Oxfordshire Highways

A415 Mitigation Measures
Feasibility Report

Ref: B0604300/60/02 June 2008

Jacobs, 95 Bothwell Street, Glasgow G2 7HX
Tel 0141 204 2511 Fax 0141 226 3109

Oxfordshire Highways
A415 Mitigation Measures
Feasibility Report

Document No	:	B0604300/60/02
Revision No	:	02
Date	:	13 June 2008

Prepared by	:	Nigel Day	Nigel Day
Checked by	:	David Husband	David Husband
Approved by	:	Bob Southey	Bob Southey

Contents

1 Introduction

1.1 Objectives

1.1.1 On 28 February 2007 Oxfordshire County Council (OCC) issued a brief to produce a feasibility report and drawings detailing a range of potential measures to mitigate any negative impacts associated with providing a new River Thames Crossing at a location close to the existing structure at Newbridge.

OCC asked that the scheme be delivered by Oxfordshire Highways and in a subsequent meeting of the Programme Board, OCC were appointed as the Project Leader and Jacobs UK Ltd commissioned to produce the Feasibility Report.

A drawing, BPN1085/F3000 *Study Route Corridor* is included in Appendix A and shows the parts of the A415 under consideration.

The report also considers the likely future situation if no new bridge is built and assesses the network wide traffic and access implications of this scenario. It assesses the likelihood, and level, of any additional traffic attracted onto the A415 by a new river crossing, together with the wider implications for the county network and the impact in terms of noise, fumes or other environmental aspects. It also looks to introduce a range of mitigation measures throughout the A415 corridor that can

be implemented to ensure the rural character of the area remains unaffected and that there are no adverse impacts on the quality of life for residents of villages in and around the A415 corridor.

As there is no current plan to upgrade the A415, this report further considers measures that can contribute to improved road safety while deterring its use by long distance hauliers.

1.2 Background

1.2.1 River Crossing at Newbridge

For structural reasons the historic crossing of the River Thames at Newbridge is no longer able to cope with the traffic demands and a weight limit has had to be imposed. It is likely that further restrictions will be required in the future as the bridge continues to deteriorate.

The current bridge is a 750 year old six-span masonry gothic arch bridge and is a Scheduled Ancient Monument. It carries the A415 Abingdon to Witney road over the River Thames. The bridge has been assessed as theoretically unable to support any traffic loading and can not be reconstructed or strengthened due to the Statutory protection arising from its historic status.

As an interim measure, the bridge is subject to an 18 tonne weight restriction which, combined with more frequent inspections is sufficient

to ensure public safety for the time being. The weight restriction currently permits use by two-axle public service vehicles, but the restriction could be lowered in the future and possibly at short notice.

Photo 1 Existing River Thames Crossing at Newbridge

As the bridge is a narrow structure, Photo 1, the current arrangement consists of a single lane 2-way carriageway controlled by traffic signals. This, together with the narrow adjacent structure over the River Windrush which is similarly controlled by traffic signals and shuttle working, is believed to currently restrict the attractiveness of the route due to the delays associated at peak times.

This report will consider mitigation measures associated with the provision of a new single or two lane bridge, plus a single carriageway road linking back to the existing road network suitable for use by all

classes of vehicles. The options investigated for the bridge locations are described in section 1.6.1.

1.2.2 Existing Route and Features of the A415

The section of the A415 under consideration in this report can be seen on drawing BPN1085/F3000 in Appendix A.

The A415 is a single carriageway rural "A" road that links the towns of Witney (SP356096) and Abingdon (SU497972) via Brighthampton (SP384036), Standlake (SP390031), Newbridge (SP404014), Kingston Bagpuize (SU407982), Frilford (SU442970) and Marcham (SU457967). The road historically formed part of the main London to Gloucester road and is predominantly narrow and winding in places. The exception to this is the Ducklington Bypass at the northern extent of the route which was built in the 1970s and adheres to more recent design standards. The road narrowing is most notable through the villages where options for road improvements are constrained due to the proximity of buildings.

The speed limit varies along the length of the route from 30mph in the built-up areas up to the national speed limit at the extents of the route. A 50 mph rural speed restriction along a large part of the route was established in 2005 as part of OCC's Casualty Reduction Programme. Details of the speed restrictions are shown on the accompanying drawing, BPN1085/F3001. A number of other traffic features have

been recently introduced along the route as part of the same programme and these are detailed below:

- **Yelford Crossroads traffic signals (2005)**

  Installation of traffic signals and minor junction realignment undertaken at the junction of the B4449 with the A415 at Hardwick.

- **Traffic Signals at Newbridge bends (2003)**

  Signalisation permitting single file shuttle movements through bends north of Newbridge and Windrush river crossing.

- **Signalisation of Frilford Crossroads (2001)**

  The construction of traffic signals at the staggered junction of the A415 with the A336.

Additionally, vehicle actuated warning signs have been erected at 4 no. locations around Cokethorpe Park.

A trial of traffic signals permitting single file shuttle vehicle movements through Marcham has been undertaken during the preparation of this report. An estimate of the contribution of this feature will be made in this report however the findings of the traffic experiment will be the subject of a separate report.

As stated in 1.2.1, a structural weight limit has been imposed on the bridge at Newbridge. This was implemented in August 2006 and the effect of this restriction on the volume and type of traffic using the route has been assessed with consideration given to the likely changes that may occur as a result of the restriction being lifted.

1.3 Traffic Data

1.3.1 Traffic Volume Along Route

The 12 hour, 7am-7pm, 5 day traffic data for the 10 years preceding 2007 was investigated at seven different sites along the study route. The locations of these sites are shown on drawing BPN1085/F3000 in Appendix A.

Data for the entire ten year period did not exist from site CP499, to the west of the A34. Data is available for six years from 2001 when data first became available. A summary of the traffic data from the count sites is shown in Appendix B.

The data has been considered over two periods, 1997 to 2002 and 2002 to 2007. The trend shows a considerable reduction in growth during the second period. This is shown in Table 1.

The greatest percentage increase in traffic was recorded at CP135 where westbound traffic increased by 37.1% between 1997 and 2002,

however the growth demonstrated in the period 2002 to 2007 was only 3.0%. This trend is reflected throughout all the count sites with significant growth in the period 1997 to 2002 followed by a much slower rate of growth or a decrease in the subsequent five year period. The commencement of this period coincides with work to provide signal controlled single file shuttle working at the Windrush bridges by Newbridge Mill.

Although some reduction in the growth of traffic volume can be attributed to the new signals at Newbridge, it should also be considered that other features along the route are also likely to contribute. This includes the existing signals for single file shuttle working at the bridge at Newbridge which predate the commencement of the traffic data and the traffic signals at Frilford junction which it is known are operating at capacity during peak times. It is also believed that the narrow nature of road at this location serves to slow down long vehicles. In consideration of this, it would be wrong to assume that the traffic volume growth would increase at similar rates to those shown for the period 1997 to 2002.

The most recent traffic data, obtained at the sites along the study route between 6 September 2006 and 25 April 2007 is represented in diagrammatic form in Figure 1. From this diagram it can be seen that the volume of traffic travelling south along the A415 decreases between Witney and Brighthampton before gradually increasing over the

remainder of the route to Abingdon. The data shows that approximately 1000 more vehicles per 12 hour day exited the route at Abingdon than entered at Witney. Similarly, for vehicles travelling north along the A415, the traffic volume reduces between Abingdon and Brighthampton before increasing as the road approaches Witney. In this direction over 2000 fewer vehicles per 12 hour day exited the route at Witney than entered it at Abingdon.

This can be explained as the A415 intersects other major routes including the A420, the A338 and the A34 at Abingdon. Accordingly, traffic will leave and join from these junctions significantly affecting the volumes traffic using the A415. However, a review of the published AADT flow figures (1996 – 2006) for these major routes show a slow down in traffic growth consistent with what has been seen on the A415. This is shown in Table 2.

Site	Direction of Flow	1997 Volume	2002 Volume	% Change (5 year)	2007 Volume	% Change (5 year)	% Change (10 year)
CP96 South of Ducklington	East	4086	4873	+19.3	5143	+5.5	+25.9
	West	4276	4972	+16.3	5279	+6.2	+23.5
CP258 North of Brighthampton	South	3047	3426	+12.4	3546	+3.5	+16.4
	North	2835	3528	+24.4	3710	+5.2	+30.9
CP36 Newbridge	South	3233	3916	+21.1	3834	-2.1	+18.6
	North	4047	4051	+.01	3942	-2.7	-2.6
CP198 South of Kingston Bagpuize	East	3405	4285	+25.8	4207[1]	-1.8	+23.6
	West	3719	4411	+18.6	4787[1]	+8.5	+28.7
CP135 West of Marcham	East	3982	5190	+30.3	5410	+4.2	+35.9
	West	4251	5830	+37.1	6004	+3.0	+41.2
CP260 East of Marcham	East	5628	5875	+4.4	6079[1]	+3.5	+8.0
	West	5836	6532	+11.9	6528[1]	-0.1	+11.9
CP499 Abingdon, West of A34	East	7160[2]	7326	+2.3	7038	-3.9	-1.7
	West	8113[2]	8404	+3.6	8123	-3.3	+0.1

[1] data from 2006

[2] data from 2001

Table 1: 5 day, 12 hour traffic data along the study route

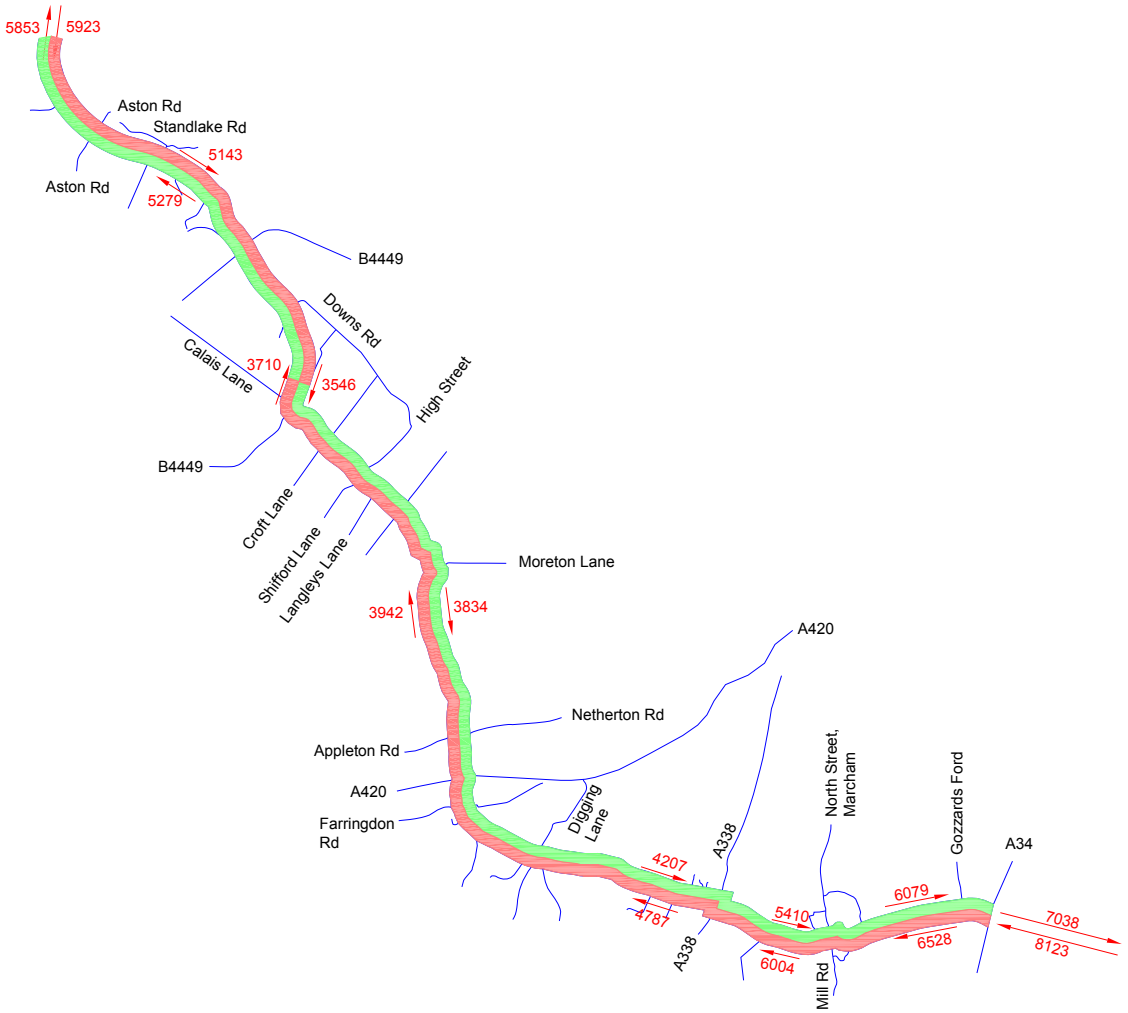


Figure 1: Traffic Data, 6 September 2006 to 25 April 2007

Road and Location	Ref	1996 AADT	2001 AADT	% Change (5 year)	2006 AADT	% Change (5 year)	% Change (10 year)
A338, North of Frilford	CP88	5500	5900[1]	+7.3	6000	+1.7	+9.1
A420, East of A415	CP232	16700	18000	+7.8	19000	+5.6	+13.8
A34, South of A415, Drayton	CP133	51700	60100	+16.2	62300	+3.7	+20.5

[1] 2001 data unavailable, 2002 data used

Table 2: Annual Average Daily Traffic (AADT) at Locations on Major Routes Intersecting with A415 Corridor

.

1.3.2 Introduction of the Newbridge Weight Restriction

The introduction of the 18 tonne weight limit for structural reasons at Newbridge has not had a significant effect on the total traffic volume using the route however a reduction in HGVs at the site has been recorded. This is shown in Table 3, however it should be noted that only one manual classified count has been undertaken since the implementation of the weight restriction in August 2006.

The number of HGVs using the bridge at the last count was 283 representing 3.4% of the total traffic volume. Most of the HGVs recorded (90%) consisted of 2-axle rigid vehicles though there were examples recorded of all types, up to and including articulated vehicles with six or more axles. Though there is no data concerning whether these are laden vehicles, it is assumed that a number of vehicles are ignoring the weight restriction. However it can be seen that the number of HGVs using the bridge has significantly reduced from previous years, from a peak of 688 HGVs per day in 2002 to 283 HGVs per day in 2008. The most recent recorded data shows consistent volume following the imposition of the structural weight limit in 2006. It should also be noted that there is general trend that shows a reduction in HGV use between 1999 and 2006 which may suggest that HGV traffic was already favouring alternative routes.

Ref	Date	HGV	All Traffic	% HGV
TC1138	27 May 99	512	7214	7.1%
TC1387	04 Jul 00	561	7595	7.4%
TC1566	18 May 01	639	8476	7.5%
TC1762	26 Apr 02	688	8371	8.2%
TC2193	22 May 03	610	8227	7.4%
TC2722	14 Oct 04	521	8262	6.3%
TC2973	22 Jun 05	535	8215	6.5%
TC3172	22 Mar 06	484	7498	6.5%
TC3694	15 Jun 07	288	8772	3.3%
TC3925	5 Mar 08	283	8347	3.4%

Table 3 Heavy Goods Vehicles Use of A415 at Newbridge
Extracted from Manual Classified Passing Counts (1999 – 2008)

Note that the data relating to heavy goods vehicles prior to 1999 has not been included due to the change in classification of vehicles in that year.

It is anticipated that following the construction of a new river crossing, the HGV traffic will increase to levels similar to those experienced prior to the introduction of the 18 tonne weight restriction on the existing bridge. Although the overall traffic volume is likely to increase this is unlikely to be at a rate that exceeds current growth due to the constraints that exist along other parts of the route.

1.4 Accident Data

1.4.1 Assessment of Accident Data

Accident data for the length of the route, gathered between 1 April 2002 and 31 March 2007 has been analysed and areas with a high accident count highlighted and shown diagrammatically in Figure 2. Note that this relates only to recorded accidents involving casualty injuries (fatal, serious or slight). Accordingly there may have been additional accidents along the various sections of highway under consideration that remain unrecorded.

During the five year period 177 accidents were recorded along the length of the route which equates to nearly one reported accident every ten days. The route has been split into 17 different sections to allow a comparison between the number of accidents occurring along different stretches of the road to be made.

Table 4 details the length of each section of the road and the number of accidents that occurred in this length. The sections of road are listed in geographical order from north west to south east.

From the table it can be seen that the highest concentration of accidents occur at the major junctions along the route. This is to be expected due to the large volume of traffic that will be using these junctions daily.

Sector	Length of sector, l (km)	No. of vehicles, V_{12}	No. of accidents, n_a	No. of accidents per km	Severity			No. of casualties	Accident density
					Slight	Serious	Fatal		
Ducklington Bypass	2.42	11,776	14	5.79	8	5	1	22	0.49
Ducklington Bypass to B4449	1.47	10,322	12	8.16	6	3	3	26	0.79
*B4449 junction**	*4.90*		*11*	*22.45*	*7*	*3*	*1*	*17*	
B4449 to Standlake	1.85	7,256	9	4.86	9	0	0	16	0.67
Standlake	1.96	7,256	6	3.06	5	1	0	6	0.42
Standlake to Newbridge	0.63	7,256	8	12.70	6	1	1	14	1.75
Newbridge	0.76	7,776	12	15.79	10	2	0	15	2.03
Newbridge to A420	2.27	7,776	7	2.27	4	3	0	9	0.40
A420 junction	*0.51*		*13*	*25.49*	*12*	*1*	*0*	*17*	
Kingston Bagpuize	0.80	8,994	5	6.25	4	1	0	10	0.69
Kingston Bagpuize to Frilford	2.08	8,994	9	4.33	8	1	0	10	0.48

Sector	Length of sector, l (km)	No. of vehicles, V_{12}	No. of accidents, n_a	No. of accidents per km	Severity			No. of casualties	Accident density
					Slight	Serious	Fatal		
Frilford	0.84	8,994	12	14.29	8	4	0	19	1.59
A338 junction	*0.54*		*14*	*25.93*	*14*	*0*	*0*	*20*	
A338 to Marcham	0.63	11,414	5	7.94	5	0	0	7	0.70
Marcham	1.33	11,414	17	12.78	17	0	0	24	1.12
Marcham to A34	1.31	12,607	12	9.16	8	3	1	19	0.73
A34 junction	*0.23*		*11*	*47.83*	*11*	*0*	*0*	*18*	

** Accident data includes period pre-dating new traffic signals installation at Yelford Crossroads*

Table 4: Accident data (5 Year to 31 March 2007) for different sections of the A415

The table also examines the sections of road between the junctions and assesses the number of accidents per kilometre. Whereas this may provide a useful indication of accident clusters, it fails to take into account how many vehicles actually use that section of road. To identify the stretch of road with the greatest accident concentration the *accident density* must be considered. This is established by dividing the number of accidents recorded in each sector *(n_a)* by the multiple of the sector length in km *(l)* and the number of thousand vehicles recorded in the 12 hour traffic count (*V_{12}).*

$$\text{Accident density} = \frac{n_a}{lV_{12}}$$

The accident density is essentially an examination of the number of accidents per 1000 vehicle kilometres. The higher the result, the poorer the accident record in that sector. Accordingly, the stretches of road with better accident histories are seen to be Standlake and the section from Newbridge to the A420. Conversely the poorest accident records are seen to be from Standlake to Newbridge, a section which based on accidents per kilometre apparently demonstrated a better record than Kingston Bagpuize to Frilford and Marcham.

It should be noted that this evaluation has not been extended to include the junctions as traffic data regarding the total number of vehicles using each junction has not been collated.

Reviewing the specific accident data and investigating the exact locations of the individual accidents shows a number of areas where multiple accidents have taken place. These areas include the junctions with Standlake Road and Barrows Farm Road where 4 accidents have occurred, the junctions with Downs Road in Standlake and Digging Lane outside Kingston Bagpuize where five accidents have occurred and the narrow left hand bend in the centre of Marcham where four accidents have occurred. The causes of the accidents at these locations have been assessed in more detail and, where relevant, referred to later in the corresponding section of the report.

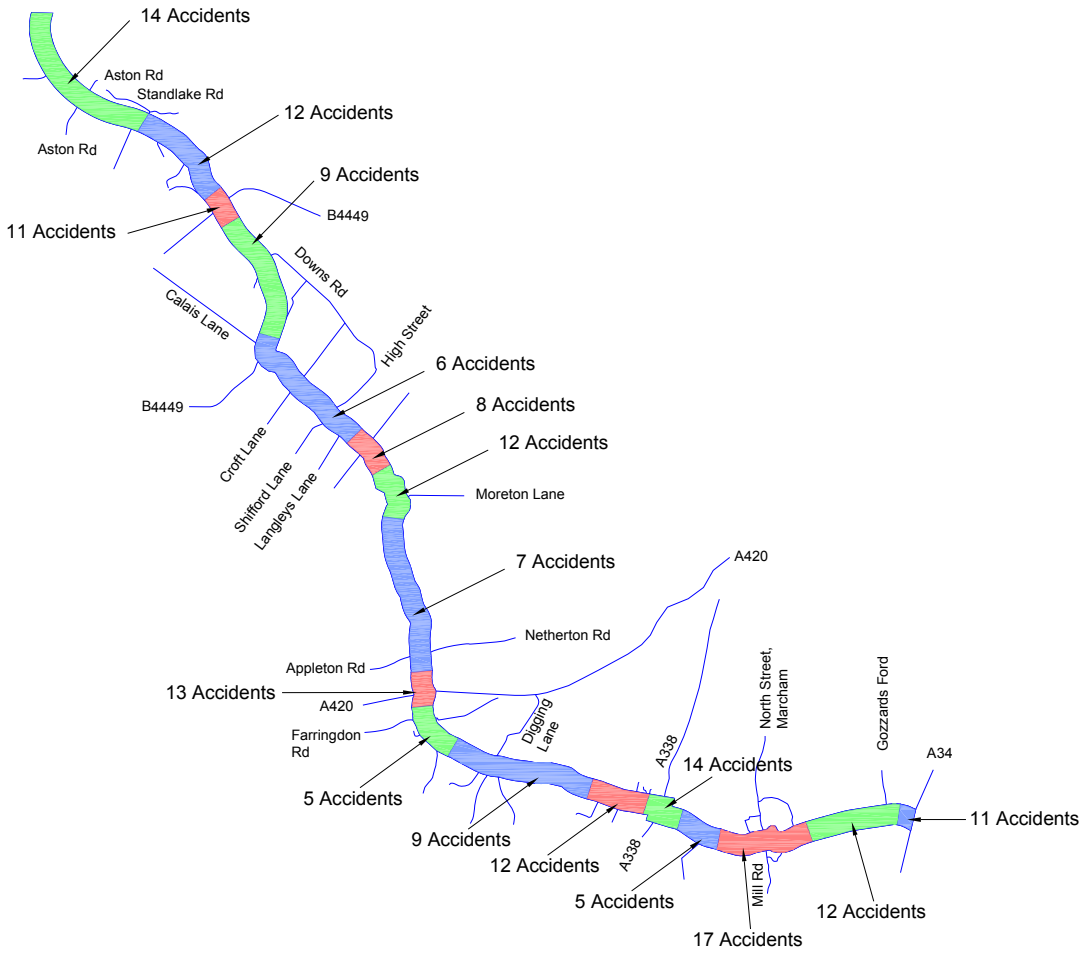


Figure 2: Diagrammatic representation of accident numbers and locations

1.5 Existing River Crossing Options

1.5.1 Impact of Current Restrictions

The current weight limit restricts the use of Newbridge to vehicles under 18 tonnes gross weight. A similar limit has also been put in place on Tadpole Bridge which is the next bridge upstream, on the classified unnumbered road running south from Bampton to the A420. The traffic flow figures available show a reduction in HGVs of 196 vehicles (total 2-way) between a count taken in March 2006, before the weight limit was imposed and one in June 2007. The figure is not split down and includes all vehicles over 1.5 tonnes unladen weight and is for the 12 hour period 7.00 am to 7.00 pm. No detailed traffic studies have been carried out on the impact of these two restrictions however it is likely that local traffic will either use the Bridge at Radcot on the A4095 north of Faringdon or the Toll Bridge at Eynsham. Both these routes make use of A and B roads but these particular roads are generally of a low standard and pass through a number of small villages.

1.5.2 Impact on Network of Re-routing Vehicles and Imposing Further Restrictions

The typical off peak journey time for a vehicle using the A415 between Witney and Abingdon is 32 minutes over a distance of 15 miles. As has been established, the nature of the road is not ideally suited to large vehicles and this is particularly applicable in areas where the line of the

road has not been improved due to the topography, location of residential areas or fixed constraints, such as the bridge at Newbridge.

With the current weight restriction at Newbridge, the number of vehicles affected is relatively low and therefore the impact on the road network is also low. Local traffic from the west and south west going north is likely to use the A4095/B4449 to avoid the A415 at Newbridge and affect the villages along these routes notably Bampton and Aston. The bridge at Radcot on the A4095 north of Faringdon is generally of a low standard and passes through a number of small villages (notably Aston and Bampton), the route is not ideally suited to HGV traffic, due to the twisty nature of the road. This will be the same for the opposite flow. Local traffic from the south and south east going north west and vice versa will generally divert via the Swinford Toll Bridge or A34/A40. For a journey between Abingdon and Witney the diversion via Swinford would not increase the off-peak journey time or distance travelled significantly with estimates of the 18 mile journey taking approximately 36 minutes being considered reasonable. However, the route is again not ideally suited to HGV traffic with the B4044 narrow in places and passing through villages and residential areas. It should be similarly noted that at peak times, demand for the use of the river crossing is high and the nature of the toll collection acts as a significant throttle to traffic.

The other alternative likely to be considered by drivers is the A34 with traffic from Abingdon heading for Witney leaving at the Pear Tree

interchange and using the westbound A40. This is the longest alternative with the distance increasing to 20 miles. The off-peak journey time would also increase to 37 minutes but on a route that is much better suited to HGV traffic. It is noted again that peak time journeys on both of these roads can increase dramatically, particularly if there are problems elsewhere on the network, however this is generally not thought to be disproportionate to any of the increases in journey times anticipated on the other routes at similar times.

Abingdon to Witney						
Route	Distance (miles)	Increase (miles)	Increase (%)	Time (mins)	Increase (mins)	Increase (%)
A415	15	0	0	32	0	0
Swinford A34/A430/B4044	18	3	20%	36	4	12.5%
Pear Tree A34/A40	20	5	33.3%	37	5	15.6%

Table 5: Comparison of journey times on alternative routes

It is noted that the A34/A40 alternative provides a suitable route for HGV traffic between Witney and Abingdon. The imposition of a further weight restriction at Newbridge of say 7.5 tonnes would have an increased impact over the 18 tonne limit by demanding that the heavier vehicles use such an alternative but the reduction, anticipated to be 196 vehicles per day, would not have a major effect on the overall traffic volume and therefore would not contribute significantly to improved traffic movement along the route.

1.5.3 Impact of bridge closure

Closure of the bridge to all traffic would have a major impact on the local road network and a considerable effect on people living in the surrounding villages. It would severely restrict emergency service vehicles and prohibit effective public transport links. It is also likely to have a more widespread affect on the extended road network as commuter traffic from further afield diverts to other routes.

1.6 Proposals Already Under Consideration

Oxfordshire Highways has been commissioned by OCC to investigate the provision of a new River Thames crossing at Newbridge. Subject to satisfactory outcomes at each stage, this work is likely to include:

- Feasibility Study and Stage 1 Report
- Preliminary Design and Public Consultation
- Planning Application and Environmental Assessment
- Section106 (Highways Act) Statutory Instrument Procedures and all approvals associated with the new river bridge
- Detailed Design and Orders (CPO and SRO)
- Procurement
- Construction Supervision
- Safety & Vulnerable User Audits

The work is currently at a relatively early stage with the completion of the A415 Newbridge River Thames Crossing, Environmental Stage 1 Report in May 2007. The programme for the current scheme, subject to satisfactory approvals at each stage, extends until the anticipated completion of construction in 2012.

1.6.1 Bridge Crossing Options Presented in Environmental Stage 1 Report

Six route corridors have been identified in the Stage 1 Report and these are shown on drawing BPN1085/F3010 in Appendix A. The corridors are grouped together in pairs and provide two to the east of the existing bridge and four corridors to the west, two inner corridors and two outer corridors.

The proposals are the same within each corridor, namely the provision of a new river crossing, plus a single carriageway road linking back to the existing road network suitable for use by all classes of vehicles. Consideration is being given to the provision of a single lane, two way layout controlled by traffic signals, as well as a conventional 2 lane layout. Junction strategies have not been developed at this stage though the layout is probably most suited for the provision of roundabouts. Two junctions will be included allowing the existing bridge to be closed to vehicular traffic.

The two inner corridors would retain the traffic signals through the section of the A415 covering Howes and Newbridge Mill bridges which cross the Windrush north of the Thames. These were installed as a measure to reduce accidents and could only be removed if substantial improvements were made in this area including the widening of the bridges. The Four outer corridors bypass this section of the existing road although it would be retained as part of the link back to Newbridge.

1.6.2 Assessment of Bridge Options

The six routes presented in the *A415 Newbridge River Thames Crossing, Environmental Stage 1 Report* were assessed with consideration given to traffic volume, air quality, noise and vibration, geology, archaeology, ecology, landscape, agriculture, drainage and road users. The report ranked each of the corridors according to its impact on each of these criteria (1 being the least impact and 6 being the greatest impact). The cumulative results are abstracted from the report and are shown in Table 6.

Corridor	Impact Rating (out of possible 72)
Red Corridor	53
Red/Purple Corridor	51
Orange Corridor	42
Yellow Corridor	41
Blue Corridor	36
Green Corridor	26

Table 6 Summary of Cumulative Route Corridor Scores

As can be seen, the Green Corridor has been established as the one with the least cumulative environmental effect and also scored highest in individual categories including Traffic, Policies and Plans, Air Quality, Archaeology, Ecology and Landscape. Additionally, a route upstream of the confluence of the River Windrush and the River Thames is preferred by the Environment Agency. The most detrimental impact of the Green Corridor was in terms of Pedestrians and Community Effects where there is a likely impact the Windrush Footpath Network.

Upon review of the Environmental Stage 1 Report, it was recommended that the optimum corridor for further investigation was a revised Green

Corridor, and specific routes within this are now being investigated. No further consideration is being given to the other corridors described.

1.6.3 Anticipated Journey Change

It is anticipated that if a new river crossing is constructed within the revised green corridor, the character of the journey will be changed accordingly. This will be most dramatic with the provision of a two lane bridge, upon which the following assumptions have been made. It is not anticipated that there will be a significant change from the current arrangement if a single lane bridge is constructed.

The revised green corridor promotes a new road construction including a river crossing for a length of approximately 1000m. This is approximately 680m shorter point to point than the existing road layout. Given the shorter physical length and the existing pre-requisite to navigate the existing bends and 2 no. sets of traffic signals with single file shuttle operation, it is anticipated that as well as a more easily navigable route, the proposed corridor would provide a route with shorter duration. Quantifying this is difficult as variables concerning the time of day and the phasing of the lights upon approach needs to be taken into consideration. Empirical assessment of these signals indicated that there were occasions when the lights did not impede progress at all, however it is usual for vehicles to be stopped at both sets of signals.

Table 7 shows times recorded to undertake the journey on the existing road between the terminal points of the green corridor where it is proposed to leave and rejoin the A415. The times were recorded on two occasions between 7.45am and 9.25am. It is noted that after 9.00am the volume of traffic reduces significantly and recorded times of around 145 seconds are consistent with other off-peak journey times.

	Approx time	Journey Time (s)	
		Southbound	Northbound
1	07:45	237	331
2	08:00	222	255
3*	08:10	211	496
4	08:20	213	247
5*	08:25	224	357
6	08:30	259	197
7	08:40	216	164
8*	08:45	86	191
9	08:50	207	154
10*	08:55	176	130
11*	09:05	149	146
12*	09:20	141	142
Average		195	234

** Data recorded on different day*

Table 7 Journey time assessment, Newbridge

The recorded journey times have a significant spread from 86 seconds to 496 seconds. Clearly, both these figures are exceptional and on their own are not indicative of typical journey times.

In order to permit some element of quantification, the following assumptions have been made.

- The existing topography between the terminal points of the revised green corridor permits a mean travel speed of 30mph.
- Although the speed restriction of the new highway incorporating the new river crossing shall be 50mph, consistent with the current road, the mean speed that will be achievable will be 40mph.

The existing route is 1.68km long and based on the first assumption would take 125 seconds to drive. The average measured journey time (northbound and southbound combined) is 215 seconds which implies the associated delay attributed to the traffic signals is 90 seconds. It has been noted that it is usual to be held at both sets of signals, therefore it can be estimated that each set of signals contributes 45 seconds delay to the journey.

			Time Taken (s) *			
	Mean Speed	Distance (m)	Travel	Signals	Junctions	Total
Existing Route	30mph	1680	125	90	0	215*
Proposed Route	40mph	1000	56	0	25	81

** Measured average*

Table 8 Typical journey times based on existing and proposed corridor

As can be seen from Table 8, the anticipated journey time for the proposed route corridor affords a reduction of 134 seconds. Although this uses the assumptions shown, it does correlate with what has been found empirically and therefore the assumptions can be considered as reasonable.

The evaluation does not take into account peak time discrepancies as although there may be a reduction in journey time at this one location, the number of pinch points elsewhere along the route will still contribute to an extended journey time which an alternative route would do little to offset.

2 Environmental Considerations

2.1 Scope of Report

As this report investigates mitigation measures that can be employed strategically at different locations along the A415 route corridor, it has not attempted to undertake an environmental audit of the whole route and does not attempt to make assessments of any restrictions that may be placed on the implementation of any of the proposed measures.

As each of the measures proposed can be considered separately and distinctly, any environmental impact resulting from the proposed work must be assessed individually. Due consideration has been given to the proposed mitigation measures at each location during the feasibility design stage and an assessment made to avoid or minimise any detrimental impact on the environment. This includes consideration of:

- Habitats and natural environments
- Air quality
- Noise pollution
- Light pollution
- Development inconsistent with local character

It is recognised that this is early consideration and has not been exhaustive. A recommendation is made that site specific investigation

should be undertaken for each measure that may be developed further. This may be restricted to a desktop study in most cases however where it is anticipated that additional land may be required or significant changes to existing hedgerows proposed, as in *3.6.*1, a more detailed assessment should be accommodated. This should extend beyond the flora and fauna and heritage value of a particular area into quality of life for people living along the route.

2.2 Quality of Life

2.2.1 Environmental Weight Restrictions

An important element of this report is to assess the measures that can be introduced to minimise any increase in traffic volume along the route of the A415. If a new river crossing is required at Newbridge there may follow a disproportionate increase in traffic as a result of

1. Traffic signals and shuttle working over the two existing river crossings not affecting journey times **if two lane bridge is provided**;
2. Part of the route no longer being subject to a structural weight restriction as Newbridge currently is.

In addition to the traffic growth, there could be an increase in HGVs using the route, back to the original levels, as described in 1.5.2. This

could impact on other parts of the A415 corridor, notably in Marcham and Standlake, the most densely populated locations.

In order to preserve the quality of life of these communities and minimise the inflation of traffic volume, environmental weight restrictions have been considered for implementation along parts of the A415.

2.2.2 Limitations of Environmental Weight Restriction

Environmental weight restrictions assist in preventing large vehicles from using inappropriate roads and can be applied to:

- Reduce danger to pedestrians and other road users
- Prevent damage to buildings, roads and bridges
- Preserve the character, amenity and environment of an area
- Reduce and manage congestion on the roads

It is noted that in order to preserve opportunity for delivery wagons, refuse collections etc, an “except for access” clause should be introduced to the Order imposing the restriction. The Police have limited resources to enforce this type of restriction and restrictions with "except for access" clauses can quickly fall into disrepute and are notoriously difficult to enforce. Enforcement therefore commands a low priority and where possible, physical measures should also be introduced to minimise abuse of the restriction.

2.3 Air Pollution

The mitigation measures proposed attempt to maintain air quality at a neutral level along the A415 corridor though it is recognised that some of the measures under consideration will result in an offset of emissions to other areas.

Traffic signal controlled junctions along the route of the A415 currently attracts queuing traffic at peak times and it is not anticipated that any relief to these junctions will be introduced as a result of any measures considered within this report. However, if a new river crossing at Newbridge goes ahead it will alleviate traffic queues at peak times over the existing Thames and Windrush bridge crossings which currently demand single file shuttle working due to the narrow nature of both structures. If the queue delay could be offset elsewhere, care should be taken to avoid any increase in air pollution associated with queuing traffic at these locations. Where this may be encountered, specific investigation should be undertaken if the proposed measures are to be developed further.

2.4 Noise Pollution

The objective of this report is to establish mitigation measures that can be employed along the route of the A415 to minimise future traffic growth. If traffic growth is minimised this should also minimise the associated increase in traffic noise. The mitigation measures also

attempt to restrict any disproportionate increase in HGV traffic which may increase significantly if there is no longer a structural weight restriction in force at the Thames river crossing at Newbridge. Again, if the measures are implemented to achieve this, the increase in noise associated with the traffic should also be minimised however, care should be taken to ensure that noise levels are not locally increased by offsetting traffic queues to alternative, more sensitive locations.

2.5 Light Pollution

Light pollution is caused by poorly directed light straying into neighbouring property and affecting the right of the property owner to enjoy that property. It can also have an adverse effect on ecology and wildlife.

A number of locations along the route of the A415 remain unlit and this limits the work that can be typically undertaken in these areas. Where a system of street lighting is to be introduced to an area or the existing street lighting is to be amended, care should be taken to avoid or effectively minimise light pollution. In some situations, a minimal approach to street lighting can be adopted providing the current regulations are adhered to. In sensitive areas where traffic calming features have been considered, priority has been given to measures that do not have a pre-requisite for street lighting.

Although not considered by this report, it is recommended that where proposed measures in areas already benefiting from street lighting are put forward for further development, part of that development should be to assess the standard of the current lighting and upgrade where required to minimise the local light pollution. The minimisation of light pollution should be similarly considered at locations where traffic signals are proposed ensuring that light from the signal heads is not unduly intrusive.

The Institute of Lighting Engineers recommend that Local Planning Authorities specify environmental zones for exterior lighting. Most of the areas under discussion within this document would be classified as *Low District Brightness Areas, Category E2,* which comprise rural, small villages or relatively dark urban locations.

3 Mitigation Measures – Two Lane Bridge

For the option of a two lane bridge at Newbridge, an assessment of the A415 was made between its junction with the A40 in Witney and its junction with the A34 in Abingdon, as shown on drawing BPN1085/F3000 in Appendix A. The assessment attempts to establish a series of traffic calming measures that could be implemented, either individually or cumulatively. A common perception is that if a new river crossing is constructed it may attract more traffic onto the A415. Particular concern has been expressed by residents of Standlake and Brighthampton who also anticipate an increase in the volume of HGV traffic along the route. A proposal to improve the A415 between the A34 and A40, including a Standlake Bypass, has now been abandoned as there is little likelihood of attracting funding from Central Government.

Any of the following mitigation measures could be implemented to address the concerns expressed especially by residents of Standlake and Brighthampton. Such measures as the Gateway Features described in the following 3.4.1 and 3.4.2 and the proposed environmental weight restriction along the existing route of the A415 through Standlake would assist in preserving the quality of life throughout the village. It would also assist with improved road safety as the narrow nature of the road in places contributes to its unsuitability as a route for heavy goods vehicles, described in detail in 3.4.6.

For the measures described, the base line for the whole journey time correlates with the date of the inception of the *A415 Newbridge River Thames Crossing, Environmental Stage 1 Report* which pre-dates existing features such as the Yelford Crossroads signalisation. Accordingly the road safety benefits and journey time contribution made by each feature will be considered in this report and shall be used to estimate the change in total journey time in combination with the anticipated decrease associated with a proposed two lane river crossing.

3.1 Ducklington Bypass

The A415 Ducklington bypass was opened in 1975 to the west of Ducklington village and runs from the A40 offslip (SP351084) to Cokethorpe Park (SP367069) as shown on drawing BPN1085/F3003 in Appendix A. The road is currently subject to the national speed limit, equivalent to a design speed of 100kph, and is significantly wider than much of the A415 under consideration. There are four turnings from this section of the A415 two of which connect directly with Ducklington village. These are situated at Aston Road (SP357074) and Gill Mill (SP366070). There are two turnings to the west, an unnamed road to Curbridge (SP353077) and the Aston Road (SP356074).

Due to the nature of the road, it is difficult to prescribe features that will have an effect that will contribute to the desired objective however the following has been considered.

3.1.1 Introduction of a 50mph speed restriction

An extension of the 50mph speed restriction from its current terminal south of Gill Mill to the roundabout A40 slip road roundabout has been considered. It is noted that this would be popular with residents of Ducklington who have previously expressed an interest in seeing this restriction imposed.

It is considered that although there would be benefit in imposing the speed restriction, in the road's current state, such a restriction would be very difficult to enforce. Consequently, it would be unlikely to be supported by Thames Valley Police if it was implemented without additional features.

An assessment has been made of the geometric design features of the junctions which adjoin the Ducklington bypass and comparison made with the standards prescribed in the Design Manual for Roads and Bridges (DMRB) TD42/95 *Geometric Design of Major/Minor Priority Junctions*. It has been noted that although the length of the nearside diverging taper from the main carriageway of the A415 to Aston Road,

Ducklington, which exceeds 100m, conforms to standard for the design speed as shown in Table 9.

Design speed (kph)	Up Gradient		Down Gradient	
	0 – 4%	Above 4 %	0 – 4%	Above 4%
85	55	40	55	55
100	80	55	80	80

Table 9 Extract from TD 42/95 Table 7/5a:
Deceleration Length (m) for Ghost Island and Single Dualling

The turning into Aston Road has an approximate radius of 25m and therefore falls below the prescribed standard, minimum radius of 40m, shown in Table 10.

Main road design speed	Up to 85kph	Above 85kph
Radius (m)	≥ 20	≥ 40

Table 10 Recommended Corner Radius (TD42/95, paragraph 7.54)

As can be seen on drawing BPN1085/F3250 in Appendix A, realignment of the road geometry at this junction would be very difficult due to the close proximity of private dwellings and the entry into Feilden Close which restrict the available area in which to increase the turning radius. This type of improvement would demonstrate a road safety improvement however would be expensive to construct and difficult to reconcile with the community. A reduction in traffic speeds would assist

left turning vehicles, contribute to improved safety and address the implications of increased traffic.

The existing carriageway geometry is of an acceptable standard with the width significantly exceeding 7.3m along its length. If a lower speed restriction is applied, there is scope to apply a central hatched area, effectively reducing the carriageway width. This measure could be applied in combination with the above speed restriction and would increase the visual conspicuity of the speed restriction though it is not anticipated that it would assist with the self enforcement of it.

3.2 Cokethorpe Park

This section of the A415 runs from the existing speed limit terminal situated to the south of its junction with Standlake Road southwards to its junction with the B4449 at Hardwick as shown on drawing BPN1085/F3004 in Appendix A.

The carriageway is relatively narrow and, for the majority of its length, is surrounded on both sides by trees and hedgerows giving the visual impression of a narrow enclosed space. The road is currently subject to a 50mph speed limit which site observations indicate is adhered to by the majority of vehicles. There are a number of access roads to properties set back from the carriageway along this section of the A415 with the most significant of these leading to Cokethorpe School. A

number of measures already exist within this section that conform to the stated aims of reducing traffic speeds, making the road safer, along this section of the A415. These include a number of conventional and vehicle actuated (VAS) traffic signs and road markings. These have been individually assessed with a view to combining the signs where appropriate to (i) reinforce their message and (ii) comply with OCC's policy on decluttering with the findings shown in 3.2.2 and 3.2.3.

3.2.1 Cokethorpe Bends and Plantations

It is noted that Ducklington Parish Council have expressed their concerns about the accident record at this site (see Table 2). They have suggested that the change from a high speed, higher standard road (Ducklington Bypass) to the older road following its original layout at Cokethorpe Park combines with the effect of the trees in the Fishhouse and Gravelpit Plantations to make driving conditions more difficult.

Solutions suggested by the Parish Council to overcome this problem include straightening the bends or removing trees adjacent to the carriageway. Although there are road safety implications for further investigation into either of these solutions, it is not considered that either would contribute a quantifiable benefit to this study. Furthermore, examination of the accident reports at this location does not suggest that the trees create a problem on this road with most recorded

accidents being caused by a loss of control of the vehicle. This may be consistent with worn surfacing demonstrating a poor skid resistance and it is recommended that further investigations are undertaken in this location.

Having proposed a speed reduction for the Ducklington bypass section of the route, 3.1.1, it is suggested that this could be further complemented by subjecting the 1630m length of carriageway currently subject to a restriction of 50mph between Gill Mill (terminal) and the junction with the B4449 at Hardwick (Yelford Crossroads) to a further reduction in the speed limit. By reducing the limit to 40mph there would be no need to consider the straightening of the bends or removal of trees. Furthermore, the reduced speeds would benefit traffic entering and leaving Cokethorpe School grounds, reduce the risk of minor accidents with traffic queuing at the signals at the junction with the B4449 at Hardwick at peak times and the small number of pedestrian users going to or from Ducklington village.

The central hatching (proposed in 3.1.1) should be continued into this section of the carriageway, tying in with an existing length of central hatching currently located between the Gravelpit Plantation and the main vehicular entrance to Cokethorpe School. These areas of central hatching could be used in conjunction with a carriageway surface treatment such a *Rumblewave* surfacing and speed roundels to reinforce the speed restriction. The tighter bends in the vicinity of

Cokethorpe School currently benefit from chevron boards in the verge, however these can be complemented further with reflective verge marker posts and good edge markings which would assist with identifying the alignment of the road during periods of darkness and provide a vertical boundary adjacent to the carriageway during daylight hours.

It has been observed that there are a large number of traffic signs already erected in this area and it is speculated that a number of these have been erected in response to the perceived hazards along the route. In accordance with Oxfordshire Highways' decluttering policy an assessment has been undertaken to establish whether there is evidence of superfluous signs (signs that are repeated unnecessarily) or signs that can be combined onto a single post and or backing board. This will make it safer for drivers by allowing them to better concentrate on driving.

The proposed reduction in the speed limit will also benefit this exercise as the standard height of traffic signs and associated x-height of lettering can be reduced in most situations.

3.2.2 Traffic Signs and Road Markings, Southbound

The southbound A415 through Cokethorpe Park commences at the speed limit terminal at the end of the Ducklington Bypass. A notable

feature of this section is the large number of warning signs erected to assist in alerting drivers to the hazards identified along this stretch of road. Most of the traffic signs are mounted on individual posts which leads to sign clutter and a greater number of roadside hazards. Attempts have been made to reduce the number of posts by mounting multiple signs on the same post. One instance of this has been noted on the speed limit terminal signs where a warning sign mounted on a yellow back board to Traffic Signs Regulations and General Directions (TSRGD) diagram no. 506.1 (side road ahead) has been mounted with the speed restriction sign. Although this goes against the recommendations made in Chapter 4 of the Traffic Signs Manual, it is not known whether specific dispensation has been agreed to permit this arrangement. Immediately inside the speed limit boundary there is a Vehicle Actuated Sign (VAS), a warning sign to TSRGD diagram no. 516 (road narrows on both sides ahead) and a warning sign to TSRGD diagram no. 545 (children going to or from school or playground ahead) with a yellow backing all mounted on individual posts. It is recommended that the function and location of these signs is reviewed and that they are relocated as required to maximise their effectiveness while minimising the number of roadside features and adhering where practicable to published guidance.

Further along the route on the approach to the junction with the southern access road to the school the centre line has been removed and replaced with a hatched area approximately 0.75m wide. This

feature is reinforced in the vicinity of the junction through the installation of a VAS and warning signs to TSRGD diagram nos. 506.1 (side road ahead), 545 (children going to or from school or playground ahead) and 546 (supplemental plate “School”) mounted on both sides of the carriageway on yellow backing. The word SLOW and a version of warning sign to TSRGD diagram no. 545 have also been applied to the road surface on a red coloured resin based surface treatment. As the use of this diagram is a departure from the standard, a check should be undertaken to ensure that approval from the Government Office for the South East has been issued for its use in this location.

Having passed the entrance to the school the road encounters a right and then a left hand bend. To offer advanced warning of these bends each one is signed using TSRGD diagram no. 512 (bend ahead) on yellow backing and the word SLOW is printed on a red coloured resin based surface treatment on the carriageway. The bends themselves are signed using deviation of route signs, TSRGD diagram no. 515 (sharp deviation of route), mounted on yellow backing. Signs to TSRGD diagram nos. 584 (traffic queues likely on road ahead) and 584.1 (supplemental plate “Queues likely”) are also located on the approach to the second, left hand, bend to warn of queues caused by the traffic signals situated ahead.

The existing road markings consist of warning lines to TSRGD diagram number 1004.1 and hatched areas to diagram number 1040.2

complemented by edge of carriageway markings. It is recommended that the warning lines be reviewed to include markings to TSRGD diagram number 1013.1 at strategic locations to restrict overtaking manoeuvres.

3.2.3 Traffic Signs and Road Markings, Northbound

The measures used to encourage the reduction of vehicle speeds travelling northbound along this section of the A415 are very similar to those previously described for southbound traffic. The series of bends at the south of the section are signed using TSRGD diagram nos. 512 (bend ahead) and 515 (sharp deviation of route) mounted on yellow backings. The approach to the southern entrance of Cokethorpe School is highlighted through the use of signs to TSRGD diagram nos. 545 (children going to or from school or playground ahead) and 546 (supplementary plate “School”) mounted together on a yellow backing and positioned on both sides of the carriageway. These signs are reinforced through the positioning of the word SLOW and TSRGD diagram no. 545 (children going to or from school or playground ahead) on a red coloured resin based surface treatment on the carriageway. A VAS is placed just to the south of the entrance to alert drivers who are travelling at too high a speed. The approach to the northern entrance of the school includes a second VAS to encourage drivers to reduce their speed.

A full review of the traffic signs and road markings is therefore recommended to make it easier for drivers to know what is ahead.

3.3 Yelford Crossroads

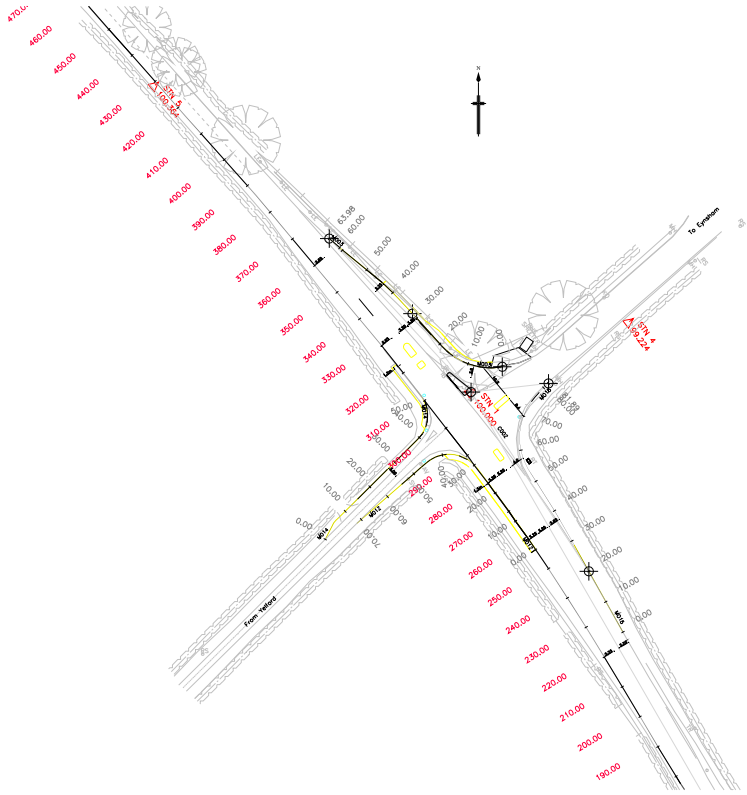
Yelford Crossroads is the junction of the A415 with the B4449 at Hardwick with the minor roads leading from the A415 to Yelford and Stanton Harcourt and is shown on drawing BPN1085/F3004.

Historically intervisibility at the junction has been poor and this led to a number of motor vehicle incidents occurring at this junction, previously subject to only Give Way priorities.

Accident records obtained from Oxfordshire County Council show that in the period from April 2002 to March 2007 there were 11 accidents at this junction with 17 casualties (6 KSI).

Following a commission received from OCC, work commenced to provide traffic signal control and revisions to the junction alignment in October 2004, culminating with the signals being commissioned in January 2005. The layout of the signalised junction is shown in Sketch 1, taken from a project drawing prepared by Jacobs UK Ltd and can be seen in Photo 2.

Since commissioning, there have been 3 accidents with 5 casualties (2 KSI).



Sketch 1 Extract of Jacobs project drawing 000/9087/100/1A, February 2004

Photo 2 "Yelford Crossroads"
A415 junction with B4449, Hardwick, looking south east

In consideration of the work at this junction it is noted that the junction improvement work and signalisation predates the commencement of the A415 Newbridge River Thames Crossing, Environmental Stage 1 Report and accordingly has not been considered within this work. However, for this report it has been considered that the results of the improvements derived from the recent signalisation of this junction can be included within this study and may be used to offset the concerns associated with the preferred corridor option of the new river crossing.

The existing speed restriction along this section of the route is 50mph (although this could be subject to review, see section 3.2). and there is little scope to unintentionally exceed this due to the narrow and twisty nature of the road from the turning to Ducklington and Gill Mill. Beyond the traffic signals, as the road continues south east towards Standlake and Brighthampton the road becomes wider and much straighter and it is here that traffic speeds are more likely to exceed the restriction.

The signals controlling the junction are working well within the capacity of the junction and it has been observed that there is little queuing, even during peak periods.

In terms of addressing this report's objectives, this feature contributes to a general road safety improvement as it assists with the regulation of traffic speed on the approach to the junction with the B4449 at Hardwick. It provides a throttle at this point and succeeds in restraining

vehicle speeds until beyond the junction, thus improving the safety of the road.

3.4 Standlake and Brighthampton

The section comprising Standlake and Brighthampton extends from the junction of the A415 with Downs Road (SP383050) through to the location of the 30mph speed restriction terminal at the southern end of Standlake (SP394026). A location plan, BPN1085/F3005, can be found in Appendix A.

3.4.1 Southbound Gateway Features

The village of Standlake currently benefits from the presence of gateway features at both the north and south entries to the village on the A415.

Photo 3 Southbound entry to Standlake showing gateway treatment

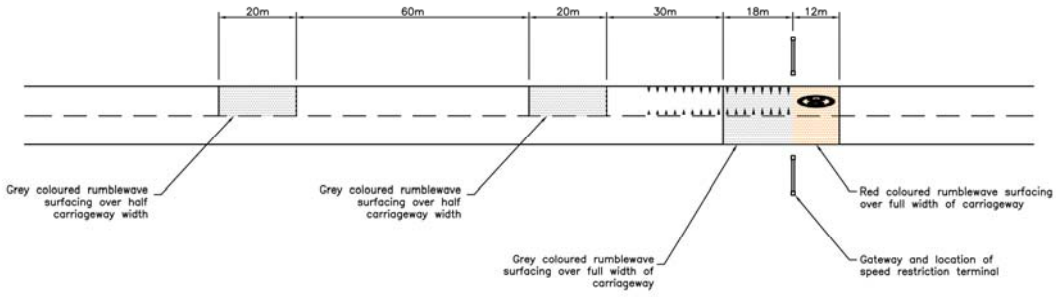
The existing southbound gateway, Photo 3, consists of white painted timber field gates, 900mm wide, located in the highway verge on each side of the road with a traffic sign plate to TSRGD Diagram No. 2402.1 (name of a town or village commencing immediately ahead) bearing the legend *Standlake, please drive carefully*. The gateway is also the terminal for the change in speed restriction from 50mph out of the village to 30mph through the village. This is reinforced with the use of red coloured resin based surface treatment and a “30” roundel.

It has been observed while on site that the speed restriction on the southbound entry to the village is poorly observed with motorists failing to reduce speed until they have arrived at the left bend at Brighthampton. The effectiveness of the gateway feature must therefore be questioned. The arrangement of the junction attempts to provide a right turn lane for southbound traffic continuing through Brighthampton to Aston, however this is of a poor standard.

Modification of the junction and its alignment is considered elsewhere in this section but it is proposed that the existing gateway feature be moved up to 200m further out of the village and constructed in combination with a relocation of the speed restriction terminal to assist in the reduction of traffic speeds prior to arrival in the residential area. This is shown on drawing BPN1085/F3200 in Appendix A. The gateway should be further complemented with features to assist in the self-enforcement of the speed restriction. These should include the use

of road markings, such as countdown bars or dragons' teeth, on the approach to the gateway and patches of rumblewave surfacing. This type of surfacing, developed in association with TRL Ltd, alerts drivers to reduce vehicle speeds by increasing the level of noise and vibration within the vehicle passing over it without significantly increasing noise levels outside the vehicle.

A typical arrangement of the gateway and associated approach is shown in Sketch 2. The gateway comprises of a 30m wide patch of rumblewave surfacing in two colours across the full width of the carriageway. The immediate approach to the actual gateway location should be laid in a neutral colour in an 18m long patch. Immediately beyond the gateway the rumblewave surfacing should be laid in a red colour and should extend for 12m.



Sketch 2 Plan of Proposed Standlake (A415 Southbound) Gateway Arrangement

Dragons' teeth road markings should be laid in 17 no. pairs on the approach to the gateway and a roundel indicating the speed limit of

30mph should be laid within the red surfacing on the entry side of the carriageway.

Two patches of neutral coloured rumblewave surfacing, extending for 20m, should be laid across the carriageway half width on the approach to the gateway at distances of 68m and 148m from the gateway itself. It is recommended that these be neutral coloured to deter drivers from driving around the surfacing. Warning surfaces extending across the full width of the road would be preferred though it is thought that these would be unpopular in an area where the speed restriction is currently 50mph.

It is accepted that for gateways to be effective a combination of features is required. Among the most important of these are the vertical elements of the gateway and this gives scope for local stakeholders to become involved. As described earlier, in addition to the village name sign and the speed restriction terminal signs, the current arrangement includes a painted timber field gate. These are quite common around the County and it is believed that driver familiarity may detract from their effectiveness. Alternatives, used elsewhere, include bespoke ornamental planters constructed in timber, brick or stone and it is considered that an option of this nature could accommodate some community involvement and assist in decluttering street furniture.

Traffic calming principles state that any feature should be self regulating and it is considered that additional measures will be required to encourage drivers to maintain their reduced speed through the village after passing through the gateway feature and for this reason it is proposed to include a 30mph VAS warning on the southbound approach to Brighthampton at the sharp left bend.

If the proposed gateway feature and corresponding speed restriction terminal were relocated 150m north of its current location the net increase in time would be 4.5 seconds over this length. It has been observed that the existing gateway is inadequate in encouraging drivers to reduce their speed at the commencement of the restriction and it is thus assumed that effective and self enforcing means would reduce traffic speeds by 20mph over a 300m length, effectively increasing the travelling time by 9 seconds. The associated construction cost of relocating the gateway to the standard described (including the provision of the VAS warning sign) would be approximately £14,700. This excludes associated costs incurred in the preparation of the revised Traffic Regulation Order.

3.4.2 Northbound Gateway Features

Photo 4 Northbound entry to Standlake showing gateway treatment

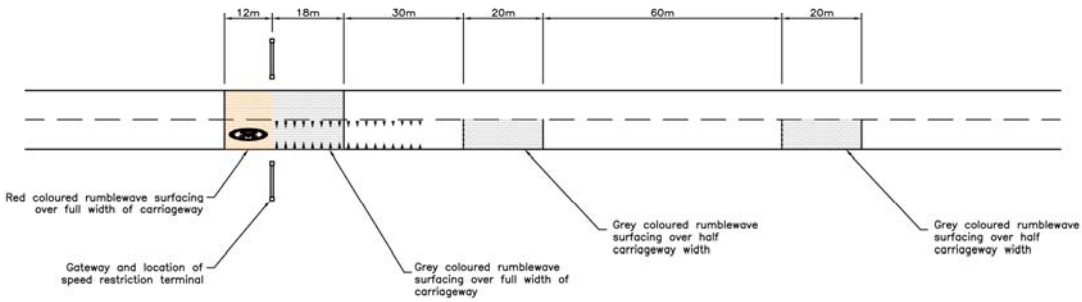
Photo 5 Southbound exit from Standlake showing gateway treatment

The arrangement of the gateway feature on the northbound entry to the village, Photo 4, is similar to that on the southbound entry previously described and consists of white painted timber field gates, 900mm wide, located in the highway verge on each side of the road with a traffic sign plate to TSRGD Diagram No. 2402.1 (name of a town or village commencing immediately ahead) bearing the legend *Standlake, please drive carefully*. This gateway is also the terminal for the change in speed restriction from 50mph out of the village to 30mph within the village and is reinforced with the use of red coloured resin based surface treatment and a “30” roundel.

It has been observed that traffic speeds reduce within the village after vehicles have passed through the gateway feature. It is not unusual for the speed of northbound traffic to be greater than 10mph above the speed restriction so the conclusion can be drawn that the current gateway arrangement does not adequately deter higher vehicle speeds.

An arrangement similar to that proposed for the southbound entry to the village would consist of 2 no. separate patches of grey rumblewave surfacing across the half width of the carriageway in advance of the gateway and 1 no. full width patch of grey and red rumblewave surfacing at the gateway itself. This is shown on drawing BPN1085/F3201 in Appendix A. Vertical features, to correspond with those selected on the southbound approach should also be integrated, though it should be noted that the verge width at this location is narrower and any feature selected would have to be suitable for use in both locations.

In order to assist with the control of vehicle speeds through the village, a VAS warning sign could be located, subject to agreement of location, to alert speeding drivers to the speed restriction in force. This could also be combined with local narrowing through the main drag of the village (see 3.4.4).



Sketch 3 Schematic of Proposed Standlake (A415 Northbound) Gateway Arrangement

Details of the arrangement shown in Sketch 3 can be found in 3.4.1, however in this instance it is recommended that the existing location of the gateway is maintained together with the associated location of the speed restriction terminals. This is because it is considered that establishing a feature that ensures the speed restriction is self enforcing further out of the village would be very difficult to accomplish, would be perceived by drivers as being of no benefit and would prejudice the effectiveness of other features within the village.

Assessing the effectiveness of this feature is difficult in the absence of traffic speed data through the village and this is augmented by the requirement to use assumptive evaluations of the effectiveness of the proposed gateway feature and VAS warning sign.

Although no specific data has been collected, observation has shown that traffic reduces speed slowly after passing through the 30mph terminal. Adopting the assumption that traffic currently reduces speed to 40mph through the terminal location and maintains this for approximately 350m until it reaches the main residential area at the junction with High Street, it can be shown that if the proposed features successfully reduce traffic speeds to 30mph on entry and maintain these as far the main residential area, the associated journey time will increase by 6.5 seconds. The cost of providing this feature, including a

solar powered VAS warning sign, is estimated at approximately £12,700.

3.4.3 Junction Modification at Brighthampton Turn

Traffic entering the village of Standlake on the A415 from the north has to pass the junction with the B4449 at Brighthampton, shown in Photo 6. The A415 continues around a tight left bend with the minor road extending in a southbound direction.

Photo 6 Aerial View of A415 at Brighthampton

The current arrangement of this junction, Photo 7, falls below current design standards with inadequate provision for southbound traffic to join the B4449.

Photo 7 Brighthampton, Junction of A415 and B4449 (looking north)

The area of the junction is wide and open with extensive verge width on the east side outside 1 Abingdon Road. The existing arrangement provides for a 2.5m wide right turn lane for vehicles to join the B4449 separated from the northbound traffic by ghost island hatching around the bend of the A415. Traffic joining the A415 from the B4449 benefits from the provision of a large splitter island within the junction that separates the Witney bound traffic from that travelling to Kingston Bagpuize and Abingdon.

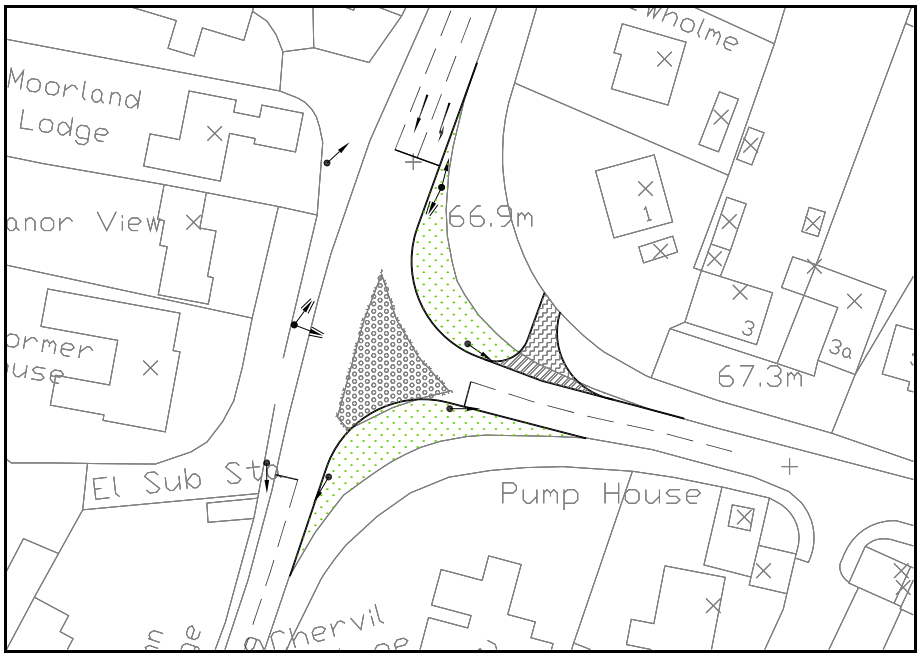
It is considered that the wide and open nature of the junction could offer a false sense of reassurance to drivers unfamiliar with the layout of the road and accordingly encourage them to exceed the speed limit. Given the tight nature of the bend and the limited provision for storage in the junction for vehicles turning onto the B4449, this may present a conflict.

Two measures have been considered that address the issues described above.

The first proposes a minor realignment of the junction to facilitate a more conventional arrangement and that the junction itself should be signalised to regulate the flow of traffic and minimise the potential for conflict between traffic joining the B4449 and that on the A415.

The second attempts to achieve the same by means of a roundabout. This would demand that a greater amount of construction work with further realignment of the junction to achieve the required deflection on each of the approaches. Although it is anticipated that both measures can be constructed within the existing highway boundary, it should be noted that maintenance of access to residential property is a problem with both.

Traffic Signals



Sketch 4 Proposed traffic signals installation at A415/B4449 Brighthampton

The works as shown in Sketch 4 would consist of site clearance to remove the existing central island and granite sett kerbs, earthworks in preparation of the new junction area, kerb works to form the junction, the relocation of surface water drainage facilities, surfacing in reinstatement to the area that was formerly splitter island, the creation of wider verges through perforation of existing carriageway and topsoiling as necessary, the provision of traffic signs and road markings and the installation of the traffic signals equipment over the three limbs of the junction.

It is noted that the proximity of residential access within the junction adds difficulty to this arrangement however the phasing of the signals should permit this to be incorporated. There is an existing residential

care home in close proximity to the junction and as part of the investigation into the provision of traffic signals, a pedestrian crossing element has been considered.

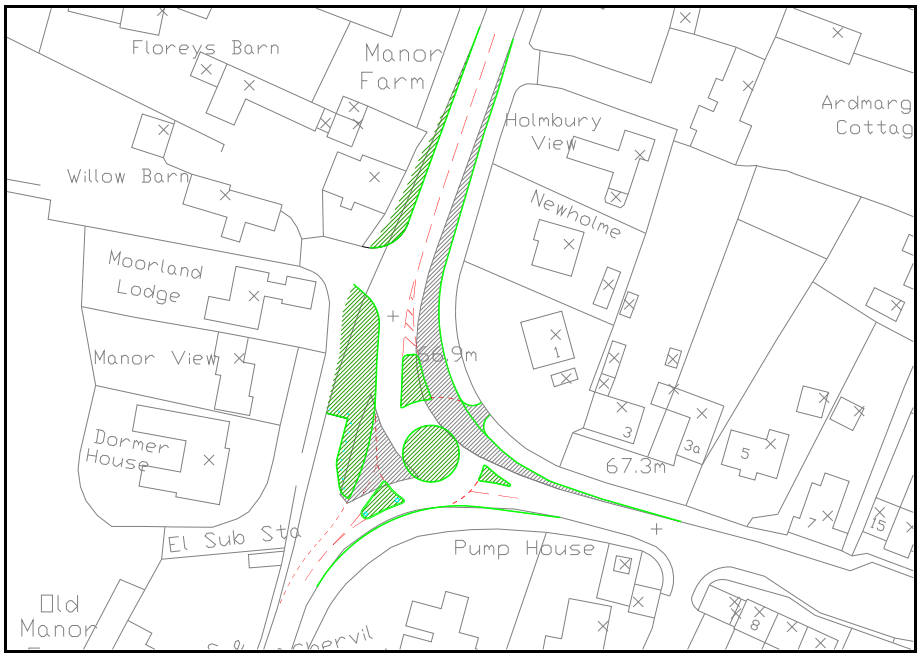
The nature of traffic signals is such that vehicles on specified limbs are held in favour of conflicting movements from other limbs. This inevitably results in queuing traffic which, given the proportionate volume of traffic, would be more severe than elsewhere on the A415. At peak times, depending on the phasing of the signals, there is a likelihood that traffic would queue in both directions along the A415 resulting in an increase in noise nuisance, a potential decrease in air quality and inconvenience for residents in the immediate vicinity of the proposed signals and the area likely to be affected by queuing traffic.

Inspection of the returns received from the Statutory Undertakers have shown the proximity of foul sewers, water mains, LV and HV electricity and BT apparatus in the proposed work area. No further correspondence has been entered into with the relevant parties at this stage and consequently no allowance for diversion or protection work has been incorporated into the construction cost estimates shown in Section 4, though it is anticipated that some plant will be affected and will require protection or diversion.

Roundabout

An alternative to the use of traffic signals at the junction of the A415 with the B4449 at Brighthampton is to construct a roundabout that will assume traffic control from all limbs on demand. This is shown on drawing BPN1085/F3252 in Appendix A.

It has been found that, like the traffic signals, the roundabout can be constructed within the existing highway boundary, however will demand a greater realignment of the existing junction as shown in Sketch 5.



Sketch 5 Diagram showing proposal for roundabout at junction of B4449 and A415

The realignment of the junction to accommodate a 12m diameter roundabout would necessitate that the southbound carriageway of the A415 be deflected into the existing verge area on the east side with the western verge being widened accordingly. The northbound approach of

the B4449 would also be significantly changed to achieve an appropriate deflection however part of the existing carriageways should be retained to act as a service slip permitting access to the properties on the west side of the junction.

In addition to the provision of the roundabout and the changes to the junction alignment the roundabout would also demand the introduction of street lighting at least in the immediate vicinity of the feature. It is known that residents of Standlake and Brighthampton are specifically opposed to the introduction of street lighting and this should be taken into account when considering the furtherment of this option as it could be considered detrimental to the quality of life of the residents of the village, which contradicts the purpose of this report. Whereas a roundabout offers the inherent benefits of minimising the potential volume of queuing traffic when compared to the traffic signals option, it is considered that any street lighting would be perceived to be as great a nuisance.

The roundabout is also a more expensive option than the traffic signals and would take longer to construct, thus affecting through traffic for a longer period of time. It is considered that in this case, traffic would look for an alternative route that is likely to comprise of Downs Road, The Downs, Church End and Rack End to rejoin the A415 east of Standlake. This report therefore recommends that should either of the junction realignment work be undertaken that the supplementary traffic

calming option is completed (see 3.4.5) prior to the commencement of construction. The proposals for the traffic calming should be consulted on prior to implementation as proposed features would also demand that street lighting be employed.

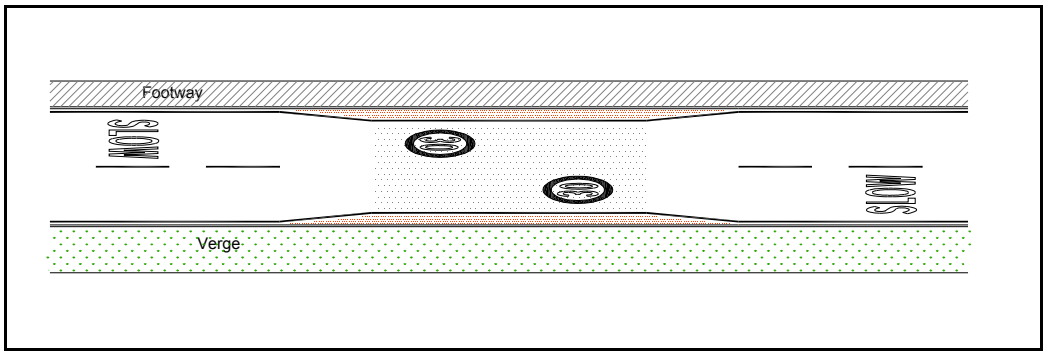
3.4.4 Standlake Village Traffic Calming, Abingdon Road Narrowing

The A415, as it passes through Standlake, becomes a residential road with housing on both sides from Lane End to High Street. Residential dwellings exist on the south west side of the road (north of Lane End) and on the north east side of the road south of High Street.

The existing road widths were measured and have been found to range from 5.1m to 6.4m with a mean width of 5.9m. There is little or no scope for further physical carriageway width restriction and given that the existing kerbs and footways are in good condition there would be little advantage in undertaking work in this area.

The area does not currently benefit from a system of street lighting and it proposed that additional road markings, edge of carriageway markings to TSRGD Diagram No. 1012.1, be laid to improve the visual conspicuity of the carriageway. This will also serve to reduce the apparent width of the carriageway which will contribute towards maintaining traffic speeds within the 30mph restriction indicated.

Due to the varying width of the existing carriageway and the already restricted width, it is not possible to provide effective central carriageway markings along its length to further restrict width and control or reduce traffic speeds. Instead, local carriageway narrowings have been considered comprising of constraining edge of carriageway markings to a further reduced carriageway width, contrasting patches of high friction surfacing at edge of carriageway and in patches across full width of the carriageway, speed roundels and “SLOW” road markings on both sides, as shown in Sketch 6.



Sketch 6 Diagram of proposed A415 Abingdon Road, Standlake narrowing

As there are no 85 percentile traffic speed records for this road any contribution to speed reduction and road safety improvement can not be assessed. As a mitigation measure to improve road safety and offset a decrease in the journey time associated with a new river crossing it is anticipated only to have a minimal effect. However, it is assumed that the effect of a series of these arrangements as shown on drawing BPN1085/F3254 would further discourage drivers from exceeding the speed limit through the village and would complement

the gateway features described in 3.4.1 and 3.4.2. Furthermore, the series of narrowings in a contrasting material may further encourage drivers to reduce their speeds, especially in the presence of oncoming traffic. Repeated instances of this, as during busy periods, would contribute to an overall reduction in speed and should assist in the limitation of peak speed attained through the village and reduce associated traffic noise.

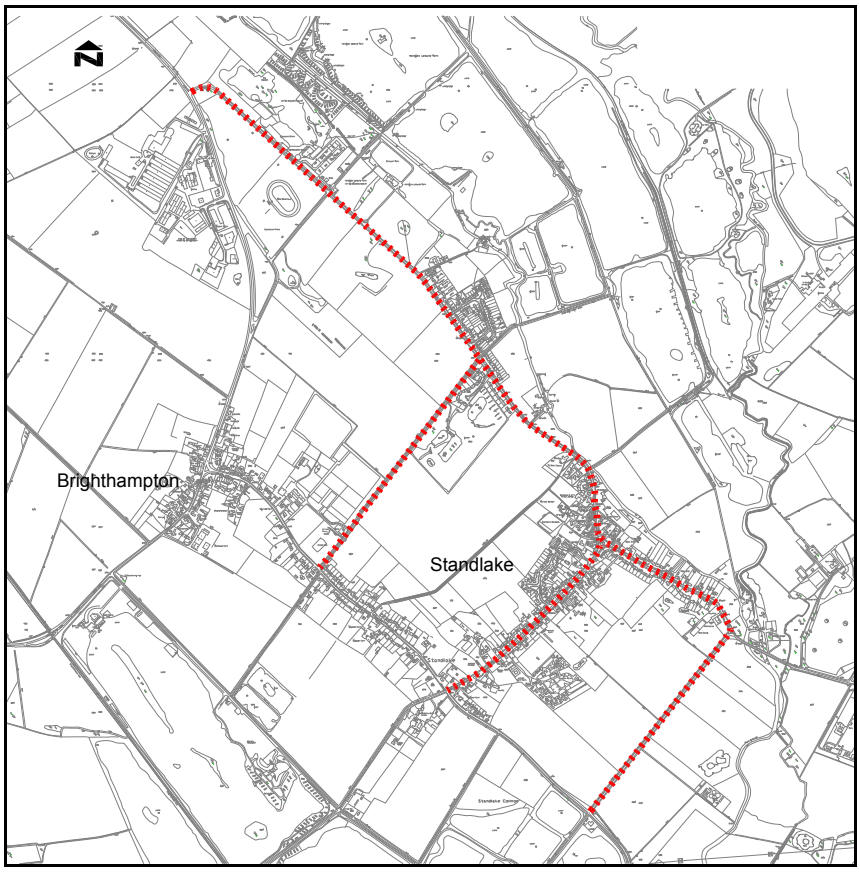
3.4.5 The Downs Traffic Calming (Rat Run Deterrent)

It has been noted that if measures are introduced at strategic locations within Standlake and Brighthampton, drivers may be inclined to seek an alternative route to bypass the features constructed. It will be important therefore to provide an effective deterrent to be implemented in conjunction with other measures, such as the junction realignment cited in 3.4.3.

The route that has been identified as being attractive to drivers wishing to avoid sections of the A415 in Standlake is shown in Sketch 7.

The speed restriction coincides with a small gateway feature consisting of 900mm wide white painted timber wicket gates mounted in the verge on each side of the carriageway. On the nearside gate only is mounted a sign to Traffic Signs Regulations and General Directions Diagram No. 2402.1 bearing the legend *Standlake, Please drive slowly*. The feature is also complemented with a patch of red surfacing at the

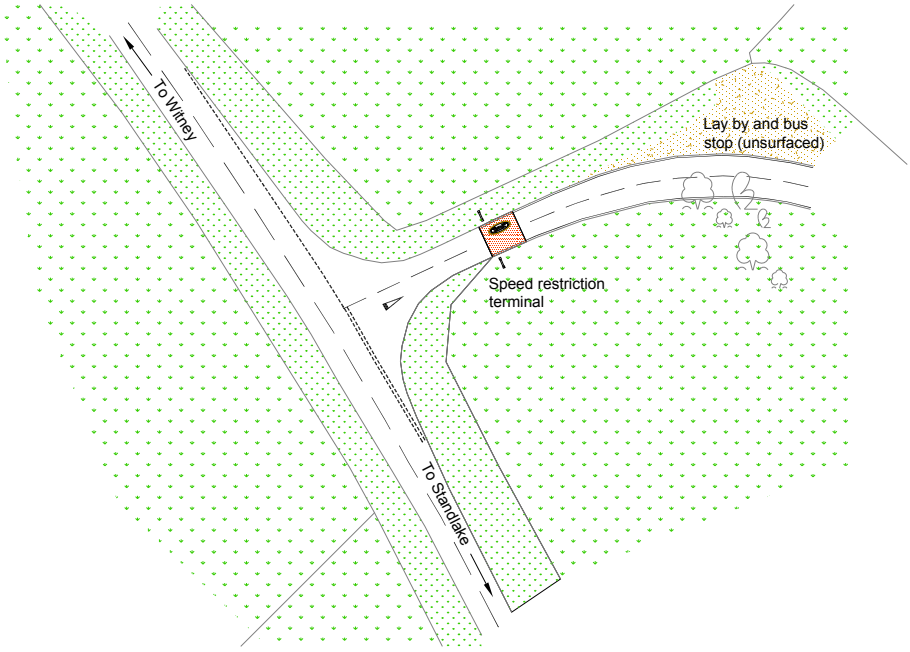
commencement of the speed restriction and a 30mph roundel marked on the carriageway within the surface treatment patch. The approach to the gateway feature is straight with good forward visibility and a longfall gradient of approximately 1 in 60.



Sketch 7 Alternative route through Standlake identified to avoid junction with B4449

Beyond the speed restriction, The Downs becomes a residential road with houses situated on the north east side of the road and agricultural land on the south west side. The longfall gradient reduces to approximately 1 in 100 and although the road is not wide, its straight nature and reasonable forward visibility can promote speeds in excess of the stated limit.

As shown in Sketch 8, it is proposed that the 30mph speed restriction terminal should be relocated at the junction with the A415 and that this should be complemented with minor realignment of the junction and a raft of traffic calming measures to self enforce the speed restriction along its length as shown on drawing BPN1085/F3203 in Appendix A.



Sketch 8 Proposed Abingdon Road/Downs Road junction with new gateway feature

A new gateway feature is proposed for the commencement of the 30mph speed restriction at the junction of Downs Road and the A415 Abingdon Road. It is anticipated that vehicles, having just negotiated the turn off the A415, will demonstrate lower speeds on the approach to the gateway and terminal of the speed restriction than on the approach to the A415 gateways. The arrangement described in 3.3.1 and 3.3.2 with the rumblewave surfacing and dragon's teeth road markings would

be unsuitable in this instance, however the use of the speed roundel, use of the coloured surfacing and the vertical elements as agreed with the Parish Council would be utilised to maintain consistency throughout the village.

As can be seen on drawing BPN1085/F3203 in Appendix A, a link between The Downs and the A415 exists which egresses by the cricket field however it is not considered that this would be attractive for drivers looking for an alternative, quicker route. Therefore no traffic calming measures are proposed for this unnamed road.

As The Downs continues beyond St Giles' Church, the density of housing increases and it is proposed that this area should become a 20mph zone, as shown on drawing BPN1085/F3206 in Appendix A. Commencement of the zone should be denoted by the introduction of a gateway feature in a different style to those used elsewhere in the village. The 20mph zone should extend from Church Farm Court beyond the junction with High Street into Rack End as far as the existing 30mph terminal sign. It should also encompass a length of High Street extending as far as Standlake Manor and Manor Crescent, thus including within it the local primary school, a residential care home and a children's play area situated at the village hall.

Traffic calming measures should be employed to self enforce the 20mph restriction. As Regulations direct that no vehicle should be

further than 50m away from a traffic calming feature within a 20mph zone, the features will need to be designed with particular sensitivity for the area in question.

The measures described are to be implemented in conjunction with other proposals such as the signalisation of the junction at Brighthampton. For the measures to be an effective deterrent to drivers looking to bypass the signals or roundabout, the additional journey time would have to exceed the additional time that traffic was held at the signals.

The time taken to travel along the A415 route through Standlake and the alternative route via Downs Road was assessed using the existing speed restrictions. These were then compared to the same routes subject to the proposed changes to the speed restrictions. The findings are summarised in Table 11.

Route	Current Speed Restrictions		Proposed Speed Restrictions		Increase (s)
	Time Taken (s)	Diff (s)	Time Taken (s)	Diff (s)	
A415 Abingdon Road	**208**	**0**	**208**	**0**	**0**
The Downs High Street	244	+36	303	+95	+59
The Downs Rack End	219	+11	296	+88	+77

Table 11 Comparison of time taken to travel A415 through Standlake and alternative routes at existing and proposed speed limits

From the table it can be seen that the time taken to travel through Standlake on the A415, from its junction with Downs Road to the egress of the unnamed road on the east side of the village, is 208 seconds. When the alternative route via Downs Roads is used, the time taken is 244 seconds if egressing via High Street or 219 seconds if continuing via Rack End. Therefore the Downs Road/Rack End route in its current form only adds 11 seconds to a typical journey. It is considered that this would become the preferred route for traffic looking to bypass any feature implemented at the A415 junction with the B4449 at Brighthampton. The measures proposed for the Downs Road traffic

calming must therefore be sufficiently robust to ensure that no additional traffic is attracted onto the alternative route and should extend beyond the junction with High Street into Rack End.

If a traffic signals installation was implemented at the A415 junction with the B4449 at Brighthampton, as shown on drawing BPN1085/F3251 in Appendix A, the Downs Road traffic calming measures would be required in full, as shown on drawing BPN1085/F3205 in Appendix A, to effectively deter drivers from adopting this as an alternative route. Accordingly, the cost of these measures should be considered as part of the signalisation proposals.

Similarly, if a roundabout was implemented at the B4449 junction at Brighthampton, as shown on drawing BPBN1085/F3252 in Appendix A, the same measures should be considered as part of the overall construction estimate. Both estimates are shown in Section 4 of this report.

As has been stated, the proposed traffic calming measures should serve to self-enforce the proposed revised speed restrictions and this includes the provision of the 20mph zone. It is recognised that the features suggested permitting only single file traffic will also contribute to an increase in overall journey time and assist in deterring drivers. Should traffic volume increase on either of the alternative routes, the potential for queuing time would also increase as there is a greater

likelihood that the motorists will have to give way to oncoming traffic within the features of the traffic calming. It is anticipated that this should further deter drivers from regularly using either of these alternative routes.

Further consideration of Table 10 and a review of the journey times associated with the proposed revised speed restrictions and the 20mph zone on the alternative routes show that on the Downs Road/High Street route the journey increases by 59 seconds. This demonstrates an overall difference of 95 seconds when compared to the A415 route in its current layout.

Similarly, the journey time on The Downs/Rack End route increases by 77 seconds which results in an overall difference of 88 seconds when compared to the A415 route in its existing layout. As this is the lowest value of the two alternative routes considered, it is recommended that to ensure that most traffic is retained on the A415, any delay associated with the provision of traffic signals or a roundabout at the Brighthampton junction should be restricted to less than this amount.

It is also noted that subject to the implementation of the proposed revised speed restrictions, the journey time difference between the two alternative routes cited is minimal. Consequently it is anticipated that neither will become preferred by traffic that does seek an alternative route.

3.4.6 Environmental Weight Restriction

It is proposed that an environmental weight restriction be implemented along the existing route of the A415 through Standlake to assist in the preservation of the quality of life throughout the village and improve road safety as the narrow nature of the road in places contributes to its unsuitability as a route for heavy goods vehicles.

An existing 7.5 tonne weight restriction is in operation through the village to the north (Downs Road, The Downs, Rack End) and this should be extended to encompass the A415 section through the village. In order to facilitate this the extents of the weight limit should extend to the nearest appropriate junction north and south of the village. Accordingly, this would be at the roundabout with the A420 at Kingston Bagpuize to the south and the Yelford Crossroads at Hardwick to the north, leading to Stanton Harcourt and Eynsham to the A40 via the B4449.

Enforcement of environmental weight restrictions remains difficult and it is likely that a number of vehicles will ignore the restriction as vehicles are requiring access are still permitted. Indeed, there is already evidence to suggest that a number of vehicles ignore the structural limit placed on the bridge at Newbridge. Consideration would also need to be given to public service vehicles and buses and it is recommended

that liaison with emergency services, waste management companies, bus operators and hauliers is undertaken prior to any implementation.

3.5 Newbridge

The area under consideration is shown on a location plan, BPN1085/F3006, contained within Appendix A.

The existing bridge structure at Newbridge, a Scheduled Ancient Monument, has been identified for potential replacement following an assessment by OCC Bridge Engineers in March 1996 which concluded that the structure has a theoretical live load capacity of zero. A temporary 18 tonne weight limit was implemented in August 2006 to assist in the reduction of ongoing damage caused by minor vehicle impacts, vibration and loading.

Photo 8 River Thames Crossing at Newbridge

Further evaluation and monitoring by OCC bridge engineers is ongoing to better understand the behaviour of this unique structure, shown in

Photo 8, and establish what measures may be taken to preserve the structure in its existing condition to the satisfaction of English Heritage.

3.5.1 Promotion of an Alternative River Crossing

Work is now ongoing to seek to develop a new river crossing before the existing bridge is severely damaged by the traffic using it.

3.6 **Kingston Bagpuize**

Kingston Bagpuize is a village situated to the south of the A420 dual carriageway. the A415 runs through the eastern extent of the village. The junction of the A420 and the A415 is a four arm roundabout. The road from the roundabout to Kingston Bagpuize is subject to a 30mph speed restriction and within 315m joins a three arm mini roundabout that permits access to the village or continuation on the A415. This existing feature acts a good traffic control and it is only beyond this feature, to the south on the A415, that potential problems have been identified. Accordingly the area under consideration restricted to this section of the road south of the mini-roundabout. It is shown on location plan, BPN1085/F3007 contained in Appendix A.

3.6.1 Digging Lane Junction Westbound Approach

The Digging Lane junction is situated to the east of Kingston Bagpuize and consists of a staggered crossroads, Digging Lane and an unclassified road that leads towards Fyfield Wick. There is currently a

HGV trailer depot situated along the Fyfield Wick road and a number of HGVs use this road throughout the day. At the junction of the A415 and this road the sight lines to the west are very good. To the east however the curvature of the road combined with the hedgerows and trees on the side of the carriageway makes visibility difficult and exit from the side road hazardous. This is shown in Photos 9 and 10.

Photo 9 A415 Junction with Fyfield Wick road facing west

Photo 10 A415 junction with Fyfield Wick road facing east

There have been four recorded accidents in the vicinity of this junction in the five year period 2002-2007 of which one involved a vehicle turning out of the Fyfield Wick road into the path of a westbound vehicle on the A415. The other three involved rear end shunts into vehicles waiting to turn right from the A415. At this location the road is subject to the national speed limit and the nearest speed restriction terminal is located immediately to the east of the Rectory Lane junction, approximately 750m west of the Digging Lane junction.

Three solutions to the safety problem at this junction have been considered. The first is to modify the existing layout of the junction in

order to improve the sight lines from the Fyfield Wick road to the east. This will require the acquisition of land to the east of the junction in order to remove both the trees and hedgerows. This would be expensive and environmentally detrimental. Although there are road safety benefits that would be enjoyed by all the road users, it does not go further to assist in the maintenance of the quality of life of people living along the route and so has not been investigated further.

Another option that has been investigated is the implementation of a signalised junction at this location which is shown on drawing BPN1085/F3256 in Appendix A. Due to the current road width at the staggered junction and the high approach speeds, the carriageway would have to be widened in the vicinity of the signals in order to allow a separately signalled right turn lane to be provided. This option will also require the acquisition of land on all four arms of the junction in order to remove both trees and hedgerows to allow sight lines between the stop lines. Based on the similar signalisation at the A415 Yelford crossroads, it is anticipated that the construction cost of this would be in the region of £185,000. Due to the small traffic flows on the side roads the traffic signals would operate on a demand basis. This would mean that the feature would only delay a relatively small percentage of the traffic that would pass through the junction. As in the previous example, there would be a road safety improvement associated with this measure in terms of accident prevention but it would contribute little to controlling the volume of traffic or regulating its flow.

The third option would be to change the existing speed limit through the junction. This could be done through either relocating the existing speed limit terminal from a position immediately to the east of the junction with Rectory Lane to a position to the east of Digging Lane or installing a new 40mph 'buffer' speed limit over the same length of road.

The Traffic Advisory Leaflet (TAL) 1/04 for Village Speed Limits recommends that a 30mph speed limit should apply for the extent of the main body of the village only. However, it suggests that in situations where there is a lesser degree of development, there may still be a need for a limit lower than the national limit. In these circumstances there might be a need to consider an intermediate speed limit prior to the 30mph speed limit signs at the entrance to a village. The guidance contained within this Leaflet would not recommend the option of extending the current limit but would support the introduction of a 40mph 'buffer' zone.

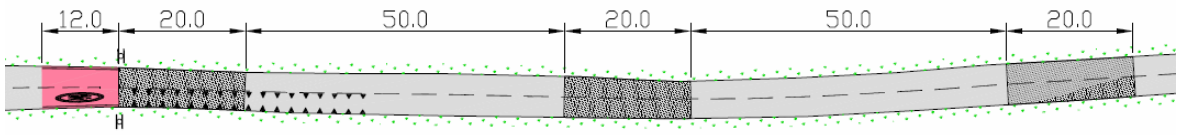
To support the implementation of the new speed limit through the Digging Lane junction a gateway feature should be installed at this location as shown in Sketch 9. Further improvements to the current gateway entrance to Kingston Bagpuize located at a location immediately to the east of the Rectory Lane junction would also be recommended to ensure that vehicles adhere to the speed limit when

travelling through the village. Such a gateway feature would be consistent with others along the route of the A415.

The speed limit boundary would comprise of a 32m long patch of rumblewave surfacing in two colours across the full width of the carriageway. The immediate approach to the boundary should be laid in a neutral colour in a 20m long patch. Immediately beyond the boundary the rumblewave surfacing should be laid in a red colour and should extend for 12m.

Dragons' teeth road markings should be laid in 17 no. pairs on the approach to the speed limit boundary and a roundel indicating the speed limit of 40mph should be laid within the red surfacing on the entry side of the carriageway. Edge of carriageway markings should be placed in the immediate vicinity of the gateway feature to give a visual impression of the road narrowing.

Two patches of neutral coloured rumblewave surfacing, extending for 20m, should be laid across the full width of the carriageway on the approach to the speed limit boundary at distances of 70m and 140m from the boundary itself. It is recommended that these be neutral coloured.



Sketch 9 Kingston Bagpuize, Gateway Feature

A warning sign to TSRGD Diagram No. 507.1 should be placed on the westbound approach to the staggered junction to warn drivers of the hazard ahead.

Having reduced the speed of vehicles passing through the staggered junction further measures may be required to ensure that this speed limit is adhered to on the approach to Kingston Bagpuize.

This approach consists of a single carriageway road with a carriageway width of less than 6m along the majority of its length. The exception to this is in the region of Kingston Business Park where the carriageway has been widened to provide a right turn lane for eastbound traffic. An edge of carriageway marking currently runs alongside the length of the proposed 40mph limit.

In order to visually narrow the carriageway in the region of the Kingston Business Park the current hatch markings protecting the eastbound right turn lane should be laid upon red coloured resin based surface treatment. However, due to the narrow carriageway along the

remainder of the approach to Kingston Bagpuize additional carriageway narrowing either visual or physical would be unsuitable. A Vehicle Activated Sign could be placed in this section of the route but its impact would be negligible in such close proximity to a speed limit terminal.

The introduction of a 40mph speed limit over a distance of approximately 850m on the westbound approach to Kingston Bagpuize and the associated traffic calming features will result in a reduction of speed in the region of 15mph. This equates to the journey time along this section of the route being extended by approximately 13 seconds.

3.6.2 Westbound Gateway Feature

The existing gateway feature on the westbound approach to Kingston Bagpuize consists of a red coloured resin based surface treatment with a “30” roundel and edge of carriageway markings.

The proposed gateway, shown on drawing BPN1085/F3208 in Appendix A, should comprise of a 30m long patch of rumblewave surfacing in two colours across the full width of the carriageway. The immediate approach to the actual gateway location should be laid in a neutral colour in an 18m long patch. Immediately beyond the gateway the rumblewave surfacing should be laid in a red colour and should extend for 12m. This speed restriction boundary should be complemented through the introduction of a vertical measure on either

side of the carriageway such as a painted timber field gate or similar measures. These could be used to display a traffic sign plate to TSRGD Diagram No. 2402.1 bearing the legend, Kingston Bagpuize please drive carefully, or similar to inform drivers of the reason for the change of speed restriction gaining a greater level of compliance. The undergrowth in the region of this gateway would need to be cut and maintained in order for the features to be easily visible.

The associated construction cost of improving the Digging Lane junction, the westbound approach to Kingston Bagpuize and the western gateway to the standard described would be approximately £23,500. This excludes associated costs incurred in the preparation of the revised Traffic Regulation Order.

3.6.3 Abingdon Road, Kingston Bagpuize

Abingdon Road in Kingston Bagpuize between its junctions with Frax Close and Rectory Lane links the village of Kingston Bagpuize with the cycle route to Kingston Business Park. There is currently a narrow footway on the south west side of the carriageway and edge of carriageway markings along the length of the road. The possibility to widen the footway along this section of the road was considered to ease the movements of both pedestrians and cyclists.

It was discovered that the stone walls positioned on both sides of the carriageway form a 'pinch point' outside 'The Lodge' where the carriageway width is currently 6.1m. This is shown in Photo 11. The footway at this point is currently less than 1m in width and so would be inadequate for passage of a cyclist or a wheelchair. Widening the footway on both approaches to this 'pinch point' would therefore have little benefit to its users as problems would still be encountered when they reach the narrow section. It would be possible to lower and re-lay it to carriageway level, effectively widening the footway to the edge of carriageway marking. If this was re-marked to create a pinch point, it would assist in slowing down vehicles without physically reducing available road width.

Photo 11 'Pinch point' along Abingdon Road

3.6.4 Kingston Business Park

Consideration was given to changing the priorities at the entrance to Kingston Business Park. The existing layout provides for a dedicated right turn lane with ghost island road markings. As this junction modification was made recently it conforms to the current standards for

the speed of the road. It was considered that at peak times a right turn manoeuvre out of the business park could be difficult and flow could be better regulated by using a mini roundabout. This would also be likely to have a beneficial effect on the approach speeds both to the business park and Digging Lane junction (see *3.6.1*).

This idea has been rejected as it could not be demonstrated that there was significant advantage to be gained. As the junction is of a good standard with reasonable inter-visibility and there is not an accident history at that specific location there would be little benefit in undertaking such a major change to the junction. The design and construction costs as well as the significant disruption to travel would be disproportionately high when compared to the benefits that would be yielded. Furthermore, similar benefits such as the reduction in speed can be achieved through the implementation of the speed limit and gateway reviews previously described.

3.7 Frilford Junction

The area around Frilford Junction is shown on a location plan drawing, BPN1085/F3008 in Appendix A. The existing junction of the A415 with the A338 benefits from traffic signals controlling turning movements onto and from the A338. This junction is currently operating at full capacity and vehicles are subject to significant peak time delays. As traffic volume increases, so does the associated delay. Over the past 5 years the rate of traffic volume growth on the A415 has not increased at

the same levels as elsewhere in the county and it is believed that the delays experienced at this junction are in part responsible.

Considerable investigation into ways to improve the performance of this junction has been previously undertaken as part of other schemes carried out by and on behalf of OCC. This is notably in connection with proposals for a Marcham Bypass and has included options for traffic signals control of a realigned junction and a roundabout.

Both options have been designed to increase the capacity at the junction and improve traffic flow. This would assist with journey times and associated with a bypass, attract traffic onto the route.

As unique features there is nothing to suggest that there would be a road safety improvement associated with either. Moreover, if junction capacity was to improve it may contribute to an increase in the rate of traffic growth exceeding current expectations. This may adversely affect the quality of life of people living along the route of the A415.

Mindful of the consideration previously given to this junction, no further investigation has been made. There are currently no plans to progress development of a Marcham Bypass.

3.7.1 Junction with Millets Farm

The current speed limit terminal to the west of the A415 junction with the A338 is situated on the outskirts of Frilford at the western boundary of Manor Farm Cottage. This change in speed restriction, from 40mph to the east of the boundary to the national limit to the west of the boundary, consists only of terminal signs and as a result doesn't have a large impact on vehicle speeds. At various times of year, the signs' visual conspicuity can be diminished by the proximity of overgrowing foliage.

To the west of the current speed limit terminal is the entrance to Millets Farm. This is a complex featuring a garden centre, farm shop, children's play area and restaurant and receives a large number of visitors each day. Vehicle speeds along this section of road are high and so a right turn lane is provided east bound along the A415 to aid the turning movements of drivers visiting this attraction. The road width does not permit a well segregated right turn lane and it is suspected that its provision is to the minimum or below standard. An accident has been recorded at this location involving a vehicle exiting Millets Farm and being struck by a second vehicle travelling along the A415.

In order to reduce the speed of vehicles along this section of the A415 and to improve the turning movements both into and out of the attraction, the existing speed limit terminal should be relocated to a

position approximately 325m west of its present location as shown on drawing BPN1085/F3209 in Appendix A. This terminal should incorporate a 30m wide patch of rumblewave surfacing in two colours laid across the full width of the carriageway. An 18m stretch of neutral coloured rumblewave surfacing should be laid immediately prior to the terminal signs and a 12m stretch of red coloured rumblewave surfacing immediately after. A 40mph speed roundel should be laid on top of the red coloured rumblewave surfacing. A hatched area currently protects a right turn lane into the entrance of Millets Farm. Red coloured resin based surface treatment should extend from the gateway throughout the hatch area as far as the right turn lane. The edge of carriageway lines currently along this section of the carriageway should be retained to further create the impression of a narrower road.

A warning sign to TSRGD Diagram No. 506.1 (side road ahead) should be located on both approaches to the Millets Farm entrance to improve its conspicuity and aid driver awareness.

3.8 Marcham

A location plan, BPN1085/F3009, showing the area under consideration around Marcham can be found in Appendix A.

3.8.1 Eastbound Gateway Features

The village of Marcham currently benefits from the presence of gateway features on both the eastbound and westbound approaches to the village along the A415.

The existing eastbound gateway, shown in Photo 12, consists of a narrow white painted timber field gate on the north side of the carriageway and a vertical white painted timber post on the south side of the carriageway. The gateway is also the terminal for the change in speed restriction from the national speed limit to the west of the gateway to 30mph to the east of the gateway and through the village. The terminal sign on the north side of the carriageway facing westwards incorporates a traffic sign plate to TSRGD Diagram No. 2402.1 bearing the legend, *Marcham please drive carefully*. The change in speed restriction is reinforced with the use of red coloured resin based surface treatment and a "30" roundel. Edge of carriageway markings are present on the eastbound approach to the gateway.

Photo 12 Eastbound entry to Marcham showing gateway treatment

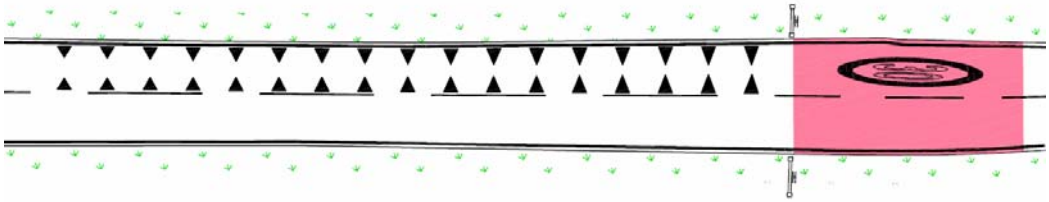
The gateway is located at a position along the A415 where trees and hedgerow grow close to the edge of the carriage, creating a visual narrowing of the road. From observations on site this layout tends to restrict vehicle speeds through the gateway, however, the foliage also

acts to restrict the penetration of sunlight making the area appear dull. It is therefore important to ensure that the gateway features are easily visible to the driver and if possible, incorporate the natural visual narrowing.

A typical arrangement of the gateway and associated approach is shown in Sketch 10. The gateway comprises of a 12m wide patch of rumblewave surfacing in red laid across the full width of the carriageway positioned immediately after the change in speed restriction. This will replace the current red coloured resin based surface treatment which is in a poor state of repair and will incorporate a '30' roundel as described previously. The gateway should be further complemented by the use of road markings such as dragons' teeth which should be laid in 17 no. pairs on the approach. These markings will draw drivers' attention to the change in speed limit ahead.

The existing white painted timber field gate on the north side of the carriageway should be retained and repainted white and a similar if somewhat narrower field gate should be installed on the south side. This will provide an element of a vertical feature that, together with the overhanging trees, will contribute to making the carriageway appear narrower to traffic entering Marcham. The existing terminal sign on the north side of the carriageway facing westwards incorporating a traffic sign plate to TSRGD Diagram No. 2402.1 bearing the legend, *Marcham*

please drive carefully should be repeated on the south side of the carriageway to emphasise to drivers that they are entering a village.



Sketch 10 Schematic of Proposed Marcham (A415 Eastbound) Gateway Arrangement

It is anticipated that the improvements suggested at the gateway will result in a reduction in average vehicle speed of up to 5mph. Over the 520m between the gateway and the first physical measure in the village that will require vehicles to slow down to below the speed limit, the tight left hand bend in the centre of Marcham, this reduction in speed will increase the travelling time by approximately 2-4 seconds. Although this is a negligible amount, the improvements at the gateway will complement other features throughout the village suggested later in this report and contribute to improved road safety and assist in maintaining the quality of life for residents of the village.

3.8.2 Westbound Gateway Features

The arrangement of the gateway feature on the westbound entry to the village is similar to that previously described on the eastbound entry and is shown in Photos 13 and 14. It consists of white painted timber field gates on both sides of the carriageway with the one on the south

side being considerably narrower due to the reduced verge width at this location. The gateway is also the terminal for the change in speed restriction from the national speed limit to the east of the gateway to 30mph to the west of the gateway and through the village. The terminal sign on both sides of the carriageway facing eastwards incorporates a traffic sign plate to TSRGD Diagram No. 2402.1 bearing the legend, *Marcham please drive carefully*. The change in speed restriction is reinforced with the use of red coloured resin based surface treatment and a "30" roundel. Edge of carriageway markings are present on the eastbound approach to the gateway.

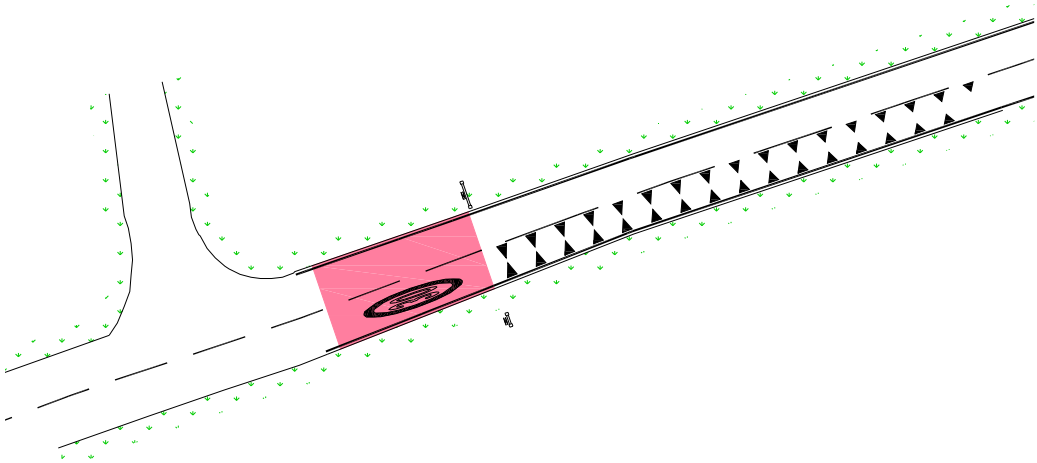
Photos 13 and 14 Westbound entry to Marcham showing gateway treatment

The westbound approach to Marcham is different from the eastbound approach with fields on either side of the carriageway offering a more open feel which does not discourage vehicles from travelling at higher speeds. However, upon reaching the gateway feature vehicles immediately enter a residential environment with a side road appearing immediately to the right and a pedestrian crossing situated within sight of the gateway. It has been observed on site that the speed restriction on the westbound entry to the village is initially poorly observed and the

vehicle activated warning sign positioned after the gateway feature is regularly activated. Once beyond this point, vehicles do tend to reduce their speed in preparation for a tight right hand bend situated approximately 230m from the gateway.

A typical arrangement of the gateway and its associated approach is shown in Sketch 11. The improvements recommended will not only increase drivers' awareness that they are entering a village environment with a change of speed limit but they will offer some continuity and consistency between the two approaches into Marcham and the other villages along the route of the A415. The gateway comprises of a 12m wide patch of rumblewave surfacing in red laid across the full width of the carriageway positioned immediately after the change in speed restriction. This will replace the current red coloured resin based surface treatment which is in a poor state of repair and will incorporate a '30' roundel as previously. The gateway should be further complemented by the use of road markings such as dragons' teeth which should be laid in 17 no. pairs on the approach. These markings will draw drivers' attention to the change in speed limit ahead.

The existing white painted timber field gates should be retained and repainted white to improve their conspicuity. They should be repositioned closer to the edge of the carriageway, away from the long undergrowth in which they are currently located, to visually narrow the gateway and provide effective vertical elements.



Sketch 11 Diagram of Proposed Marcham (A415 Eastbound) Gateway Arrangement

It is anticipated that the improvements suggested at the gateway will result in an approximate 2mph reduction in vehicle speed. Over the 230m between the gateway and the first physical measure in the village that will require vehicles to slow down to below the speed limit, the tight right hand bend on Packhorse Lane, this reduction in speed will increase the travelling time by approximately 1 second. Although this time gain is negligible the improvements at the gateway will complement other features throughout the village suggested later in this report and contribute to improved road safety and assist in maintaining the quality of life for residents of the village.

3.8.3 Packhorse Lane

Traffic currently travelling through the centre of Marcham has to negotiate Packhorse Lane, a narrow stretch of carriageway with widths as little as 5.2m, Photo 15. This road also has a number of tight bends,

most notably outside number 8 Packhorse Lane where HGVs encounter great difficulties in progressing when vehicles are travelling in the opposing direction. There is currently no footway along this stretch of carriageway and pedestrians, with no line of sight to oncoming traffic, have to walk in the road creating additional hazards.

Photo 15 Packhorse Lane, Marcham

In an attempt to improve this situation Oxfordshire Highways have undertaken a traffic experiment at this location, introducing traffic signals with vehicular shuttle working between house numbers 3 and 10 Packhorse Lane. The trial period lasted from 10 July to 11 August 2007 and attempted to evaluate the impact that traffic signals at this location would have on traffic flows in the area. A 1.5m wide footway between the traffic signals has been proposed as part of this scheme.

It is recommended that this scheme is adopted in Marcham with a few amendments. Currently the scheme provides a footway for pedestrians

along only a short stretch of carriageway leaving pedestrians perhaps with pushchairs or wheelchairs to walk on a stretch of carriageway with a large volume of traffic including HGVs. The footway, and therefore the length of signal controlled vehicular shuttle, should run between the current lengths of footway which end outside numbers 1 and 27 Packhorse Lane. The stop line on the westbound approach to these signals should be positioned before the left hand bend outside the village hall as shown in drawing BPN1085/B3210 in Appendix A so that vehicles do not encounter a queue of traffic immediately after travelling around a blind bend. Similarly the patch of current red coloured resin based surface treatment including the legend 'Slow' positioned outside Hucclecoat House which is in a poor state of repair should be replaced in order to warn drivers of both the approaching bend and the possibility of traffic queuing beyond it. There is also potential to provide for a pedestrian demand phase of the signals to allow pedestrians to cross the road more safely in this area.

Due to the large volume of traffic that currently travels through Marcham, it is anticipated that the introduction of the traffic signals would create queues of traffic in both directions. In order to accurately assess the length of these queues detailed traffic modelling would need to be carried out. However, if a car arrives at the stop line at the instant the traffic signals change to red that car would be delayed in its journey for the length of time that the opposing flow was shown the green light

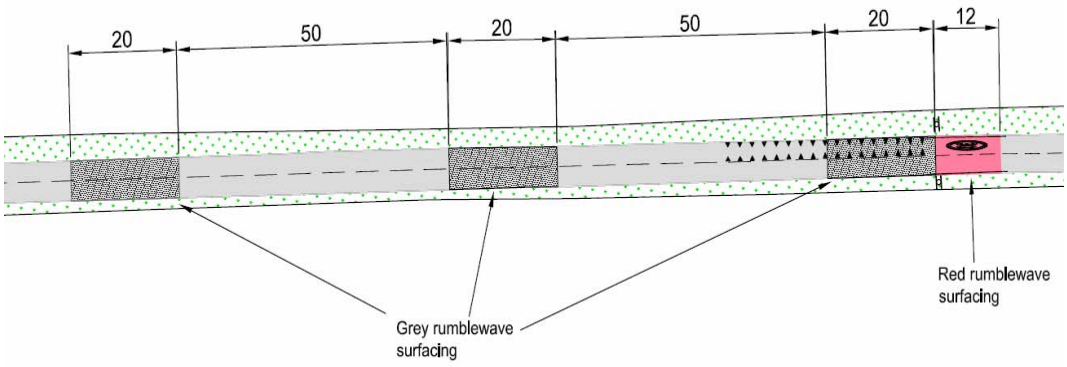
and a period of approximately 20 seconds which would account for the signals intergreen time and the cars acceleration time.

The associated construction cost of implementing the improvements outlined in sections 3.6.2, 3.6.2 and 3.6.3 would be approximately £94,500. This excludes associated costs incurred in the preparation of the revised Traffic Regulation Order.

3.8.4 Barrow Farm Turn

Barrow Farm turn is an unclassified road to the north of the A415 leading to Gozzards Ford. It is situated approximately 425m west of its junction with the A34 at Abingdon and is subject to a large number of turning movements, predominantly from vehicles turning right into the road and left onto the A415. The national speed limit currently applies in the vicinity of the junction with a 30mph restriction commencing approximately 250m to the east on the approach to the A34. Four accidents, one of which was serious, have been recorded in the vicinity of this junction over the five year period between 2002 and 2007. The accidents all involved vehicles turning into or out of this junction and being hit by cars travelling along the A415. A warning sign to TSRGD Diagram No. 506.1 (side road ahead) exists on the west bound approach to the junction but not on the east bound approach.

In order to ease the turning movements into and out of this junction and improve safety, the existing speed limit terminal should be moved approximately 500m westwards to a point 200m to the west of the junction as shown on drawing BPN1085/F3211 in Appendix A. The new speed limit terminal and associated approach should be set out as shown in Sketch 12. The approach to the speed limit terminal position should comprise of a 32m long patch of rumblewave surfacing in two colours across the full width of the carriageway. The immediate approach to the terminal position should be laid in a neutral colour in a 20m long patch. Immediately beyond the boundary the rumblewave surfacing should be laid in a red colour and should extend for 12m beyond the commencement of the speed restriction.



Sketch 12 Proposed gateway on eastbound approach to junction with A34 and Abingdon at Gozzards Ford

Dragons' teeth road markings should be laid in 17 no. pairs on the approach to the speed limit boundary and a roundel indicating the speed limit of 30mph should be laid within the red surfacing on the entry side of the carriageway.

Two patches of neutral coloured rumblewave surfacing, extending for 20m, should be laid across the full width of the carriageway on the approach to the speed limit boundary at distances of 70m and 140m from the boundary itself. It is recommended that these be neutral coloured.

A warning sign to TSRGD Diagram No. 506.1 (side road ahead) should be placed on the eastbound approach to the junction along with a patch of red coloured rumblewave surfacing, 3m in length, to include the legend ‘slow’ to warn drivers of the left hand turn ahead.

Relocating the speed restriction terminal 500m west of its current location and providing effective and self enforcing means would reduce traffic speeds by 25mph over its length and facilitate improved turning into and out of the side road as approaching traffic should be at a much slower speed. This would effectively increase the journey time by 13 seconds. The associated construction cost of relocating the speed restriction terminal to the standard described would be approximately £13,100. This excludes associated costs incurred in the preparation of the revised Traffic Regulation Order.

4 Mitigation Measures – Single Lane Bridge

In section 3, a number of measures were proposed that would mitigate the estimated reduction in journey time on the A415 between the A40 in Witney and the A34 in Abingdon, as shown on drawing BPN1085/F3000 in Appendix A. The journey time benefit derives from the proposed two way movements of traffic on the new bridge and the mitigation measures were considered to offset the difference in journey time and to offer complementary road safety benefits. These could carry over for any of the measures described whatever work was undertaken on the bridge. In this section, consideration will be given to effectiveness of the measures proposed if the bridge was to be replaced with a single lane carriageway controlled by traffic signals, effectively mimicking the existing arrangement.

The current 750 year old bridge which has been assessed as theoretically unable to support any traffic loading and can not be reconstructed or strengthened due to the Statutory protection arising from its historic status, is subject to an 18 tonne weight restriction as an interim measure which, combined with more frequent inspections is sufficient to ensure public safety for the time being. As the bridge is a narrow structure, the current arrangement consists of a single lane 2-way carriageway controlled by traffic signals. This is believed to currently restrict the attractiveness of the route due to the delays associated at peak times.

If a new bridge were to be constructed to provide a similar arrangement for traffic movements (single lane, two way bridge controlled by traffic signals), it is unlikely that the route would be perceived as significantly more attractive. The proposed traffic signals would act as a throttle in much the same way as the current signals do. The throttling effect would be further compounded with potential delays at the roundabout junctions proposed to tie-into the existing A415. At peak times, it is not anticipated that the inclusion of roundabout will contribute to any further delay than is already experienced at Newbridge and other locations along the A415. Off peak travel times are unlikely to differ significantly from the current arrangement as any delay incurred by negotiating the roundabouts will be negated by the improved route to the river bridge, where traffic signals would still restrict traffic movements.

As the route's characteristic will be similar to its existing condition, it is not considered likely that an increase in traffic volume would occur beyond that which would be expected under current growth conditions. What is likely to change is the make-up of that traffic. With no need for a structural weight limit to be imposed, there is likely to be an increase in heavy traffic to levels more typical of a county A road.

An existing 7.5 tonne weight restriction is in operation through the village to the north (Downs Road, The Downs, Rack End) and this should be extended to encompass the A415 section through the village.

In order to facilitate this, the extent of the weight limit should extend to the nearest appropriate junction north and south of the village. Accordingly, this would be at the roundabout with the A420 at Kingston Bagpuize to the south and the Yelford Crossroads at Hardwick to the north, leading to Stanton Harcourt and Eynsham to the A40 via the B4449, described in detail in 3.4.6. Additionally the Gateway Features and extension of the speed restriction described in 3.4.1 and 3.4.2 could be implemented.

It is acknowledged that an environmental weight limit would be likely to be less effective at deterring HGVs than a structural limit along the route and there is a likelihood that the volume of HGV traffic would increase over the current levels. However it is anticipated that the volume would be lower than that experienced prior to the imposition of the weight limit in 2006.

A single lane bridge with traffic signals would emulate the conditions already provided by the existing structure. In this way, the requirement for mitigation is reduced as it is not perceived that the route will attract a greater volume of traffic as a result, although the make-up is likely to change. For this reason, the measure described above is the one that should be promoted in conjunction, by way of maintaining a reduced number of heavy vehicles along the route. Complementary route signing should also be considered.

The other measures described in section 3 could also be implemented and these would offer the road safety and traffic calming benefits. These could be used independently or cumulatively and could be further investigated and prioritised through consultation with relevant Parish Councils.

5 Implementation

5.1 Construction Costs and Journey Time Evaluations

An estimate of the costs in terms of construction and associated journey time has been made for each of the measures proposed in section 3. These are shown individually in tables in each section.

A summary of the accident history of the section of road under consideration is also given. It is impossible to say whether any of the accidents could have been prevented had the measures proposed been implemented, but the consistent theme of the measures is speed reduction to promote driver awareness of conditions and the road ahead. It is accepted that the frequency and severity of incidents reduces when vehicles travel at slower speeds. Accordingly, it is anticipated that implementation of the measures proposed would contribute to a reduction in the number and severity of accidents in that section.

5.1.1 Ducklington Bypass

The measures proposed for Ducklington bypass predominantly extend a reduction in apparent carriageway width by reducing the width of the running lane using road markings and providing a consistent hatched area in the centre of the carriageway. This is to be supported by a reduction in the existing speed limit, from 60mph to 50mph.

For the five years up to 31 March 2007 there had been 14 recorded accidents of which 6 involved casualties either killed or seriously injured. It is impossible to say how many of these could have been

The effect of reducing the current speed limit, assuming that it is adhered to, would be to increase the journey time over the length of the bypass and is summarised in Table 12a.

	Construction Cost	**Differential Journey Time, s**
Ducklington Bypass	£13,532*	+17

*£66,428 if resin based surface treatment used in central hatched area

Table 12a Summary of Feasibility Options for Ducklington Bypass

5.1.2 Cokethorpe Park

The measures proposed for this area were limited similarly to that of Ducklington Bypass but for different reasons. Whereas the bypass is a relatively modern road of good standard, the section through

Cokethorpe Park follows the old alignment of the road and includes a series of bends that have been the location and cause of a number of accidents including serious and fatal. The number of recorded accidents for the five years up to 31 March 2007 is 12, of which 3 included casualties with serious injuries and 3 included casualties with fatal injuries, the highest number of any of the sections under consideration in this report.

There is evidence to suggest that the change in character of the road from the bypass may contribute to the poor safety record of this stretch of road and provisional plans have been raised to straighten the bends as part of a Kingston Bagpuize link road development. It is unlikely that funding will be secured for this type of scheme and so it is suggested that this part of the route be subject to a further reduction in speed limit to 40mph from the end of the Ducklington Bypass, through the plantations and bends as far as the Yelford Crossroads traffic signals at Hardwick.

There would be minimal construction work required however revised road markings and traffic signs would be required. This exercise should look to augment and integrate a number of existing traffic signs that currently contribute to sign clutter in the area.

Reducing the existing speed limit would increase the journey time over the length of the road. The anticipated increase assumes that the limit

is adhered to and is summarised in Table 12b with the estimated construction cost. Note, this does not include for costs associated with the preparation of a revised Traffic Regulation Order.

	Construction Cost	Differential Journey Time, s
Cokethorpe Park	£19,161**	+18

**£48,507 if resin based surface treatment used in central hatched area

Table 12b Summary of Feasibility Options for Cokethorpe Park

5.1.3 Yelford Crossroads

As has been described in section 3.3, the Yelford Crossroads Signalisation project has already been undertaken and has successfully introduced traffic control to the junction of the B4449 at Hardwick, the unclassified road to Yelford and the A415 south of Ducklington.

As the scheme has been constructed, the associated construction costs are not applicable in this case, however the introduction of the additional time delay is admissible as the scheme had not been constructed at the base point date under consideration.

It has been established that the signalisation of this junction contributes to a mean increase in journey time of 38 seconds. This figure has been derived empirically and may not be statistically representative.

The accident record at this site covers a period both before and after the implementation of the traffic signals. For the five year period up to 31 March 2007 there were 11 recorded accidents of which 4 involved casualties who were seriously or fatally injured. Since the traffic signals were commissioned there have been three recorded accidents, one of which was serious.

5.1.4 Standlake and Brighthampton

A number of measures have been proposed for Standlake and Brighthampton which can be implemented individually or cumulatively. The proposed gateway features and relocation of the speed restriction terminals could be used in conjunction with the redevelopment of the junction of the B4449 at Brighthampton or in isolation. It is recommended however that any development instigated at the junction with the B4449 (roundabout or traffic signals) should be inclusive of the proposed traffic calming through the north of the village. This should be instigated in advance of works to the junction to minimise the likelihood of “rat running” and afford protection to residents of the village during the construction period when traffic volumes would be expected to increase on the identified alternative route.

In the five years up to 31 March 2007 there were 15 recorded accidents on the sections of the A415 between the B4449 at Hardwick and

Standlake, including the village. One of the recorded accidents was classified as serious, with the others being slight.

The construction costs of the various options and the assessment of their effectiveness are summarised in Table 12c.

	Construction Cost	Differential Journey Time, s
Standlake Gateways	£27,400	+15
B4449 Junction Roundabout**	£246,500†	+15
B4449 Junction Traffic Signals**	£132,300†	+45
A415 Narrowing	£7,800	0
StandlakeTraffic Calming and 20mph	£290,000	0
Environmental Weight Limit (TRO/Signing)	£5,000	0

** to be implemented with The Downs Traffic Calming
† exclusive of diversion works costs

Table 12c Summary of Feasibility Options for Standlake and Brighthampton

5.1.5 Newbridge

A new River Thames crossing is to be constructed in accordance with the recommendations made in the A415 Newbridge River Thames Crossing, Environmental Stage 1 Report. The anticipated off-peak journey time is likely to reduce by 134 seconds (see 1.6.3). Concern has been expressed that the reduction in journey time, or significantly,

the perceived reduction in journey time, may be instrumental in attracting new traffic onto the route over and above the volume that would be expected under normal growth conditions. It is important that any measures implemented from this report are perceived to offset that decrease so as to preserve the quality of life of residents in the outlying villages.

The accidents recorded at Newbridge in the five years up to 31 March 2007 totalled twelve, of which ten were slight and two were serious. In the same period, there were seven accidents recorded between Newbridge and the A420, of which four were slight and three were serious.

5.1.6 Kingston Bagpuize

The implementation of measures in Kingston Bagpuize is limited to the extension of a 40mph speed restriction for an additional 850m on the A415 westbound approach to the village. This, when combined with the traffic calming features described in 3.6.1 would contribute to a reduction in approach speeds which should make a positive contribution to the road safety around the areas of the Digging Lane junction and the entrance to the Business Park. It is anticipated that as a result of this measure, the journey time would be extended by approximately 13 seconds which would assist in offsetting the decrease achieved if a new River Thames crossing was to be constructed.

The number of accidents recorded in the five year period to 31 March 2007 was five, of which four were slight and one was serious.

The construction costs of the measures described for implementation at Kingston Bagpuize and an assessment of their effectiveness are shown in Table 12d.

	Construction Cost	Differential Journey Time, s
Kingston Bagpuize TC and Gateways	£23,500	+13

Table 12d Summary of Feasibility Options for Kingston Bagpuize

5.1.7 Frilford

As with Kingston Bagpuize, there are only limited measures that can be implemented at Frilford. It has been noted that the existing signalised junction with the A338 is operating at capacity and is largely responsible for peak time queue delays. If an alternative river crossing is constructed at Newbridge, it is anticipated that the difference in journey time will have a negligible contribution to the overall peak journey time. Accordingly, this has not been given separate consideration and has effectively been factored out by considering off-peak journey times only.

Consideration has been given to the A415 approach to the A338 from Kingston Bagpuize and it has been noted that there could be significant safety benefits in relocating the speed restriction terminal and incorporating a gateway feature consistent with those described elsewhere on the route. This would ensure that vehicles travelling beyond the turn to Millets Farm or approaching queuing traffic were already slowed down appropriately. There have been nine accidents recorded in the five years to 31 March 2007 in the section where the measures are proposed. Of the nine accidents, eight were slight and one was serious.

The approach to the junction with the A338 and the junction itself have seen sixteen accidents in the same period, twenty-two of which were slight and four being classified as serious.

Relocating the speed limit terminal and providing the features outlined in 3.7.1 will reduce vehicle speeds by approximately 15 mph over a length of 325m. This equates to an extension of the journey time of 5 seconds at a construction cost of approximately £13,500, as summarised in Table 12e. This excludes associated costs incurred in the preparation of the revised Traffic Regulation Order.

	Construction Cost	Differential Journey Time, s
Frilford Gateway	£13,500	+5

Table 12e Summary of Feasibility Options for Frilford

5.1.8 Marcham

The package of measures that can be implemented in Marcham can contribute to some of the most obvious improvements to all road users. In Packhorse Lane, the existing road width is especially narrow with no means for widening the road. By implementing the single file shuttle working there would be minimal risk of conflict on the road (vehicle to vehicle and vehicle to property) and also facility to improve footway provision in the area.

The results of the traffic experiment undertaken by OCC's Area Office are still under evaluation, however delays experienced by contributors to this report were not excessive and would imply that this is an option that should be investigated further.

A further recommendation is that the village gateways should be enhanced to be consistent with other areas along the route and increase the prominence of the prevailing speed restriction.

Review of accident statistics demonstrated that considering the narrow and windy nature of the road, there were relatively few accidents

occurring through Marcham village itself, all of which were of slight severity. It is presumed that this is because the narrow nature of the road demands slower speeds and additional driver caution. A number of accidents were recorded at Barrow Farm turn and the measures described should assist in promoting improved safety at this location.

There were five accidents recorded in the five year period up to 31 March 2007 on the section of A415 from the junction with the A338 to Marcham and seventeen accidents during the same period on the A415 in Marcham. The severity of all of these was slight.

On the A415 between Marcham and the A34, there were twelve accidents recorded over the five year period to 31 March 2007. Eight of these were slight, three were classed as serious and one was a recorded fatal injury accident.

The construction costs and estimate of the effectiveness of the measures proposed are summarised in Table 12f.

	Construction Cost	**Differential Journey Time, s**
Gateways and Signals	£94,500	+45
Barrow Farm Turn	£13,500	+13

Table 12f Summary of Feasibility Options for Marcham

6 Summary of Evaluated Options

Paragraph	Feature	Time	Cost	£/s	Rank
3.3	Yelford Crossroads Signalisation*	+0'38"	N/A	N/A	1
3.1	Ducklington Bypass Introduction of 50mph	+0'17"	£13,532	£796	2
3.8.4	Barrow Farm Turn	+0'13"	£13,100	£1,008	3
3.2	Cokethorpe Park Introduction of 40mph	+0'18"	£19,161	£1,065	4
3.4.1	Standlake Southbound Gateway	+0'09"	£14,700	£1,633	5
3.6.1 3.6.2	Kingston Bagpuize – Digging Lane junction and approach to village	+0'13"	£23,500	£1,808	6
3.4.2	Standlake Northbound Gateway	+0'07"	£12,700	£1,814	7
3.8.1 3.8.2 3.8.3	Marcham – Gateways and signals	+0'45''	£94,500	£2,100	8
3.7.1	Frilford Gateway	+0'05"	£13,500	£2,700	9
3.4.3 3.4.5	B4449 Brighthampton Traffic Signals and Traffic Calming	+0'45"	£422,300	£9,384	10
3.4.3 3.4.5	B4449 Brighthampton Roundabout and Traffic Calming	+0'15"	£536,500	£35,767	11

** Already constructed, journey time established empirically*

Table 13 Tabulated Evaluation of Feasibility Options

Table 13 shows the cost per second journey time when used in consideration to offset the anticipated decrease in journey time associated with the new river crossing. Based on cost alone, it can be seen that including the existing Yelford Crossroads, the first eight measures would need to be implemented to fully offset the anticipated decrease in journey time associated with the new River Thames crossing; the measures would increase journey time by 160 seconds at a cost of £166,533.

There would undoubtedly be road safety improvement benefits derived from the implementation of any of these measures but it could be argued that implementation of multiple measures may have a cumulative benefit. For instance, a consistent approach to the village entry treatments, with similar gateway features used along the length of the study corridor, would assist drivers in better determining the entry to villages. This should help influence a culture of adherence to the prevailing speed restrictions in those villages and contribute to the welfare of all road users.

7 Conclusion

This report has investigated measures that could be implemented along the route of the A415 to offset any anticipated changes arising as a direct consequence of the construction of a new River Thames crossing at Newbridge to replace the existing historic structure and relieve the difficulties associated with operating and maintaining such a structure.

The primary concerns are associated with a perceived increase in popularity of the route if one part of it which has traditionally acted as a “throttle” is now relieved through the provision of a new, two lane river crossing. This could lead to an increase in traffic volume beyond normal year on year growth as well as an increase in the percentage of HGVs using the route which would have an adverse affect on residents living along the length of the route. If a single lane river crossing was provided, it is anticipated that only the latter would be a problem though this could be mitigated to some extent with the provision of improved gateway features and the imposition of environmental weight limits.

The measures described in the report also attempted to consider the benefits that could be drawn from the implementation of each one from a road safety perspective. While it is recognised that Oxfordshire County Council have commissioned other schemes to review specific accident locations and propose improvements, the measures proposed in this report attempt to establish parallels to ensure that there is a road

safety benefit associated with the offsetting of journey time that will help to maintain the quality of life for people living along the route.

The implementation of the mitigation measures described in Section 5 and shown in ranking order in Table 13 relate to the provision of a new two lane bridge. The table establishes which features are most effective from a time and cost perspective. It would be very easy to recommend that the first eight measures are undertaken which completely offset the anticipated decrease in journey time associated with a new two lane river crossing. However although this would achieve the desired objective in one sense, it may not completely satisfy the concerns of residents living along the route who do not want to see a disproportionate increase in traffic volume. For this reason, there should be consultation with Parish Councils and the public so that the measures described can be discussed and any additional concerns expressed responded to.

There does not appear to be any single measure that can be implemented that will satisfy the concerns of residents and still ensure that the existing bridge structure remains in a condition becoming of its status. Oxfordshire County Council as the Local Highway Authority has a duty of care to residents and a Statutory obligation to preserve the bridge for future generations. It is likely that there will be some conflict of interest in this and it should be remembered that the A415 currently sits as a major part of the strategic network. Whereas the concerns of

disproportionate traffic growth can be addressed with measures described, it should be clear that none of these should become, or be considered to be, measures to deter traffic from using the route.

References

Local Transport Note 1/07, Traffic Calming (March 2007)

Traffic Advisory Leaflet 1/05 “Rumblewave Surfacing”

Traffic Advisory Leaflet 09/99 “20mph Speed Limits and Zones”

Design Manual for Roads and Bridges

Volume 6, Section 2, Road Geometry Junctions

TD42/95 Geometric Design of Major/Minor Priority Junctions

Traffic Signs Regulations and General Directions 2002

Traffic Signs Manual, Chapter 4, Warning Signs 2004