlwood, Surrey* by A H Wheeler, J V Kennedy, G Harris, R E Stait and J M Green. 2001 (price £35, code J)

TRL452 *Changes in accident frequency following the introduction of traffic calming in villages* by A H Wheeler and M C Taylor. 2000 (price £25, code E)

TRL385 *Traffic calming in villages on major roads: Final report* by A H Wheeler and M C Taylor. 1999 (price £35, code H)

TRL364 *A traffic calming scheme at Costessey, Norfolk* by A H Wheeler , G Harris, L Chinn, M C Taylor and P Abbott. 1998 (price £35, code J)

TRL238 *Traffic calming on major roads: the A47 trunk road at Thorney, Cambridgeshire* by A H Wheeler, P G Abbott, N S Godfrey, S M Phillips and R Stait. 1997 (price £50, code L)

TRL212 *Traffic calming on major roads: the A49 trunk road at Craven Arms, Shropshire* by A H Wheeler, P G Abbott, N S Godfrey, D J Lawrence and S M Phillips. 1996 (price £50, code L)

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