Fairford Town

Transport Appraisal Report

January 2016

Doc. No. 1601RP01

Helix Transport Consultants Limited
16 Springfield Court, Stonehouse, Gloucestershire, GL10 2JF.
Tel: 01453 822625
www.helixtc.co.uk

Fairford Town

Transport Appraisal Report

January 2016

Contents Amendment Record

This report has been issued and amended as follows:

Issue	Description	Date	Signed
1	Draft	January ’16	JH
2	Issue	February ‘16	JH

Contents

Drawings

1601SK01 - Study Area Highway Network

1601SK02 - Recommended Improvements

1601SK03 – Illustrative High Street Improvements

Appendix

Speed Survey Results

1 Introduction

1.1.1 Helix Transport Consultants Ltd are appointed by Fairford Town Council (FTC) to consider the traffic and transportation issues affecting the town.

1.1.2 The purpose of this report is to assist in the development of the Fairford Neighbourhood Plan (FNP).

1.1.3 The scope of this report has been discussed and agreed with FTC and covers a range of specific and general issues. These are summarised below:

To consider all issues at a strategic level and provide advice and potential viable improvement options for the following:

- *High Street*
  - *(a) Parking*
  - *(b) Speed of traffic*
  - *(c) Pedestrian Realm*

- *A417*
  - *(a) Speed of traffic*
  - *(b) Peak hour traffic volumes*
  - *(c) Lack of pedestrian crossing facility*
  - *(d) Lack of road space, especially for larger vehicles*
  - *(e) Effects of on-street parking*

- *Leafield Rd/ Lower Croft*
  - *(a) On street parking during school pick-up and drop-off periods*
  - *(b) Lack of road space, especially for larger vehicles*
  - *(c) Lack of adequate footway*

- *Park Street junction with Leafield Road; Lower Croft junction with A417; Coronation Road junction with A417; High Street junction with A417*
  - *(a) Junction visibility*
  - *(b) Road width*
  - *(c) Pedestrian links*

- *Non-car accessibility*

1.1.4 The comments and recommendations within this report are based on site visits, on-site measurements, traffic surveys, speed surveys and parking counts.

1.1.5 Traffic and speed surveys were carried out (where these issues are raised as a concern) in order to quantify the extent of the problem. Peak-hour traffic surveys were carried out over 30 minute periods. Traffic speeds were recorded over 30 minutes, or for the first 50 results (or 25 in a single direction). This level of information is appropriate for the observations made in this report; but not as exhaustive as would be required for highway design purposes.

1.1.6 The sections that follow detail the baseline conditions, comment on the relevant areas of concern and recommend options for how the situation may be improved.

1.1.7 The study area considered in this report is shown on the attached plan 1601SK01. Recommended improvements are identified on the attached plan 1601SK02. Plan 1601SK03 illustrates potential changes to the High Street.

2 Transportation Infrastructure Assets

2.1.1 The following section provides an overview of the existing transportation infrastructure for each mode of travel.

2.2 Car

2.2.1 The principal local roads within the study area comprise: Coronation Street; Horcott Road; High Street; Park Street; Leafield Road / Lower Croft; and Mt Pleasant;. These roads fall within the general description of *a 'smaller road intended to connect together unclassified roads with A and B roads'*, as such, would fall within Gloucestershire County Council's road Class 3. The A417 is an A Class (GCC Class 1) although neither part of the Strategic nor Primary Road Networks. The A417 was detrunked in 1992.

2.2.2 Most roads within the study area are subject to a national speed limit of 30mph. The exception is a 40mph section of the A417 to the east of central Fairford.

2.2.3 Roads within the study area vary in width. The most generously proportioned road is High Street which, in part, offers 9m of active carriageway. The least generous carriageway is found on the A417 which has a width of just 3.4m, at its narrowest point.

2.2.4 Some street lighting is provided within the study area, although this does not achieve blanket coverage.

2.3 Public Transport

2.3.1 A range of bus services operate in the area. The following list the stops and available services

Table 2.1 – Bus Services within Fairford Town

Stop Location / Name	Key Features	Services	Highest Frequency Service
High Street			
Market Place	NB - On Street Stop; Narrow Footway. SB - On Street Stop; No Sign or Markings. Dropped Kerb Pedestrian Crossing; No Tactile Paving	74, 77, 861, 865	1 every 2 hrs
Park Street			
Cricket Field	EB - On Street Stop. WB - On Street Stop; No Sign or Markings; No Footway; No	74, 77, 861	1 every 2 hrs

	Hard Standing No Pedestrian Crossing.		
Hatherop Road / Hatherop Lane			
Churchill Place	EB - On Street Stop; No Sign or Markings; Narrow Footway WB - On Street Stop; Narrow Footway. No Pedestrian Crossing (Dropped Kerbs at Private Drives).	74, 77, 861	1 every 2 hrs
Fire Station	EB - On Street Stop; No Sign or Markings; Narrow Footway WB - On Street Stop. No Hard Standing at Carriageway Edge No Pedestrian Crossing (Dropped Kerbs at Private Drives)		
Hatherop Lane	NB - On Street Stop; Narrow Footway. SB - On Street Stop; No Sign or Markings; No Footway; No Hard Standing. No Pedestrian Crossing.		
A417 London Road			
The Home Farm	EB - On-Street Stop; No Footway; No Sign or Markings. WB - On-Street Stop; No Footway; No Sign or Markings. No Pedestrian Crossing (No Kerbs)	74, 77, 861, 865	1 every 2 hrs
The Vortex Inn	EB - On-Street Stop; No Sign; Loose Surface hard Standing at Carriageway Edge WB - On-Street Stop; Narrow Footway; No Hard Standing at Carriageway Edge. No Pedestrian Crossing		
Opposite Hatherop Lane	EB - On-Street Stop; Narrow Footway; No Sign or Markings. WB - On-Street Stop; No Footway; No Sign or Markings. No Pedestrian Crossing		
The Garretts (Coronation Street)			
The Garrets / Opposite Mill Ln	NB - On-Street Stop; No Sign or Markings; .Very Narrow Footway; No Hard Standing at Carriageway Edge. SB - On-Street Stop; No Footway; No Sign or Markings. No Pedestrian Crossing	865	1 per Day
Horcott Road			
Lakeside	NB - On-Street Stop; No Sign or Markings; Narrow Footway SB - On-Street Stop; No Sign or Markings. Dropped Kerb Pedestrian Crossing; No Tactile Paving	861	2 per Day
St Thomas Church	NB - On-Street Stop; No Sign or Markings; No Footway; Small Patch of Hard Standing. SB - On-Street Stop; No Sign or Markings. No Pedestrian Crossing		

2.4 Cycle

2.4.1 Although isolated from the National Cycle Route network, Fairford is a popular area amongst cyclists. The Town is identified on the Cotswold District Council's Route 4, and is the starting point of the Cotswolds: Great British Ride (book), as featured in the Guardian.

2.4.2 Notwithstanding the above, there is very little in the way of specific infrastructure within Fairford for cyclists. There are, for example, no public cycle parking stands within the town. Nor are there any specific recommended or advisory routes for cyclists within Fairford.

2.4.3 It is understood that a cycle route, providing access between Lechlade and the Farmor's Secondary School, via East End is a long held ambition of the Town Council. In this context crossing the A417 between East End and Lower Croft is considered to be a significant issue.

2.4.4 Given the high volume of traffic, prevailing speeds, narrow lanes and the on-street parking, the A417 is considered to be a disincentive to all but the most experienced cyclists.

2.5 Pedestrian

2.5.1 Footways are provided along at least one side of the main roads within central Fairford. Where footways are not provided, along older roads and in less built up areas, pedestrians share the surface with vehicles.

2.5.2 One particularly significant shared surface link is Back Lane. This lane links the housing areas to the south of the A417 to central Fairford.

2.5.3 Many of the footways in Fairford are quite narrow. Some of these appear to be narrower than originally intended as a result of overgrowing vegetation. This report comes with the general recommendation for a comprehensive audit of footways, and subsequent programme for widening, reinstatement, and clearing overgrowth.

2.5.4 Where provided, pedestrian crossings are in the form of dropped kerbs with, in a few cases, tactile paving. Pedestrian refuge islands are provided across Park St and The Croft. There are no pedestrian priority crossings within the study area.

2.5.5 In addition to the footways and quiet roads, pedestrians benefit from a network of footpaths. Many of these can be considered to be strategically significant, in terms of getting around the town. These paths are:

- The link between The Croft and A417
- The link between the A417 and High Street
- The link between The Croft and High Street
- The link between the A417 and the Library

2.6 Road Traffic Accident

2.6.1 The road traffic accident (RTA) records for the most recent full 5 years (2009-2014), shown on the 'road safety-gloucestershire.org.uk' website, provides the following information:

Table 2.2 – Summary Road Traffic Accident Data 2008-to date

Road	Accident Severity			Involving a single Vehicle	Accidents Occurring at Night
	Slight	Serious	Fatal		
Park Street	1				
The Croft	1			1	
Coronation Street	2			1	
A417	7	2	1	1	3
Back Lane	1				
Park Close	1				

2.6.2 The study area covers all roads within the town of Fairford. For the A417, this is defined as the area between the 'Welcome to Fairford' road signs.

2.6.3 As would be expected the majority of accidents in Fairford occur on the A417. The only serious and fatal accidents occurred on this road.

2.6.4 Just one location experienced multiple accidents and that was the A417 / High Street junction. The fact that more than one accident occurred in the same location might suggest an issue with the highway geometry. Elsewhere the accidents were one offs with no apparent clustering or causation patterns.

2.6.5 The rate of accidents along the A417 is no higher than would be expected for a road of this type.

3 Design principles

3.1 Introduction

3.1.1 Current highway design philosophy in built up areas seeks to balance the needs of all road users. In its introduction the Manual for Streets (MfS) states:

Streets are the arteries of our communities – a community's success can depend on how well it is connected to local services and the wider world. However, it is all too easy to forget that streets are not just there to get people from A to B. In reality, streets have many other functions. They form vital components of residential areas and greatly affect the overall quality of life for local people.

Places and streets that have stood the test of time are those where traffic and other activities have been integrated successfully, and where buildings and spaces, and the needs of people, not just of their vehicles, shape the area.

3.1.2 MfS is focused on lightly-trafficked residential streets, but many of its key principles may be applicable to other types of street, for example high streets and lightly-trafficked Lanes in rural areas. Additional guidance on shared surface treatments, suitable for very lightly trafficked residential areas, is available in the *Institute of Highways and Incorporated Engineers Home Zone Design Guide.*

3.1.3 Further reading on how the MfS philosophy can be retrofit to existing high streets is contained in the *Re-Imagining Urban Spaces; DfT 2012* document. A relatively recent example in Gloucestershire is Stonehouse High Street. While a lower category road Stonehouse High Street carries similar traffic volumes to the A417 in Fairford.

3.1.4 Other relevant reading is TA87/04 Traffic Calming on Trunk Roads a Practical Guide. The A417 is no longer a trunk road; nevertheless, TA87/04 provides useful guidance on what might be considered suitable and justifiable on a higher category road. TA87/04 does not rule out measures such as reduced carriageway, pedestrian crossings or vertical / horizontal deflection where these will enhance safety and connectivity.

3.1.5 The current design philosophy differs to the historic approach, which tended to result in a presumption in favour of free flowing traffic, and the strict segregation of vehicles from pedestrians.

3.1.6 In practice, pedestrians will follow desire lines and walk in the road if footways are too narrow or crowded. The historic approach would be to use guardrailing to

control pedestrians. The current approach seeks to balance road space, and priority, according to demand, and create a pleasant and safe environment where pedestrians, cars and bicycles can coexist safely.

3.1.7 Research shows that key considerations for non-car road users include:

- Footway / pedestrian area width
- Speed of traffic
- Volume of traffic
- Proportion of HGVs
- Lighting

3.2 Footway / Cycleway Width

3.2.1 Current guidance recommends a minimum footway width of 2.0m. The government's publication *Inclusive Mobility* shows that, at this width, wheelchairs and pushchairs can pass one another with relative ease. Narrower sections can be acceptable, so long as people can see clearly between areas where the footway is wide enough to pass. Sections narrower than 900mm will be problematic for some wheelchairs and pushchairs.

3.2.2 Guidance advocates a minimum 3.0m wide footway at bus stops, to allow pedestrians to pass waiting passengers.

3.2.3 Where footways are shared with cyclists, the recommended minimum width is 3.0m.

3.2.4 For separate cycle Lanes the recommended minimum width is 1.5m one-way (preferably 2.0m), or 3.0m for a two-way cycle Lane. The recommended vertical clearance is 2.3m. This is relevant to overhanging vegetation, and any high level signs.

3.2.5 In general, wider and level footways / cycleways encourage people to use these modes of travel.

3.3 Traffic Speeds

3.3.1 The MfS states:

For residential streets, a maximum design speed of 20 mph should normally be an objective. The severity of injuries and the likelihood of death resulting from a collision at 20 mph are considerably less than can be expected at 30 mph. In addition, vehicle noise and the intimidation of pedestrians and cyclists are likely to be significantly lower.

3.3.2 The *Relationship between Speed and Risk of Fatal Injury: Pedestrians and Car Occupants, Road Safety Web Publication No.16, DfT, September 2010*; states in its conclusion:

'In all of the pedestrian datasets, the risk of fatality increases slowly until impact speeds of around 30 mph. Above this speed, risk increases rapidly – the increase is between 3.5 and 5.5 times from 30 mph to 40 mph'

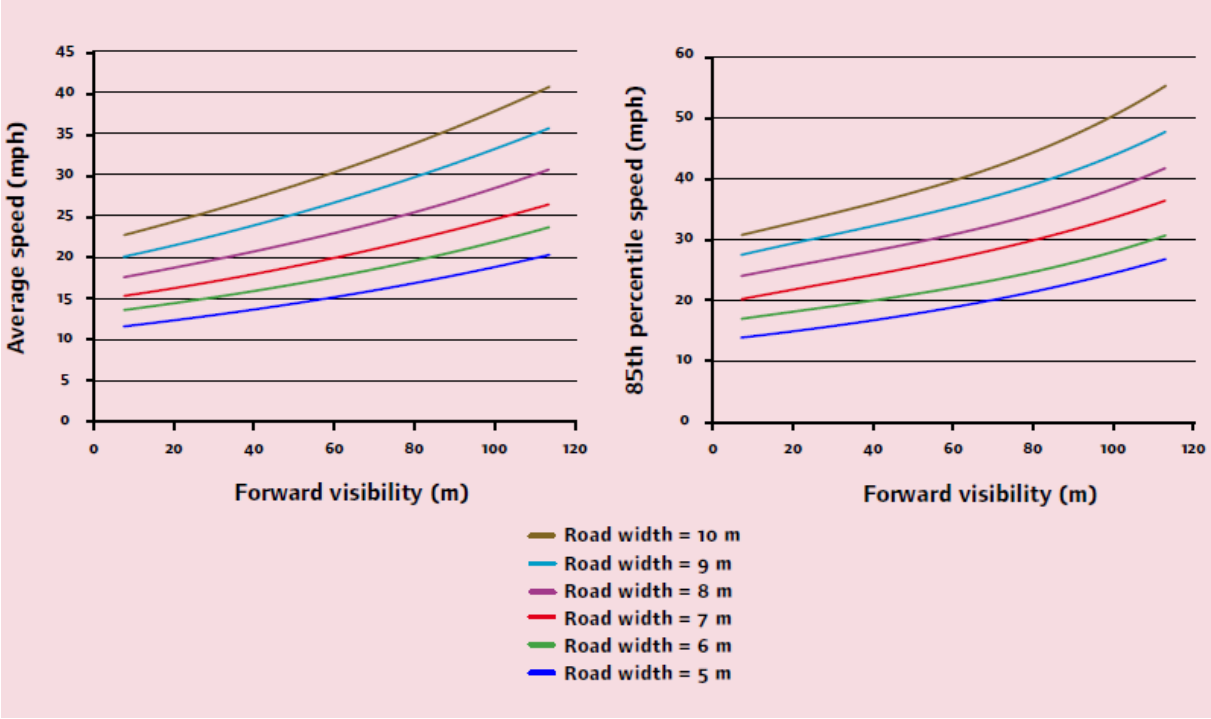
3.3.3 The above document references a number of UK based research papers, all of which draw slightly different fatality rates. A reasonable summation of all the data is that: impacts at 20mph result in about 5% fatalities; at 30mph this rises to around10%; and at 40mph the fatality rate is around 50%.

3.3.4 Just one piece of research, referenced in the Road Safety Web Publication, groups pedestrians by age. This research concludes that: child fatality rates (0-14) are largely consistent with the average; however, fatality rate for the elderly (60+) is higher, at 47% at 30mph and nearly 100% at 40mph.

3.3.5 The advice in this report is that residential streets, and other areas of significant pedestrian activity, should have a target speed of 20mph. Elsewhere within built up areas, where vehicle movement is deemed more important than pedestrian movement, a 30mph limit may be more appropriate. Speed limits of 40mph are only likely to be appropriate where there is little development and pedestrian, cycle and equestrian activity is low. In 40mph zones, non-motorised road users should be afforded segregated road space with well-designed crossing facilities, where required.

3.3.6 Target speeds of 20mph need not involve speed limits or unsympathetic traffic calming. The MfS document shows how lane widths, and limited forward visibility, affect vehicle speeds.

3.4 Lane Widths & Forward Visibility



Extract From MfS Showing the Relationship between Geometry and Speed

3.4.1 For existing roads that are relatively straight restricting forward visibility is unlikely to be possible. In these instances traffic calming measures are likely to be the best option, for controlling speeds.

3.5 Traffic Calming

3.5.1 Surveys that provided direct information on the relative popularity of different traffic calming measures indicated that vertical deflection (round-top road humps, flat-top road humps, table junctions, and speed cushions) are more popular than horizontal deflection (chicanes and mini- roundabouts, etc).

3.5.2 The table below, extracted from *Local Transport Note 1/07; Traffic Calming,* shows the relative effect of certain traffic calming measures. Measures that do not involve horizontal or vertical deflection, for example Gateways and coloured surfaces, can have a very modest effect. When used in combination with other measures, the effect is magnified.

3.5.3 The guidelines advise that where gateway features have reduced speeds, these have not been sustained over any distance. The experience is that speeds within villages have at most been reduced by 1 or 2 mph if there are no additional measures in

place. For maximum benefit, gateways should be used in conjunction with other measures within the village.

3.5.4 For a 20mph zone, the recommended spacing of speed control measures is 60 to 70 metres apart. For a 30mph zone, the recommended spacing is 60 to 90 metres apart.

Type of measure	Chapter or Section in LTN	Impact on traffic speeds * * * = largest reduction	Impact on traffic flows * * * = largest reduction	Impact on injury accidents * * * = largest reduction	Delays to emergency services * * * = shortest delay	Relative public acceptability * * * = most acceptable	Impact on vehicle emissions * * * =smallest increase		
							CO	NOx	PM
Road hump									
Round-top	4.2	* * *	* * *	* * *	*	* * *	* *	* *	* *
Flat-top	4.2	* * *	* * *	* * *	*	* * *	*	*	*
Raised junction	4.2	* * *	* * *	* * *	*	* * *	*	*	* *
Sinusoidal	4.2	* * *	* * *	* * *	*	* * *	-	-	-
'H' hump	4.2	* *	* * *	* * *	* *	* * *	-	-	-
'S' hump	4.2	* *	* * *	* * *	* *	* * *	-	-	-
Thump	4.2	* *	* * *	* *	*	* *	-	-	-
Cushion	4.2	* *	* * *	* * *	* *	* *	* *	* *	* *
Rumble device									
Area	5.1	*	*	* *	* * *	* *	-	-	-
Strip	5.1	*	*	* *	* * *	*	-	-	-
Narrowing									
Island	6.3	*	*	*	* * *	-	-	-	-
Pinch point/build-out	6.3	* to * * *	* to * *	* to * *	* * *	*	* *	* * *	* * *
Chicane									
Single lane	6.4	* * *	* *	* *	* *	*	*	* * *	*
Two-way	6.4	* *	*	* *	* *	* *	-	-	-
Gateway	7	* *	*	* *	* * *	* *	-	-	-
Mini-roundabout	8	* *	*	* *	* * *	*	* * *	* *	* *
Vehicle activated device									
Vehicle activated signs	9.1	* *	*	* *	* * *	-	-	-	
Speed cameras	9.2	* *	*	* *	* * *	* * *	-	-	
Road markings, traffic signs and furniture									
Roundels	10.2	*	*	*	* * *	* * *	-	-	
Coloured surfacing	10.2	*	*	*	* * *	-	-	-	

Extract from Local Transport Note 1/07; Traffic Calming showing Summary of measures and their relative performance

3.6 Junction Visibility

3.6.1 Junction visibility is generally measured 2.4m back from the 'give way' line. This measurement is taken as the position of the driver's eye when waiting at the give-way line. Other x-distances can apply in particular circumstances; however, 2.4m is generally considered the minimum acceptable standard for significant junctions.

3.6.2 The distance that a driver exiting from the minor arm can see, to his left and right along the main alignment, is known as the y-distance. For simplicity the y-distance is measured along the nearside kerb line of the main arm.

3.6.3 The recommended junction visibility y-distance is based on stopping distances at the prevailing, or assumed, 85th percentile traffic speeds. Although the current stopping distances advocated in MfS are significantly lower than previous assumptions, they still include a large comfort factor. It is perhaps for this reason that research presented in the Manual for Streets2 (MfS2) finds no evidence for the assumption that, a failure to provide visibility at priority junctions in accordance with MfS1 or DMRB (Design Manual for Roads and Bridges) will result in an increased risk of injury collisions. MfS2 states:

'The y-distance should be based on the recommended SSD [Stopping Sight Distance] *values. However, based on the research referenced above, unless there is local evidence to the contrary a reduction in visibility below recommended levels will not necessarily lead to a significant problem.'*

3.6.4 Although no guidance advocates basing visibility on emergency stopping distance, this is, nevertheless, a material consideration. This report provides the calculation of emergency as well as recommended stopping distances, for information. It should be noted that GCC's approach is to apply HGV deceleration rates to all vehicles on bus routes. This adds a further comfort factor.

Dealing with HGVs/PSVs

3.6.5 The need to accommodate larger vehicles can, in some respect, limit the designer's options when considering Lane geometry as a speed control measure. GCC recommend carriageways of no less than 6.75m for bus routes. Other guidelines recommend 6.0m minimum, while the MfS show that larger vehicles can pass on carriageways of 5.5m.

3.6.6 In general, the recommend approach involves balancing the frequency, and importance of large vehicle trips, with the ease with which they can pass through a street. For occasional HGV access to / from quiet Lanes it is generally considered acceptable for HGVs to turn across both lanes. Overrun areas can also be used to

provide additional turning space for HGVs, while maintaining the appearance of constrained geometry.

4 Non-Car Links

4.1 General

4.1.1 The creation of an inclusive and connected community lies at the heart of the recommendations in this report. With a growing and aging population the need for quality non-car access options, designed to accommodate the mobility impaired, can only increase.

4.1.2 This report considers the A417 to be a disincentive to pedestrian trips because of sections of narrow footpath combined with the negative impacts of road traffic, in particular HGV's. The general recommendation is to put in place measures to cross and move away from the A417 more easily.

4.1.3 The most attractive option for achieving the above is pedestrian priority crossings. However, it is known that the local highway authority prefer the (obsolete) $PV^2 \geq 0.2^8$ method for determining need. Given the levels of traffic along the A417, the number of pedestrians crossing needs to exceed 80 per hour before a priority crossing will be considered. Site observations have not revealed this level of pedestrian demand at any specific location. As a result dropped kerb / tactile paved crossings should be considered the only crossing type likely to achieve the support of the highway authority.

4.2 Key Destinations / Pedestrian Desire Lines

4.2.1 The following considers the pedestrian connections to the key destinations within Fairford.

High Street - Market Place

4.2.2 High Street, and in particular its southern end, is the focal point of activity within Fairford. Significant numbers of people shop and congregate in this area every day.

4.2.3 Pedestrian access from the housing areas to the east involves the footway links along The Croft or Park Road. Dropped kerb / tactile paved crossing are conveniently provided across the southern end of Leafield Road, the eastern end of The Croft, and the eastern end of Park Road.

4.2.4 Those choosing to access High Street, via Park Road, will currently find no crossing from the road's only footway (on the northern side) into High Street. It is understood that a dropped kerb / tactile paved crossing is to be provided between the High Street and the car park. With this in place the route of choice for those with impairment mobility will be via the dropped kerb crossing across Mill Lane (no tactile

paving) and onto High Street's western footway. From this direction, access to the shops on the eastern side of high street, is via the dropped kerb crossing outside Lloyds Bank (no tactile paving).

4.2.5 Those choosing to access High Street via The Croft will make use of the relatively narrow footway. A short cut through the Walnut Tree Playground is available, however, the narrow access points, measuring 700-750mm, makes this route problematic for some wheelchairs, pushchairs and ambulant disabled.

4.2.6 Pedestrian access to / from the south is most readily achieved via Back Lane, across the A417. Pushchairs / wheelchairs can make use of the dropped kerb access into Back Lane. However, there is no corresponding dropped kerb on the northern side of the A417. Instead, those who cannot easily mount the kerb must walk in the road for some 35 metres to reach the nearest dropped kerb on High Street.

4.2.7 Pedestrian access from the west is achieved via the footway running alongside the A417. On the whole these footways are in a good state of repair. There are some narrow sections but intervisibility between wider sections is good and, on this basis, the A417 footway links are generally considered adequate.

4.2.8 The notable exception to the above is the lack of a pedestrian crossing across Coronation St and Horcott Rd. In the case of the former, the width of the live carriageway and the absence of a footway along the desire line on the northern side, compounds the difficulties in the area. A crossing across Horcott Rd is provided, albeit somewhat offline for the east-west movement. This dropped kerb type crossing has no tactile paving.

4.2.9 Pedestrians approaching High Street, from the west, have the choice of a footway link to the rear of The Bull, or to continue along the A417. The route along the northern side of the A417 is discontinuous. Pedestrians choosing this route must, therefore, cross onto the southern side of the A417 to continue this journey. This is accommodated by an existing dropped kerb crossing. Unfortunately, as discussed above, there is no corresponding facility allowing people to access High Street from the southern side of the A417.

4.2.10 It is for the reasons identified above that the footpath link to the rear of The Bull is considered to be strategically significant. Unfortunately the suitability of this link is somewhat compromised by its width, poor forward visibility and poor lighting.

4.2.11 Measurements taken on-site indicate that this link is on average 1.2m wide. The widest section is 1.7m wide, which is barely adequate for two pushchairs / wheelchairs to pass. While there is natural surveillance, the lighting and forward

visibility issues are considered to render this path unattractive during the hours of darkness, and therefore discouraging of sustainable travel choices.

High Street – Community Centre / The Church

4.2.12 Pedestrian Access to the Church and Community Centre follow the same routes as that described in the preceding section. It is notable that the footway outside the Church and Community Centre is relatively narrow, measuring an average of 1.8m wide. This is considered to be poor provision for an area where the community would likely choose to congregate at certain days of the week / times of the year.

4.2.13 The crossing across High Street, close to the Community Centre, is considered poor for a number of reasons. There are no tactile paving, the footway on the western side is narrow, and parked cars on the eastern side obstruct the pedestrian's view.

Fairford Library

4.2.14 Pedestrian access to Fairford Library is achieved via The Orchard (road) or an adjacent footpath link. Pedestrian access across the A417, to/from the south, is achieved by means of a dropped kerb, tactile paved, build-out crossing. There are two potential footpath links from the A417. Both have features designed to discourage cyclists. At the eastern of the two these features reduce the available gap to less than 700mm, which effectively bars access to the disabled and pushchair user. For these people the available route, the western of the two, is single file only.

4.2.15 The pedestrian route to the Library from the north, via The Orchard, ends at the turning head area at the end of the road. While there is a dropped kerb on the eastern side there is no corresponding provision on the western side of the turning head. Those requiring this facility must therefore continue within the road into the car park.

4.2.16 Notwithstanding the missing dropped kerb, the result is pedestrians walking across an area where vehicles might be reversing.

Fairford Hospital

4.2.17 Fairford Hospital is located off The Croft. Pedestrians can make use of footways running both sides of The Croft. The footways are on average 0.9m wide on the northern side and 1.2m wide on the southern side, and are therefore significantly narrower that the recommended minimum. The dimensions are such that pushchairs / wheelchairs will have to cross onto the grassed verge in order to pass one another.

4.2.18 There are a number of opportunities to cross The Croft. These include dropped kerbs at private drives. There is, however, no tactile paving to clearly identify a preferred crossing point.

4.2.19 The obvious constraints on parking near the Hospital emphasises the need for good pedestrian links.

Hilary Cottage Surgery

4.2.20 Pedestrian access to the local surgery is via Keble Lawns off Beaumoor Place, off East End, off the A417. A series of dropped kerbs suggest a pedestrian route; however, the route lacks suitable dropped kerbs on the eastern side of East End and at the northern side of Beaumoor Place, at the junction with Keble Lawns. Tactile paving is also missing from the route.

4.2.21 The A417 approaches to East End warn drivers that there may be elderly people crossing the road. This serves to highlight the absence of a specific pedestrian crossing point across the A417 in this location.

4.2.22 To the northeast of A417/ East End junction lies the largest area of existing housing within Fairford. The natural 'desire line' route from this housing and the surgery is along the line of East End. This route has no footway. These issues are considered in detail in Chapter 10.

4.2.23 The obvious constraints on parking near the surgery emphasises the need for good pedestrian links.

Farmor's School

4.2.24 The Farmor's School complex is accessed via Fairford Park or Leafield Road. The park road is a quiet narrow private road with a separate footway provided along its western side. As mentioned previously, pedestrians do not have the benefit of a crossing from High Street on to the park road.

4.2.25 Within the housing area Leafield Road incorporates footways along both sides of the carriageway. Dropped kerbs are provided where minor roads join Leafield Road. There is no tactile paving.

4.2.26 The footway along the eastern side of Leafield Road terminates around 200m to the south of the main school entrance. A dropped kerb crossing is provided across Leafield Rd in this location. There is no tactile paving.

Marlborough Arms / Vortex Inn

4.2.27 Pedestrians are poorly served at the junction between Coronation Street, Horcott Rd and the A417. The lack of any pedestrian crossing facilities, and the detour of the A417 eastbound footway, is compounded by footways routinely occupied by parked cars on Coronation St, and narrow footways on Horcott Rd.

4.2.28 The potential for pedestrian traffic in this area is associated with the special needs Coln House School and Horcott Industrial Estate. The warning signs for drivers on the A417, indicating that school children may be crossing, highlights the absence of a pedestrian crossing in this location.

4.3 Recommended Pedestrian Access Improvements

High Street - Market Place

4.3.1 In order to assist those with mobility impairment, including wheelchair and pushchair users, it is recommended that new dropped kerb crossings are provided at the following locations:

- The eastern side of High Street across Park Road
- The western side of High Street across Park Road
- The eastern side of High Street across the A417

4.3.2 In order to assist those with visibility impairment, it is recommended that all dropped kerb crossings incorporate tactile paving.

4.3.3 Footways along The Croft fall below the minimum recommended by the government for inclusive mobility. It is recommended that these footways are widened to 2.0m, in order to allow wheelchairs / pushchairs to pass one another.

4.3.4 Based on the same guidance, as above, the playground access points act as a barrier to most wheelchairs and many who are ambulant disabled. The gap is also too narrow for many pushchairs. It is recommended that the central posts, and crossbeam in the case of the northern access, are removed.

4.3.5 Improvements to the footpath link beside The Bull PH are recommended. Appropriate improvements are better lighting and an improved surface. CCTV will assist with concerns over safety. Consideration should be given to coppicing / clearing overhanging vegetation from the church, in order to allow more natural light.

4.3.6 Issues relating to the A417 / High Street junction are considered in Chapter 9

Fairford Library

4.3.7 Improvements are recommended to the two pedestrian routes off the A417 towards the library. It is recommended that these are combined to create an arrangement that is friendly to wheelchairs, pushchairs and the ambulant alike.

4.3.8 It is recommended that the footway along The Orchard is extended around the rear of the turning head. This arrangement is preferred, over the simple inclusion of a dropped kerb on the western side of the turning head, because it resolves the inherent risks with walking in the same area that cars are reversing.

Fairford Hospital

4.3.9 Fairford Hospital is located off The Croft. Recommended improvements to The Croft, mentioned above, involve widening the footways to 2.0m. It is also recommended that tactile paving is used to guide the visually impaired along the best route.

4.3.10 Pedestrians accessing from the south can make use of the footpath link running past the library, to the west of the Hospital. This route has limited natural surveillance and would benefit from low level lighting and CCTV. However, the availability of an alternative, via The Orchard, is considered to reduce the priority of these improvements.

Hilary Cottage Surgery

4.3.11 It is recommended that dropped kerbs are added on the eastern side of East End and at the northern side of Beaumoor Place, at the junction with Keble Lawns. All dropped kerb crossing points would benefit from tactile paving.

4.3.12 Issues relating to routes from the north, and crossing the A417, are considered in Chapter 10

Farmor's School

4.3.13 The recommended introduction of dropped kerb crossings at the northern end of High Street will assist with access to Farmor's School, via Fairford Park.

4.3.14 The overflow parking at the northern end of High Street can make a valuable contribution to the School's access. Consideration should be given to a pedestrian access directly from the car park, so as to avoid conflicts at the existing shared surface access. A greater uptake of this parking will reduce the demand at the School's main access off Leafield Road.

4.3.15 It is recommended that a footway is provided on the western side of Leafield Road, north of the School Access, to accommodate those choosing to park and walk from here.

Marlborough Arms / Vortex Inn

4.3.16 This report recommends the provision of a new footway along the northern side of the A417, over Coronation St, incorporating suitable dropped kerb and tactile paved crossing points.

4.3.17 The issues surrounding the road layout in this location are considered further in Chapter 6.

4.4 Recommended Cycle Access Improvements

4.4.1 A number of cyclists have been observed to travel through Fairford along the A417, and the town is known as a starting point for recreational cycling. The local roads, being relatively lightly trafficked, lend themselves to cycling.

4.4.2 It is recommended that key destination incorporate appropriate secure cycle parking facilities.

4.4.3 The provision of a cycle route between Lechlade and Fairford, emerging from East End, would likely justify a toucan crossing, and add support the more ambitious suggestions in Chapter 10.

4.5 Recommended Bus Access Improvements

4.5.1 Table 2.1 of this report identifies a number of shortcomings in the provision for Bus users. This report recommends rectifying these shortcomings.

4.5.2 As a minimum, signs identifying the location of bus stops, with timetables attached, should be provided. Hardstanding and crossing points are highly desirable.

5 High Street

5.1 Existing Conditions

5.1.1 High Street is a 2-way, 2-Lane, single carriageways with footways running along both sides. The road is partially lit and subject to a national speed limit of 30mph. The width of the effective carriageway varies significantly. Surprisingly, the most generous provision for vehicles in Fairford can be found at the northern end of High Street, which has an effective carriageway width of 9.0m.

5.1.2 Footways along High Street also vary in width. The typical footway is between 1.8 and 2.0m wide. The narrowest section of footway, which is located near the northbound bus stop, has a width of around 1.5m. Dropped kerb pedestrian crossings are available close to the northbound bus stop, and towards the southern end of High Street. Just the crossing at the southern end of High Street includes tactile paving.

5.1.3 The northbound bus stop is clearly identified by a sign, whereas the southbound stop is not. It has been observed that southbound buses stop opposite the northbound stop. This is a different location to that shown on all current bus stop location maps.

5.1.4 A further issue relates to the existing on-street parking. This makes buses inaccessible from the kerbside.

5.1.5 With the exception of a short section near the northbound bus stop, on-street parking is permitted along both sides of High Street. The Market Place offers more parking opportunities. Observations reveal a high demand for parking on High Street, with full occupation a regular occurrence.

5.1.6 Site observations also suggest that the 1hr waiting restriction is not strictly adhered to by some motorists.

5.1.7 By contrast to High Street, the unrestricted overflow car park off Park Street is underutilised.

5.1.8 An undesirable effect of the on-street parking is that southbound buses and shop delivery vehicles (notably HGV deliveries outside the CO-OP) stop within the lane, to pick up passengers or make deliveries. This causes a significant obstruction at times.

5.1.9 The issues surrounding the High Street / A417 / Back Lane junction are considered in detail at Chapter 9.

5.1.10 At its northern end, High Street forms a crossroads junction with Park Street and the road through Fairford Park. On-site observations suggest no issues with junction visibility in this location. The pedestrian access issues in this location are considered in Chapter 4.

5.1.11 A further area of concern relates to vehicle speeds, and in particular whether the very wide carriageway at the northern end of the High Street may be encouraging inappropriate speeds. This report considers that the appropriate vehicle speed within a high street is 20mph or less.

5.1.12 The tables below shows the results of a speed survey carried out at the northern end of the High Street. Care has been taken to ensure that the recorded speeds reflect free flowing conditions, in accordance with the guidelines.

Table 5.1 – High Street (opposite church) Speed Survey

Direction	85th Percentile speed
Northbound	28mph
Southbound	25mph

5.1.13 The survey shows that the 85th percentile speed is significantly above the recommended target speed of 20mph.

5.2 Summary of the Issues

5.2.1 The following summarises the issues identified above

- Junction visibility from High Street onto the A417
- Vehicle speeds on the northern section of High Street
- Absence of pedestrian crossing facilities to/from High Street at the A417 and Park Road
- Absence of tactile paving's where crossing facilities are provided
- Demand for High Street parking,
- Underutilisation of the overflow parking.
- Narrow footways.
- No southbound bus stop identifying features or kerbside drop off.

5.3 Recommended Improvements

Speed Reduction on High Street

5.3.1 This report recommends a target speed of 20mph for High Street. This is based on the guidance documents referenced in Chapter 3 which shows that, compared to

30mph, the frequency and severity of accidents are lower and the amenity value (relative pleasantness) of journeys for non-motorised users is higher.

5.3.2 The research presented in the MfS shows how wide roads tend to result in higher vehicle speeds. On this basis it is recommended that the effective carriageway width is reduced to 6.0m. This might be achieved by assigning road space to additional parking and/or widened footways.

5.3.3 Parking

5.3.4 Subject to a specific design exercise, it is possible that the re-appropriation of road space to parking could deliver around 10% more spaces within High Street.

5.3.5 A pedestrian priority crossing between the High Street and the overflow parking is recommended as a way of encouraging its use. It is understood that such provision is already under consideration.

5.3.6 In order to free up space within the High Street, and make better use of the overflow parking, consideration should be given to reducing the maximum stay to 30 minutes. It is recommended that on-street parking restrictions are enforced.

5.3.7 Government guidance on the provision of parking spaces for disabled drivers in retail areas, recommends a minimum of one space for each employee who is a disabled motorist, plus 6% of the total capacity for visiting disabled motorists. At present there are just 5 designated disabled parking spaces. This equates to around 3% of the overall provision. The surface within the overflow car park is not ideal for disabled people and, therefore, it is recommended that additional disabled parking is provided within High Street. It is recommended that parking provision for disabled drivers is increased to meet either the national guidelines, or a specific assessment of local need.

5.3.8 Site observations show that the lack of clearly delineated bays makes for an inefficient use of the overflow car park. Measurements taken on site reveal that 15% more capacity could be created if the bays were marked out.

Footway Width

5.3.9 An additional or alternative benefit of reducing the effective carriageway on High Street is the potential increase in footway widths outside the church and community centre. Although the existing footways can be considered adequate, they offer little amenity in an area where the community would otherwise naturally congregate.

Bus Stops

5.3.10 As previously identified, the northbound bus stop is located at the narrowest section of footway on High Street. There are two potential remedies recommended in this report:

- Reuse the old bus stop, with its existing shelter, adjacent to the Bull PH; or
- Locally widen the footway at the bus stop, either in its current location or further north where space is less constrained.

5.3.11 The identified issues surrounding the southbound bus stop are that: its location is uncertain; and on-street parking makes kerbside access impossible. This report recommends the introduction of a Bus Stop sign in conjunction with one of the following remedies to the kerbside access issue:

- Remove some on-street parking to allow bus access to the existing kerb; or
- Build-out the kerb to meet the bus.

The latter will remove fewer on-street parking spaces but will not address the temporary obstruction issue.

Obstructions Caused by Larger Vehicles

5.3.12 Obstructions caused by on-line bus stops are generally considered acceptable for two reasons: the dwell time is typically very short; and the arrangement assists bus punctuality by avoiding any in delay exiting lay-bys.

5.3.13 Obstructions caused by delivery vehicles stopping on-line is potentially a more significant issue. Dwell time can be long and this has the potential to lead to frustration and poor choices on the part of other drivers. In the case of deliveries to businesses at the southern end of High Street, the obstruction occurs close to a busy junction and also potentially blocks-in cars parked on-street, which compounds the concern.

5.3.14 Consideration has been given to the potential for a reserved on-street area for deliveries only. The concern with this arrangement is twofold. Firstly, if properly observed it will permanently remove a number of on-street parking places. Secondly, and considered more likely, the restriction may not be observed by other drivers and therefore be ineffective.

5.3.15 The recommendation in this report is to work with retailers to develop a strategy for managing their needs. It may be that out-of-hours deliveries will be most suitable, or a system of timed deliveries for which space can be reserved in advance. Restricting

deliveries for certain sizes of vehicle to certain times of the day could be implemented with the highway authority's support.

Overall Layout

5.3.16 The overall layout of High Street is based in historic highway design principles, and effectively gives over the majority of the space to vehicles. Current design guidance seeks to redress the balance by minimising or eliminating the hard division between pedestrian and vehicular areas. At one end of the spectrum there is no clear distinction between pedestrian and car areas. This type of arrangement is most suited to quiet residential roads and cul-de-sacs. The arrangement considered most suitable for High Street is sometimes referred to as the Living Street and/or Shared Surfaces. For these roads the vehicular, parking and pedestrian areas are delimitated using different coloured surface and/or low profile kerbs and/or bollards. With this type of arrangement pedestrians are encouraged to cross at will, while the change in surface treatment also warns drivers that they have left the traditional highway and should proceed with caution.

5.3.17 The accompanying sketch, reference 1601SK03, illustrates the recommended improvements to High Street. This sketch shows how on-street parking can be maximised, as this is known to be a particular issue for the community. However, it should be recognised that excessive on-street parking will compromise the sense of pedestrian permeability within a Living Street/Shared Surface arrangement. There is a balance to be struck. It is recommended that any Living Street/Shared Surface treatment of High Street extend over Park Street towards the overflow car park. This will help support its use and a reduction in parking on High Street.

6 A417 Layout

6.1 Existing Conditions - Layout

6.1.1 There are three distinct characters of the A417 within Fairford. At the eastern and western extent of the study area the A417 is a standard single 2-way free flowing carriageway with a footway along at least one side of the road. Further in towards central Fairford two footways are provided, while on-street parking reduces the effective carriageway to single lane sections. This area is also characterised by numerous side roads and private accesses. At the centre of Fairford the footways narrow, and disappear along the northern side, and the road reduces to a single lane.

6.1.2 A number of specific concerns have been raised in respect of the A417 in Fairford. The following paragraphs identify these issues in turn.

On-street parking outside The Vortex Inn / Marlborough Arms.

6.1.3 Regular on-street parking causes an obstruction to eastbound traffic in this location.

6.1.4 Although the A417 measures 7.3m wide kerb to kerb, white lining has been used to reduce the effective carriageway to 5.8m. It is assumed that this white lining was introduced as a traffic calming measure.

Pedestrian Movements between Coronation St and Horcott Rd.

6.1.5 Road signs identify this as a school crossing point. It is also a route to the Horcott Industrial Estate (employment) and Youth Football Club (recreation). There are, however, no pedestrian crossing facilities across the A417 in this location.

Pedestrian Movements across Coronation St.

6.1.6 The footway alongside the A417's eastbound carriageway takes a significant deviation from the desire line, as it crosses the Coronation Street. Those inclined to follow the direct (desire line) route are hampered by a wide junction bell- mouth and a low level metal chain (trip hazard).

6.1.7 Those choosing to follow the footway diversion are hampered by parked cars straddling the footway and the lack of any dropped kerb or tactile paving at the point where crossing would be appropriate.

Junction Visibility from Coronation St.

6.1.8 Measurements taken on site indicate that the visibility from Coronation Street to the right along the A417 is limited to 40mph. An assessment of the site specific visibility requirement demonstrates that the current provision falls below the recommended

minimum but well above the emergency stopping distance. There is one recorded accident occurring at this junction within the study period.

6.1.9 The results of a sample speed survey and corresponding Stopping Sight Distance Calculations are shown in the table below.

Table 6.1 – A417 (near junction with Coronation St) Speed Survey

Direction	85th Percentile speed	Stopping Sight Distance	
		Recommended	Emergency
Eastbound	29mph	43m	22m

On-Street Parking to the East of Coronation St.

6.1.10 Regular on-street parking causes an obstruction to eastbound traffic in this location.

6.1.11 Within the parked area the A417 varies between 6.5m and 7.5m wide.

River Coln Bridge.

6.1.12 The A417 narrows and makes a bend over the River Coln. Footways also narrow over the bridge.

6.1.13 Observations show that larger vehicles must straddle both lanes in order to achieve the turn. The current arrangement can result in significant obstruction if drivers do not anticipate and make suitable allowance for larger vehicles. The anecdotal evidence is that this often occurs.

6.1.14 The bridge parapet is less than 1.0m high and this means that it is possible for drivers to take a view across the corner. The apparent frequency with which problems occurs suggests drivers either do not routinely look across the corner, or do not have a sufficiently early view. Influencing factors are considered to be: the appearance of two lanes does not alert drivers to the potential problems ahead; the view across the corner is so far from straight ahead that it might be an unnatural observation for many; and, there is no indication of the extra space large vehicles require.

6.1.15 Site observations indicate that westbound HGV's tend to straddle both lanes until they are adjacent to Grove Place. It must be acknowledged that the eastbound view from here (across the corner) crosses third part land. Nevertheless a view is possible.

6.1.16 On the eastern side of the junction HGV's will tend to be confined to their respective lanes on the straight section of the A417, close to the bridge.

6.1.17 On Street parking restrictions apply at and in advance of the bridge.

A417 / High Street Junction.

6.1.18 The issues affecting the A417 / High Street junction are considered in Chapter 7.

On-Street Parking to the East of High Street.

6.1.19 On-street parking is permitted for 40m along the westbound carriageway outside local shops. However, parking regularly extends beyond the permitted zone, which indicates that the existing provision is insufficient. The result is a section of single lane carriageway which has been observed to extend over 75m.

6.1.20 Parking is restricted to 1 hour.

6.1.21 Within this area the A417 is on average 5.9m wide.

A417 / East End Junction.

6.1.22 The issues affecting the A417 / East End junction are considered in Chapter 10.

6.2 Summary of the Issues

6.2.1 The following summarises the issues identified above

- On-street parking restricting traffic flow and causing queuing
- Junction visibility from Coronation St onto the A417
- Provision for pedestrians at the A417 / Coronation St / Horcott Rd junction
- River Coln Bridge layout

6.3 Recommended Improvements

Managing Traffic Flows

6.3.1 The paragraphs above identify the areas where traffic tends to flow in a single lane. For the areas either side of Coronation St this is largely a result of the road markings rather than the geometry of the road. In these areas the A417 is typically 7.3m wide. Allowing 1.8m for a parked car leaves 5.5m live carriageway. Design guidance shows that this is the minimum required for the 2-way passage of HGV's.

6.3.2 If on-street parking near Coronation St were the only areas of concern, the recommendation would be to use road makings to clearly indicate 2 running lanes. However, there are areas in Fairford were it will be impossible to create two running lanes. The effect, therefore, of freeing up traffic movements where it is possible, would simply be to concentrate queuing and delays in the areas where it is not possible. This would be an undesirable outcome.

6.3.3 Given the above, the recommendation in this report is to formalise the existing restrictions to maintain or exaggerate the existing breaks in the traffic flow. This arrangement will control the arrival rates at the pinch points while creating greater

certainty to motorists, thereby minimising confusion and reducing the existing problem of opposing vehicles blocking one another, as regularly occurs on the Bridge and at the High Street junction.

6.3.4 Measures considered appropriate include road markings to delineate permitted on-street parking, and signs with further road markings to define priority movements.

On-Street Parking to the East of High Street.

6.3.5 Specific consideration is given to the on-street parking east of High Street. During busy times this parking extends well beyond the area where parking is permitted. In order to minimise the parking in this area it is recommended that the maximum duration is reduced to 30 minutes or less, and enforced.

6.3.6 Given that vehicles already park without regard to the restrictions, extending the permitted parking area will not, in itself, change anything. If additional legitimate parking is deemed desirable a better outcome, in traffic flow terms, would be to offset sections of parking on opposite sides of the road. With this arrangement the priority is shared. This initial view is that 4 or 5 additional on-street spaces could be adequately accommodated. This equates to a 50% increase in legitimate parking.

River Coln Bridge

6.3.7 Site observations suggest that, depending on the route chosen by HGV's, it will be possible for drivers to see opposing traffic before entering the problem area. This will require testing with a detailed design using vehicle tracking software.

6.3.8 Assuming the above is proven, the recommendation in this report is a combination of road markings and signs warning drivers that approaching HGV's require both lanes. This type of arrangement is common under narrow arched railway bridges, and should include lines to guide HGV's round the most efficient path.

6.3.9 The alternative to the above is the use of a signal controlled shuttle system. This type of arrangement would create inefficiencies and is unlikely to be supported by the highway authority, given the absence of a clear safety need.

Coronation Street

6.3.10 The Coronation St junction onto the A417 seems unnecessarily wide. A more constrained geometry will allow for improved junction visibility and better provision for pedestrians.

6.3.11 The preferred outcome for the Coronation Street junction would involve the following improvements:

- Ban on-street parking near the junction;
- A continuing footway alongside the eastbound carriageway incorporating appropriate standing area for bus passengers; and
- Dropped kerb tactile paved crossings along the new eastbound footway and north-south across the A417

6.3.12 The minimum recommendation, as an alternative to a new footway link, is for the provision of a dropped kerb and tactile paved crossing along the route of the existing eastbound footway. Measures should also be put in place to stop vehicles parking on the footway.

7 A417 Traffic

7.1 Existing Traffic Flows

7.1.1 Information on the existing traffic flows can be found within the Gladman Developments Ltd planning application (reference 13/03097/OUT). Traffic survey data within that application includes automatic traffic counts (ATC) at the western end of Fairford, as well as peak hour turning data for the A417/High Street junction. This information is summarised in the table below.

Table 7.1 – A417 (west of Horcott Road) ATC Survey 2-8 May 2013 Weekday Average Traffic Flows

Time	Westbound	Eastbound	Total
AM Peak (08:00 - 09:00)	245	268	513
PM Peak (17:00 - 18:00)	241	257	498
Daily	2990	2928	5918

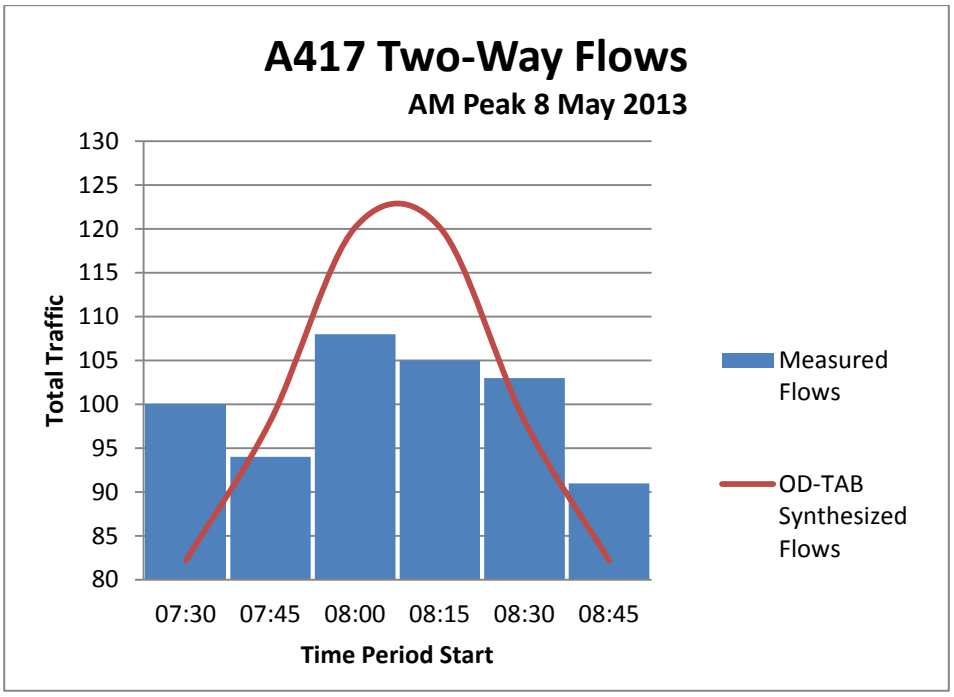
7.1.2 The table above shows 2-way traffic flows peaking at around 500 vehicles per hour.

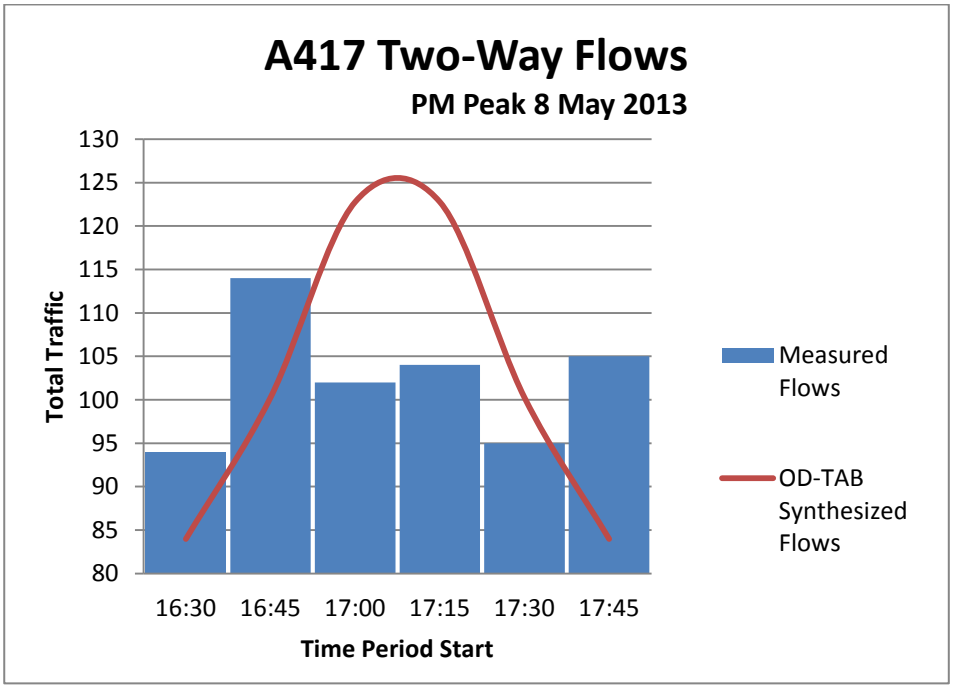
7.1.3 As discussed in the previous chapter, the A417 through Fairford is constrained to a single lane with passing spaces, in a number of areas. There are no national guidelines on the capacity of single lane roads with passing spaces but there have been a number of attempts to plug this gap in knowledge. A recent paper entitled The Capacity of Single-Track Rural Lanes provides a useful summary of the existing research, as well as offering new findings based on the latest micro-simulation traffic modelling software. The general conclusion of this research is that …'I*n practice it seems likely that the true capacity of a typical lane is likely to lie between 100 and 300 vehicles per hour. This will however be highly dependent on local conditions.'*

7.1.4 Fairford's traffic flow and road layout are unique and, as the research paper says, the actual capacity will be highly dependent on local conditions. The best type of traffic model for a complex road network is a micro-simulation model. In the absence of such a model the conclusion, based on the available research, is that traffic flows along the A417 in Fairford exceed any reasonable expectations of the likely capacity. On this basis it seems unlikely that there remains any spare peak hour capacity on the A417 through Fairford.

7.1.5 Further evidence that peak hour traffic demand has reached saturation levels can be found in the A417/High Street junction traffic survey. The diagram below compare

the observed traffic flows along the A417 over 15 minute increments, with a synthesized traffic profile using the OD-TAB assumptions. OD-TAB is the default assumption used when modelling priority junctions, and is designed to reflect the expectation that, within an unconstrained network, traffic demand will ebb and flow within the peak hour.





7.1.6 The above diagram reveals a relatively flat traffic demand profile which, when compared to the OD-TAB assumption, shows a supressed peak but with higher than expected pre and post-peaks. This situation is indicative of capacity constraint leading to peak spreading.

7.1.7 Based on the above, the conclusion of this report is that traffic demand along the A417 in Fairford appears to reach its capacity during the peak periods, at the principal constraint. As a result, any increase in traffic in the future can be expected to extend the peak over a longer time period creating longer delays and queues.

7.2 HGVs

7.2.1 The Gloucestershire Advisory Freight Route Map identifies the A417 between Cirencester and Lechlade as a 'road for local traffic.' There are just two industrial / trading estates identified on the map. These are the Horcott Industrial Estate and RAF Fairford.

7.2.2 Both the identified industrial / trading estates are accessed off the same road. At the northern end of this road (Horcott Road) an 18 tonne weight restriction applies. Instead HGV's can make use of the route running through Kempsford and Welford.

7.2.3 The above route is accessed off the A419 at Cricklade and off the A417 just east of Fairford. The general observation of this route is that it has been largely upgraded / designed around the needs of HGV's, in a way that the A417 through central Fairford cannot.

7.2.4 Given the above, and particularly in the context of the weight restriction on Horcott Road, it is surprising that the route is not identified as an HGV access road.

7.2.5 It is further understood that, during the Air Show, HGV's are diverted around Fairford via Meysey Hampton and Marston Meysay on to the route described above. This route is also not mentioned as a diversionary route in the Freight Route Map.

7.2.6 The traffic survey shows that HGV's comprise around 10% of the total peak hour traffic flows. While this is not unusual for the distributor road network it seems somewhat high for 'local journeys' on a road with just two significant destinations.

7.2.7 Site observations indicate that a large proportion of the off-peak traffic is HGV, some of which is destined for Fairford. It is apparent that many larger vehicles are routing through Fairford.

7.3 Recommendations

7.3.1 Traffic Modelling

7.3.2 The available evidence points to a stretch of the A417 which is fully saturated during the peak periods. Given this, the likely outcome of an increase in peak hour traffic demand in Fairford is more delays, queuing and peak-spreading.

7.3.3 A detailed microsimulation traffic model is considered to be the only way to advance current understanding.

Dealing with HGV's

7.3.4 The negative impacts of HGV's are noise, pollution, fear and intimidation. Speed, volume and proximity all influence the level of the impact.

7.3.5 Traffic speeds through Fairford, especially in areas where pedestrians are most vulnerable, does not appear to be a particular problem.

7.3.6 There are measures that may reduce the impact of HGV's. An option discussed in Chapter 9, to limit the times of HGV access to the High Street, could result in a reduction in the number of HGV's at a time when people are most receptive to the impacts.

7.3.7 A potentially more significant effect could result from a Lorry Watch group which identifies those businesses regularly passing through Fairford, and then opens discussions with them on alternative routing.

7.3.8 The recommended strategy for addressing fear and intimidation is to limit the exposure. The recommended crossings at: the A417 / Coronation St junction (Chapter 6); the A417 / High St junction (Chapter 9); and the A417 / East End junction (Chapter 10) will help achieve this.

7.3.9 To effect a more significant reduction in HGV traffic will involve identifying an alternative route. As indicated above the route between the A417 and A419 via Kempsford and Welford is generally better designed for HGV's than the A417 through Fairford. The value of this route is somewhat compromised by the weight restriction in Latton. Nevertheless, this report recommends discussions with the relevant authority over the designation of this route for access to the significant industrial estates near Fairford.

7.3.10 With the above in place a weight restriction in Fairford could be justified. A much stronger justification would result from the provision of a local bypass route around Fairford. This will inevitably involve new highway infrastructure over third party land.

7.3.11 It is suggested that the provision of a link between Horcott Road and the A417 to the west could provide a suitable HGV route around Fairford. A similar piece of new highway infrastructure bypassing Welford, on its northern side, would be preferable in achieving a true all-purpose bypass of Fairford.

7.3.12 This report does not consider the current need case to be particularly strong. However, given the available evidence (see section 7.1) it is opinion of this report that measures to remove some through movements from Fairford Town Centre, such as those described above, can be justified as necessary to accommodate any significant increase in traffic on the A417, such as that which might derive from a significant land allocation.

8 Leafield Rd / lower Croft

8.1 Existing Conditions

8.1.1 This chapter considers Lower Croft and Leafield Road between Farmor's School, to the north, and The Croft to the south.

8.1.2 At the northern end of the study area Leafield Road is a single 2-way carriageway measuring around 6.2m wide. A 2.0m wide footway is provided alongside the northbound carriageway up to the entrance to Farmor's School. 'Keep-clear' road markings are included along the frontage to the school.

Farmor's School

8.1.3 For the majority of the time there are no parked cars and traffic flow is relatively light. Things change significantly at school pick-up and drop-off times. This is a common experience outside most schools and tends to be deemed an acceptable inconvenience, so long as there are no significant safety or obstruction problems. The accident records do not show a single accident occurring on Leafield Rd in the past 5 years.

8.1.4 In one respects the arrangement at Farmor's School is unusual, and that is the lack of a convenient arrangement for those vehicles not entering the site to return in a forward gear, by making use of a local road grid or convenient roundabout for example. Leafield Road is a straight junctionless route between Fairford and Quennington, and this explains why a number of cars perform three point turn on the carriageway.

8.1.5 There is no footway along Leafield Road to the north of the school access. As a result those parking here tend to walk in the road.

8.1.6 Around 160m to the south of the School access, a second footway appears alongside the southbound carriageway. A dropped kerb crossing links the two footways. There is no tactile paving at this crossing.

Park St / Leafield Rd Junction

8.1.7 The local community have identified the restricted visibility to the right, from Park St onto Leafield Road, as a safety concern. Site measurements show that the visibility in this direction is limited to 36m. This measurement was taken from 2.4m back from the give-way line.

8.1.8 In order to determine what the recommended minimum junction visibility would be, speeds were measured and site specific stopping distances calculated. The results of this assessment are shown below.

Table 8.1 – Leafield Rd (Nr Park Street) Speed Survey

Direction	85th Percentile speed	Stopping Sight Distance	
		Recommended	Emergency
Northbound	28mph	48m	21m

8.1.9 The survey shows that the available visibility to the right is less than the recommended minimum but above the emergency stopping distance.

8.1.10 A further potential issue with the Leafield Rd / Park Street junction is the limited forward visibility afforded to the southbound movement. Based on site measurements this is limited to around 15m.

Mt Pleasant / Lower Croft

8.1.11 The driver's view from Mt Pleasant to Lower Croft is very limited. Measurements taken on site show that the junction visibility to the left, 2.4m back from the give-way line, is 17m.

8.1.12 In order to determine what the recommended minimum junction visibility would be, an assessment based on current design guidance has been undertaken. The results of this assessment are shown below.

Table 8.2 – Lower Croft Rd (Nr Mt Pleasant) Speed Survey

Direction	85th Percentile speed	Stopping Sight Distance	
		Recommended	Emergency
Northbound	25mph	39m	17m

8.1.13 The above shows that the available visibility is only equal to the emergency stopping distances.

The Croft / Lower Croft

8.1.14 At the junction with The Croft, Lower Croft turns through nearly 90 degrees and narrows from 6.0m to 5.5m. The width and tightness of the bend mean that larger vehicles straddle both lanes in order to make the turn. The limited forward visibility means drivers may not see larger vehicles approaching the restriction in good time.

8.1.15 Measurements taken on-site indicate that forward visibility is limited to around 30m on the bend.

8.1.16 In order to determine what the recommended minimum junction visibility would be, an assessment based on current design guidance has been undertaken. The results of this assessment are shown below.

Table 8.3 – Lower Croft Rd (Nr The Croft) Speed Survey

Direction	85th Percentile speed	Stopping Sight Distance	
		Recommended	Emergency
Northbound	25mph	40m	17m
Southbound	21mph	30m	13m

8.1.17 The survey shows that the available forward visibility meets the recommended minimum.

8.2 Recommended Improvements

General

8.2.1 Design guidance advocates an evidenced based assessment of risk. The evidence from the accident records is that the current road layout operates safely.

8.2.2 Unless the current situation was to change significantly the justification for improvements would be based on improving the amenity value for drivers by reducing the perception of risk.

Farmor's School

8.2.3 The current arrangement at Farmor's School creates a lot of turning traffic, including a number of three point turns within the live carriageway, at a time when there is significant vehicular and pedestrian traffic. While these manoeuvres are perfectly legitimate there is an inherent risk with vehicles reversing into areas pedestrians might be.

8.2.4 The most comprehensive remedy to the above is an off-line parking and turning facility. This already exists. It can only be assumed that some do not use this facility because of the congestion and delays within the site. The best outcome would be for Farmor's School to resolve the issues within the site.

8.2.5 Consideration has been given to the provision of an on-line turning facility as an alternative or addition to the above. Initial observations suggest that there may be sufficient land in public control to replace the existing priority junction access with a

mini-roundabout, large enough to allow a normal car to perform a U-turn. A roundabout will also make it easier to exit the site.

8.2.6 While the above, on its own, will do nothing to reduce on-street parking it will address the inconvenience, delay and potential risks with three point turns.

8.2.7 A further consideration is the width of the road. At 6.2m wide, and allowing 1.8m for a parked car, leaves barely enough space for two cars to pass one another and insufficient space for a larger vehicle to pass a car. Widening to 4.8m would address this issue; or localised widening to offer passing spaces would assist.

Park St / Leafield Rd Junction

8.2.8 Visibility improvements from Park St onto Lower Croft can be made by either setting the park's boundary wall back, or by reducing its height to 1.0m, so that views can be taken over the top.

Mt Pleasant / Lower Croft

8.2.9 Visibility from Mt Pleasant to Lower Croft could be improved by advancing the give-way line marginally. On-site measurements suggest that visibility to the left might improve from 17m to 25m by simply lining the give-way up with the nearer carriageway edge.

8.2.10 This report considers that visibility improvements from Mt Pleasant should be afforded a relatively high priority, given that the existing visibility only matches the emergency stopping distance.

The Croft / Lower Croft

8.2.11 Space exists to provide localised widening on the bend at this junction. Subject to a design exercise, it is considered likely that sufficient space can be created to allow two large vehicles to pass one another.

9 A417 / High Street Junction

9.1 Existing Conditions

9.1.1 At its southern end, High Street forms a crossroads junction with the A417 and Back Lane.

9.1.2 At this junction the A417 is just 3.4m, at its narrowest point, and operates as a single lane, with the High Street bell-mouth forming an unofficial passing space. There are no defined priorities through this single lane section and temporary blockages are a common occurrence during busy periods.

9.1.3 Pedestrians moving across the A417 to/from High Street can take advantage of the dropped kerb access from the shared surface that is Back Lane. However, there is no similar dropped kerb on the footways on the northern side of the junction.

9.1.4 Visibility for traffic emerging from High Street is very limited. On-site measurements of this visibility, taken 2.4m back from the give-way line, revel that it is limited to 17m to the left and 25m to the right.

9.1.5 On Street parking restrictions apply at and in advance of the A417 / High Street junction.

9.1.6 The records show that two road traffic accidents occurred at this junction within the study period. Both accidents occurred around midday during a normal weekday. During this period the traffic activity around a shopping area is typically busier, while the mainline traffic flow is relatively light. It is possibly significant that both accidents occurred under the same traffic conditions.

9.1.7 Notwithstanding the above, without a comprehensive safety review it cannot be automatically assumed that the visibility restriction caused the two recorded accidents. The general observation is that the rate of accidents is not atypical for this junction type.

9.1.8 In the absence of a comprehensive safety review of the junction, the recommended improvements are advanced on the basis of being measures designed to enhance accessibility and amenity.

9.1.9 In order to determine what the recommended minimum junction visibility would be, an assessment based on current design guidance has been undertaken. The results of this assessment are shown below.

Table 9.1 – A417 (Nr High St) Speed Survey

Direction	85th Percentile speed	Stopping Sight Distance	
		Recommended	Emergency
Eastbound	15mph	20m	8m
Westbound	15mph	19m	8m

9.1.10 The survey shows that the available visibility to the left is less than the recommended minimum but above the emergency stopping distance.

9.2 Summary of the Issues

9.2.1 The A417 / High Street junction is very different in character and entirely inconsistent with its A-Road (Class 1) status. The issues are numerous:

Issue	Comment
50m 2-way single lane section through the junction.	• Greater than the recommended maximum distance of 40m between passing areas. • There are no priorities defined along the A417 which leads to uncertainty
Use of High Street bell-mouth as an unofficial passing bay	• Right turns into High Street blocked by this practice, regularly causing temporary blockages at peak times. • Left hand drive vehicles do not have a clear view ahead from this position.
High traffic demand relative to capacity	• Research on the capacity of single lanes with passing space suggests maximum practical capacities of 300vph. A recent survey of the junction shows actual traffic flows of 597vph. The same survey also records little variation in the 15 minute surveyed periods. It is reasonably concluded that the junction has reached its capacity and that further demand will simply result in additional queuing and 'peak spreading.'
Very limited visibility to the left from High Street	• The available visibility in this direction falls below the recommended stopping distance. A specific safety review would be required to determine if this factor has contributed to the recorded road accidents.
Missing dropped kerbs and tactile paving	• Legislation and modern design guidelines require tactile paving and dropped kerbs in order that the mobility and visually impaired are not disadvantaged. These features are absent from the junction.
Narrow footways	• The existing footway provision falls short of the recommended minimum necessary to wheelchair / pushchair users to pass one another, on the footway.

Discontinuous footways to the northwest of the junction	• The northwest quadrant of the junction lacks a footway. People travelling in this direction are partially catered for by means of a north-south crossing away from the junction. There is, however, no corresponding provision to return to the High Street side of the road (see above)

9.3 Recommended Improvements

9.3.1 This report recommends the introduction of dropped kerbs on the northern side of the junction and tactile paving at all dropped kerbs.

9.3.2 Consideration has been given to providing pedestrian priority, in the form of a zebra crossing. There are two principle areas of concern with this proposition. Firstly, the highway authority's chosen method for justifying need is not met; and secondly, a pedestrian priority would introduce another decision for the driver, in a layout that already has a high level of uncertainty.

9.3.3 Consideration has also been given to the introduction of a traffic signal scheme. While such an arrangement would certainly help to rebalance priorities towards sustainable travel and community connectivity, there would be downsides. Vehicle queues would be longer, with a resultant increases in noise and fumes. It should also be acknowledged that the highway authority is unlikely to support such a proposal unless the safety case was proven.

9.3.4 Considering the current layout further, the maximum design vehicle is 2.55m wide which, allowing for some clearance space, means that the practical minimum lane width at this junction is 3.0m. This report recommends that any space not required for a 3.0m wide lane, within the existing single lane section, is given over to the pedestrian. This arrangement will allow extra space on the footway for: 2-way passage of wheelchairs; extra standing area; and (subject to detailed design) a footway link at the northwest quadrant of the junction.

9.3.5 The recommendations so far have been based on tweaks to the existing 'conventional' highway layout. However, the layout is far from conventional in many respects. This report considers the A417/High Street junction to be an ideal candidate for a Shared Surface/Living Street type treatment. Such arrangements are widely acknowledged to offer significant enhancement to the pedestrian amenity value without necessarily affecting vehicular capacity.

9.3.6 Land constraints mean that there are no practical means by which junction visibility from High Street could be significantly improved. Options for addressing this issue

are therefore limited to removing the conflict. A traffic signal control system would effectively remove the conflicting movements but, as discussed above, may struggle to achieve the necessary support.

9.3.7 The alternative option is to designate the High Street access as one-way (in only). This option has a number of distinct advantages. It is expected to improve traffic flows on the A417, by reducing conflicting movements and creating a more formalised passing space, and offers the opportunity to enhance the pedestrian provision at the junction.

9.3.8 It is anticipated that the High Street will be maintained as a 2-way road, under the above arrangement, with Market Place providing the turning space for southbound vehicles. Those leaving High Street would be re-routed to Park St and Lower Croft. To avoid the potential for an excessive number of diverted traffic using Mill Lane, which is unsuited to significant 2-way traffic flows, a one-way only restriction should be considered as part of any proposed restrictions at High Street's southern junction.

9.3.9 The undesirable implications, for a one-way access from the south, are a combined north / southbound bus stop and temporary closure of access from the north on market days.

9.3.10 Nether of the above is without precedent and should be considered workable. However, there would be significant implications for the bus user. A compromise would be to permit (public) bus-only exit. These vehicles only turn right, which would allow space for pedestrian improvements, and are quite infrequent, which would have a major reduction in the number of conflicting movements.

9.3.11 The traffic survey at High Street consistently shows twice the number of arrivals as departures. This suggests that exiting vehicles already re-route in large numbers to avoid the High Street's southern junction. Nevertheless an increase in traffic would add to the justification for improving the Leafield Rd / Lower Croft Road, see Chapter 6.

9.3.12 This report recommends, as a minimum, the introduction of dropped kerb tactile paved crossings between Back Lane and High Street. In addition, the possibility of a footway connection at the northeast quadrant should be explored.

9.3.13 The more ambitions options considered in this report are put forward on the basis of improving the environment for all road users. The full recommendation of this report is for the creation of a Shared Surface / Living Street type design for High Street and its southern junction.

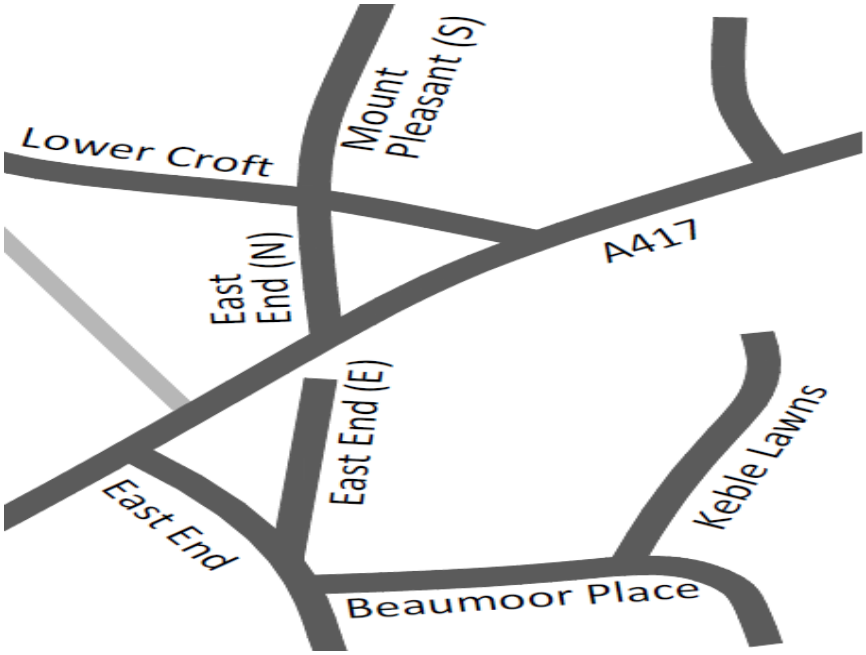
9.3.14 There are a number of options for the A417/High Street junction, most of which have knock-on implications. To fully understand the implications, and therefore determine viability, a detailed design of the options will be required. The attached sketch 1601SK03 illustrates a potential improvement option which, at this stage, is considered to strike the best balance between all road users.

10 A417 / East End Junction

10.1 Existing Conditions

10.1.1 This chapter considers the connections between Lower Croft and East End. This area is significant for two reasons. Firstly, this section of the A417 lies between the major housing areas east of Fairford and the local surgery. Secondly, Lower Croft is the principal road connection to Fairford Hospital and Farmor's School.

10.1.2 Many of the roads within this area lack any clear identification. For the purpose of this report, these roads have been assigned a name. These improvised names are shown on the accompanying plan, reference 1601SK01, and reproduced below, for ease of reference.



10.1.3 Lower Croft and East End create triangles on both sides of the A417. Each arm, except East End (E) form priority T-junctions with the A417.

10.1.4 To the south, East End provides access to the surgery. This road is a single carriageway with a footway running alongside the northbound carriageway. The second arm of the southern triangle (East End (E)) is a shared surface road providing access to the Eight Bells PH and a few residential properties.

10.1.5 On the northern side of the A417, East End(N) and Mount Pleasant (S) and Lower Croft serve as the principle access to the services, facilities and housing on the

eastern side of Fairford. These roads are single carriageways and, within the area considered in this chapter, have no footways. Additionally, site observations show that the eastbound movement along Lower Croft is often obstructed by on-street parking.

10.1.6 East End(N) and Mount Pleasant(S) offer the most direct route between a major housing area and the local surgery. Those choosing to walk, but who feel uncomfortable walking on the road, will need to take a significant diversion to the footpath link running south from The Croft. This footpath link, despite being straight, has little natural surveillance. It also has a loose surface. As a result, this report considers the footpath link to be relatively unattractive to the type of vulnerable road user likely to want an alternative to walking on the road, particularly during the hours of darkness.

10.1.7 A speed survey has been carried out in order to demine whether this area has a speeding problem. The results are summarised below.

Table 10.1 – A417 (near East End) Speed Survey

Direction	85th Percentile speed
Eastbound	29mph
Westbound	29mph

10.1.8 The speed survey results show that vehicles tend not to exceed the speed limit.

Hillary Cottage Surgery

10.1.9 At the time of a recent site visit the surgery car park was observed to be full, with a similar number of vehicles parked on the nearby residential streets. Given the location and time of day it is expected that the majority of these vehicles were associated with the surgery.

10.2 Recommended Improvements

10.2.1 A pedestrian crossing should be provided in this location, so that the local community has a clear and attractive walk route to the local surgery. This report recommends the introduction of a dropped kerb tactile paved crossing. There appears to be sufficient space for this to include a pedestrian refuge island.

10.2.2 The alternative, a pedestrian priority crossing, is unlikely to be supported by GCC due to their preferred method for assessing need. In the event that a cycle route, emerging from East End, is established from/to Lechlade it is likely that the need

criteria will be met and, therefore, a combined pedestrian/cycle priority crossing facility would be considered appropriate.

10.2.3 In consideration of the importance of the surgery to the local community, and given the obvious pressure on parking, this report recommends the provision of a quality pedestrian link. The minimum recommendation is for an upgrade to the existing footpath link, involving low level lighting and a tarmac surface. CCTV surveillance is also considered appropriate.

10.2.4 A better alternative to the above would be the provision of a footway along the East End(N) and Mount Pleasant(S) roads. This might be achievable within the existing highway envelope if East End(N) and Mount Pleasant (S) were to be designated as a one-way northbound (in) only road. If the Lower Croft arm of the triangle is also designated one-way, southbound (out) only, the issues with on-street parking in this location can also be addressed. It is clear that some of the angles involved will be challenging for larger vehicles. Only a detailed design can determine whether this or similar improvements are possible without encroaching on third party land.

11 The Next Step

11.1.1 This report looks at the key areas of concerns, identified by the local community, and considers viable improvements options. This report does not intend to provide a comprehensive set of fixed improvement proposals.

11.1.2 Many of the small-scale recommendations in this report are expected to be readily achieved with relatively little cost.

11.1.3 The cost and viability of introducing the more ambitious recommendations can only be determined through a detailed design process.

11.1.4 To progress these recommendation further, the next-step should involve a design based review of the options and a clear strategy to prioritise, fund and phase in the improvements over time.

11.1.5 Likely funding sources include regeneration money, highway maintenance and improvement budgets and developer contributions.

Bibliography

Design Manual for Roads and Bridges, TA 79/99 Amendment No 1; Traffic Capacity of Urban Roads, Department for Transport, 1999

Design Manual for Roads and Bridges, TD 42/95 Geometric Design of Major/Minor Priority Junctions. Department for Transport, 1994

Guidance on Road Classification and the Primary Route Network, Department for Transport, 2012

Home Zone Design Guide, Institute of Highways and Incorporated Engineers, 2002

Inclusive Mobility, Department for Transport, 2005

Local Transport Note 1/07 – Traffic Calming, Department for Transport, 2007

Local Transport Note 1/04 - Policy, Planning and Design for Walking and Cycling. , Department for Transport, 2004

Local Transport Note 2/04 - Adjacent and Shared Use Facilities for Pedestrians and Cyclists. Department for Transport, 2004

Manual for Streets, Department for Transport, 1997

Manual for Streets 2. Chartered Institute of Highways and Transportation, 2010

Manual for Gloucestershire Streets, Gloucestershire County Council, 2013

Re-Imagining Urban Spaces. Department for Transport, 2012

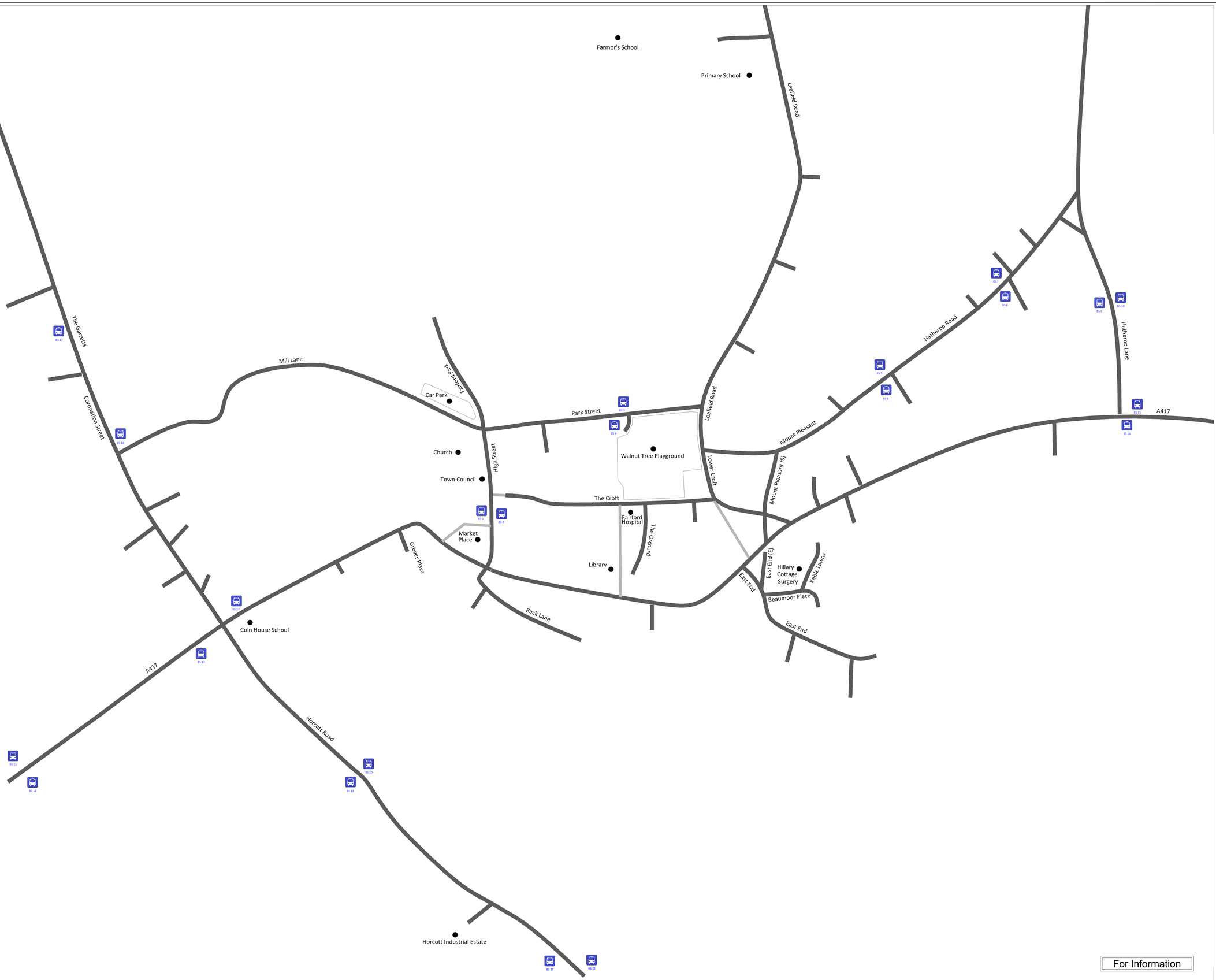
Setting Local Speed Limits. Department for Transport, 2012

The Relationship between Speed and Risk of Fatal Injury: Pedestrians and Car Occupants, Road Safety Web Publication No.16. Department for Transport, 2010

www.travelinesw.com, Bus timetables – various

The Capacity of Single-Track Rural Lanes, Richard Sweet Somerset County Council, 2012

Drawings



For Information

Helix Transport Consultants

16 Springfield Court, Stonehouse, Gloucestershire. GL10 2JF
tel +44 (0)1453 822625

Key

- Highway
- Strategic Foot / Cycle Link
- Local Bus Stops

BS 1-2	High Street, Market Place
BS 3-4	Park Street, Cricket Field
BS 5-6	Hatherop Road, Churchill Place
BS 7-8	Hatherop Road, Fire Station
BS 9-10	Hatherop Lane, Hatherop Lane
BS 11-12	A417, The Home Farm
BS 13-14	A417, The Vortex Inn
BS 15-16	A417, Opposite Hatherop Lane
BS 17	The Garretts, The Garretts
BS 18	Coronation Street, Opposite Mill Lane
BS 19-20	Horcott Road, Lakeside
BS 21-22	Horcott Road, St Thomas Church

Rev	By	Chkd	Apprvd	Date	Description
-					

Client

Fairford Town Council

Project

Transport Appraisal Report

Drawing

Studay Area Highway Network

Drawn by: JH **Date:** 08/02/2016
Checked by: JH **Date:** 08/02/2016
Approved by: JH **Date:** 08/02/2016

Drawing No. 1601SK01

Revision

Drawing Scale: NTS

Mini-roundabout to provide on-line turning and ease movements to/from school.

Work with school to resolve internal circulation issues

Provide sign, timetable, hardstanding at bus stop and a pedestrian crossing point

Provide sign and timetable at bus stop

Pedestrian access between car par and Fairford Park

Provide westbound bus stop sign, timetable, hardstanding and a dropped kerb crossing point

Junction visibility improvements

Upgrade bus stop to provide missing signs, timetables, crossings and hardstanding at carriageway edge

Pedestrian crossings across Park Road

Perpendicular parking layout to increase numbers

Remove obstructions to Playground Accesses

Provide footway. Expected to require one-way working and possible land take at triangle

Widen road at bend

Comprehensive redesign guided by Living Street / Shared Surface design principles

widen footway for waiting northbound bus passengers

Widen Footways where practicable

Signs and road lining to improve HGV flow

Upgrade lighting and possible CCTV on footpath

Provide sign and timetable at bus stop and build out footway to allow kerbside bus access

Upgrade lighting and possible CCTV on footpath

Upgrade lighting, surfacing and possible CCTV on footpath

Provide new pedestrian crossing

Dropped kerb crossing

Provide hardstanding at bus stop and dropped kerb crossing point

Widen footway and provide north-south pedestrian crossing point

Additional on-street parking

Rationalise Pedestrian access arrangement

Ban parking on footway

Reduce junction bell-mouth, provide new footway alongside eastbound carriageway and new pedestrian crossing points

Provide dropped kerbs for pedestrian access

Widen footway and provide hardstanding to edge of carriageway at bus stop

Provide sign, timetable, hardstanding at bus stops and a pedestrian crossing point

Provide bus stop signs with timetables and additional hardstanding at the northbound stop

Provide / improve hardstanding at bus stop and crossing point

For Information

Helix Transport Consultants

16 Springfield Court, Stonehouse, Gloucestershire. GL10 2JF
tel +44 (0)1453 822625

Key

Improvements expected to be achieved at a relatively low cost within adopted highway

Improvements expected to be relatively costly / more technically challenging which may involve third party land

Rev	By	Chkd	Apprvd	Date	Description
-					

Client

Fairford Town Council

Project

Transport Appraisal Report

Drawing

Recommended Improvements

Drawn by: JH **Date:** 08/02/2016

Checked by: JH **Date:** 08/02/2016

Approved by: JH **Date:** 08/02/2016

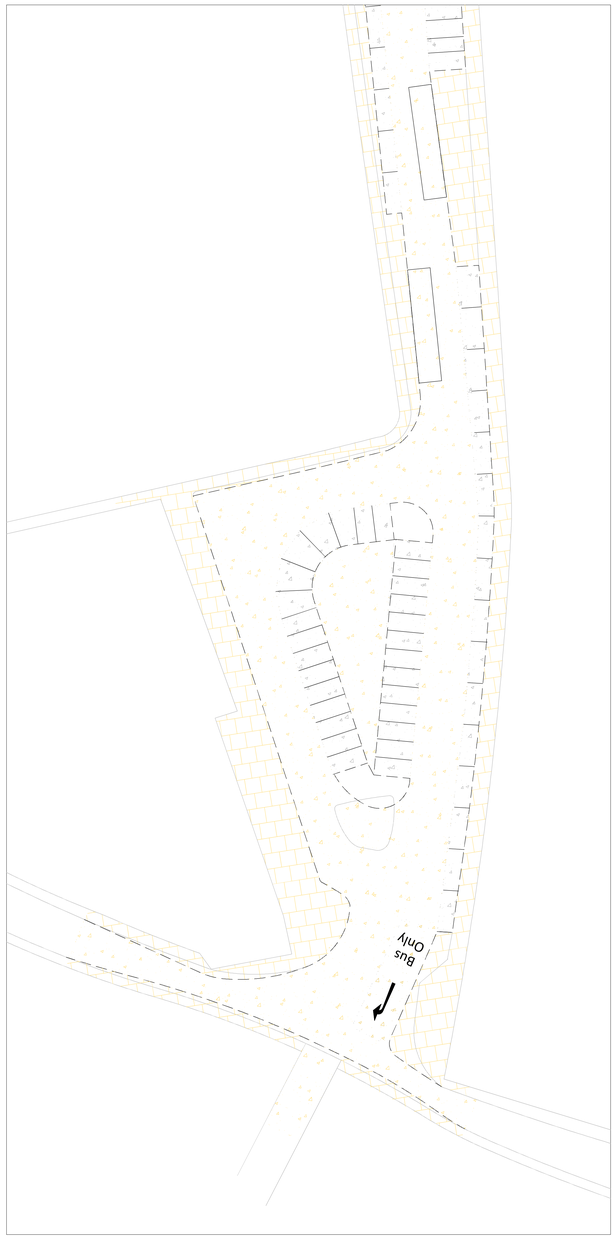
Drawing No. 1601SK02

Revision

Drawing Scale: NTS

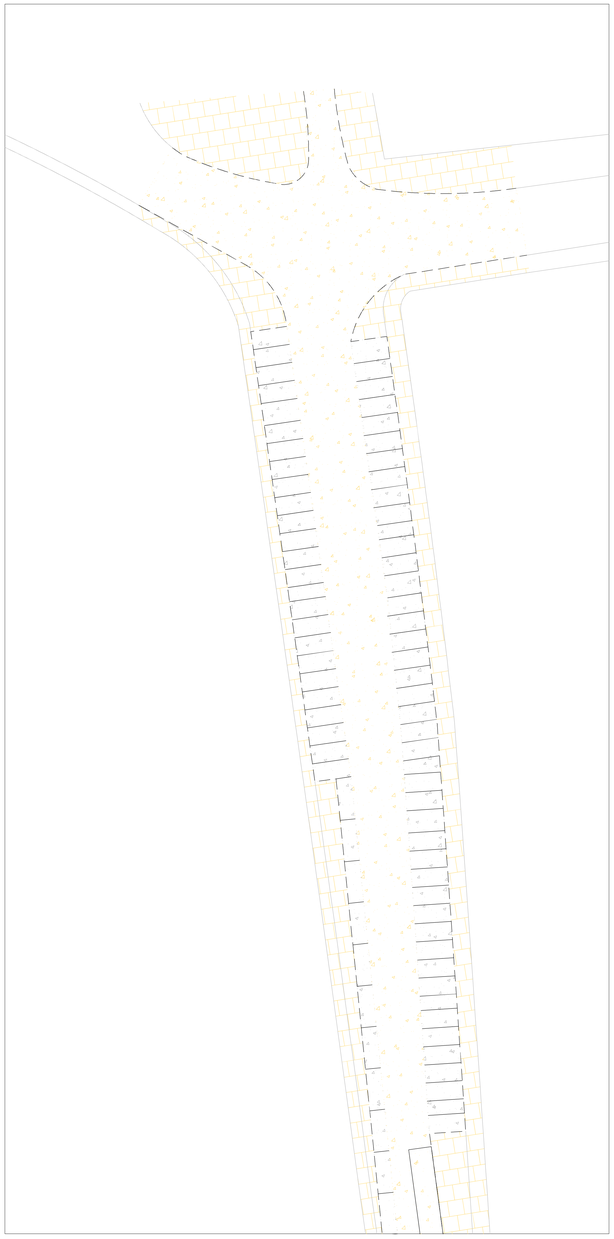
Helix Transport Consultants

16 Springfield Court, Stonehouse, Gloucestershire, GL10 2JF
tel +44 (0)1453 822625



Southern end of High Street

Northern end of High Street



Example of a Shared Space layout

Stonehouse High Street - Before

Stonehouse High Street - After

For Information

Rev	By	Chkd	Apprvd	Date	Description
-	-	-	-	-	-

Client

Fairford Town Council

Project

Transport Appraisal Report

Drawing

Illustrative High Street Improvements

Drawn by: JH **Date:** 08/02/2016
Checked by: JH **Date:** 08/02/2016
Approved by: JH **Date:** 08/02/2016

Drawing No. 1601SK03 **Revision**

Drawing Scale: NTS

Appendix

High St - Northbound

Calculation of 85th Percentile Speed

Standard Deviation (s) =

$$s = \sqrt{\sum(v-m)^2 / n-1}$$

Where

Sum of Speeds $\sum v$ = 744

Number of Recordings n = 31

$m = \sum v/n$ = 744 / 31 = 24

And

$\sum(v-m)^2 = \sum v^2 - (\sum v)^2/n$ = 18330 - 553536 / 31 = 474

s = 4.0

85th Percentile (v) = m + s = 28 MPH

= 13 m/s

High St - Southbound

Calculation of 85th Percentile Speed

Standard Deviation (s) =

$$s = \sqrt{\sum(v-m)^2 / n-1}$$

Where

Sum of Speeds $\sum v$ = 765

Number of Recordings n = 35

$m = \sum v/n$ = 765 / 35 = 22

And

$\sum(v-m)^2 = \sum v^2 - (\sum v)^2/n$ = 16987 - 585225 / 35 = 266

s = 2.8

85th Percentile (v) = m + s = 25 MPH

= 11 m/s

Coronation St - Eastbound

Calculation of 85th Percentile Speed

Standard Deviation (s) =

$$s = \sqrt{\sum(v-m)^2 / n-1}$$

Where

Sum of Speeds	∑v =	755							
Number of Recordings	n =	29							
m = ∑ v/n =		755	/	29	=	26			

And

∑(v-m)² = ∑ v² - (∑v) ²/n =		19940	-	570048	/	29	=	283	
	s =	3.2							
85th Percentile (v)	= m + s =	29	MPH						
	=	13	m/s						

Calculation of Stopping Site Distance (MfS)

$$SSD = vt + v^2 / 2d$$

Where:

Speed	v =	13	m/s						
Drivers reaction time	t =	1.5	s						
Deceleration (0.375g)	d =	3.68	m/s²						
	SSD =	20	+	171	/	7.36	=	43	m

Calculation of Stopping Site Distance (DMRB)

$$SSD = vt + v^2 / 2d$$

Where:

Speed	v =	13	m/s						
Drivers reaction time	t =	0.67	s						
Deceleration	d =	6.57	m/s²						
	SSD =	9	+	171	/	13.14	=	22	m

Lower Croft (Nr Park St) - Northbound

Calculation of 85th Percentile Speed

Standard Deviation (s) =

$$s = \sqrt{\sum(v-m)^2 / n-1}$$

Where

Sum of Speeds	$\sum v$ =	628							
Number of Recordings	n =	25							
$m = \sum v/n$ =		628	/	25	=	25			

And

$\sum(v-m)^2 = \sum v^2 - (\sum v)^2/n$ =		16047	-	394321	/	25	=	274	
	s =	3.4							
85th Percentile (v)	= m + s =	28	MPH						
	=	13	m/s						

Calculation of Stopping Site Distance (MfS)

$$SSD = vt + v^2 / 2d$$

Where:

Speed	v =	13	m/s						
Drivers reaction time	t =	2	s						
Deceleration (0.375g)	d =	3.68	m/s^2						
	SSD =	25	+	162	/	7.36	=	48	m

Calculation of Emergency Stopping Site Distance

$$SSD = vt + v^2 / 2d$$

Where:

Speed	v =	13	m/s						
Drivers reaction time	t =	0.67	s						
Deceleration	d =	6.57	m/s^2						
	SSD =	9	+	162	/	13.14	=	21	m

Lower Croft (Nr Mt Pleasant) - Northbound

Calculation of 85th Percentile Speed

Standard Deviation (s) =

$$s = \sqrt{\sum(v-m)^2 / n-1}$$

Where

Sum of Speeds	$\sum v$ =	545						
Number of Recordings	n =	25						
$m = \sum v/n$ =		545	/	25	=	22		

And

$\sum(v-m)^2 = \sum v^2 - (\sum v)^2/n$ =		12155	-	297516	/	25	=	255

s = 3.3

85th Percentile (v)	= m + s =	25	MPH
	=	11	m/s

Calculation of Stopping Site Distance (MfS)

$$SSD = vt + v^2 / 2d$$

Where:

Speed	v =	11	m/s
Drivers reaction time	t =	2	s
Deceleration (0.375g)	d =	3.68	m/s^2

SSD =	22	+	126	/	7.36	=	39	m

Calculation of Emergency Stopping Site Distance

$$SSD = vt + v^2 / 2d$$

Where:

Speed	v =	11	m/s
Drivers reaction time	t =	0.67	s
Deceleration	d =	6.57	m/s^2

SSD =	8	+	126	/	13.14	=	17	m

Lower Croft (Nr The Croft) - Northbound

Calculation of 85th Percentile Speed

Standard Deviation (s) =

$$s = \sqrt{\sum(v-m)^2 / n-1}$$

Where

Sum of Speeds	∑v =	547						
Number of Recordings	n =	25						
m = ∑ v/n =		547	/	25	=	22		

And

∑(v-m)² = ∑ v² - (∑v) ²/n =		12225	-	298936	/	25	=	268

s = 3.3

85th Percentile (v) = m + s = 25 MPH

= 11 m/s

Calculation of Stopping Site Distance (MfS)

$$SSD = vt + v^2 / 2d$$

Where:

Speed	v =	11	m/s
Drivers reaction time	t =	2	s
Deceleration (0.375g)	d =	3.68	m/s²

SSD = 23 + 127 / 7.36 = 40 m

Calculation of Emergency Stopping Site Distance

$$SSD = vt + v^2 / 2d$$

Where:

Speed	v =	11	m/s
Drivers reaction time	t =	0.67	s
Deceleration	d =	6.57	m/s²

SSD = 8 + 127 / 13.14 = 17 m

Lower Croft (Nr The Croft) - Southbound

Calculation of 85th Percentile Speed

Standard Deviation (s) =

$$s = \sqrt{\sum(v-m)^2 / n-1}$$

Where

Sum of Speeds	∑v =	470						
Number of Recordings	n =	25						
m = ∑ v/n =		470	/	25	=	19		

And

∑(v-m)² = ∑ v² - (∑v) ²/n =		8923	-	220534	/	25	=	102

s = 2.1

85th Percentile (v) = m + s = 21 MPH

= 9 m/s

Calculation of Stopping Site Distance (MfS)

$$SSD = vt + v^2 / 2d$$

Where:

Speed	v =	9	m/s
Drivers reaction time	t =	2	s
Deceleration (0.375g)	d =	3.68	m/s²

SSD = 19 + 87 / 7.36 = 30 m

Calculation of Emergency Stopping Site Distance

$$SSD = vt + v^2 / 2d$$

Where:

Speed	v =	9	m/s
Drivers reaction time	t =	0.67	s
Deceleration	d =	6.57	m/s²

SSD = 6 + 87 / 13.14 = 13 m

A417 (Nr High St) - Eastbound

Calculation of 85th Percentile Speed

Standard Deviation (s) =

$$s = \sqrt{\sum(v-m)^2 / n-1}$$

Where

Sum of Speeds	∑v =	303						
Number of Recordings	n =	25						
m = ∑ v/n =		303	/	25	=	12		

And

∑(v-m)² = ∑ v² - (∑v) ²/n =		3888	-	92052	/	25	=	206

s = 2.9

85th Percentile (v) = m + s = 15 MPH

= 7 m/s

Calculation of Stopping Site Distance (MfS)

$$SSD = vt + v^2 / 2d$$

Where:

Speed	v =	7	m/s
Drivers reaction time	t =	2	s
Deceleration (0.375g)	d =	3.68	m/s²

SSD = 13 + 45 / 7.36 = 20 m

Calculation of Emergency Stopping Site Distance

$$SSD = vt + v^2 / 2d$$

Where:

Speed	v =	7	m/s
Drivers reaction time	t =	0.67	s
Deceleration	d =	6.57	m/s²

SSD = 5 + 45 / 13.14 = 8 m

High St (Nr High St) - Westbound

Calculation of 85th Percentile Speed

Standard Deviation (s) =

$$s = \sqrt{\sum(v-m)^2 / n-1}$$

Where

Sum of Speeds	∑v =	312						
Number of Recordings	n =	25						
m = ∑ v/n =		312	/	25	=	12		

And

∑(v-m)² = ∑ v² - (∑v) ²/n =		4025	-	97522	/	25	=	124

s = 2.3

85th Percentile (v) = m + s = 15 MPH

= 7 m/s

Calculation of Stopping Site Distance (MfS)

$$SSD = vt + v^2 / 2d$$

Where:

Speed	v =	7	m/s
Drivers reaction time	t =	2	s
Deceleration (0.375g)	d =	3.68	m/s²

SSD = 13 + 44 / 7.36 = 19 m

Calculation of Emergency Stopping Site Distance

$$SSD = vt + v^2 / 2d$$

Where:

Speed	v =	7	m/s
Drivers reaction time	t =	0.67	s
Deceleration	d =	6.57	m/s²

SSD = 4 + 44 / 13.14 = 8 m

A417 (Nr West End) - Eastbound

Calculation of 85th Percentile Speed

Standard Deviation (s) =

$$s = \sqrt{\sum(v-m)^2 / n-1}$$

Where

Sum of Speeds $\sum v$ = 807

Number of Recordings n = 31

$m = \sum v/n$ = 807 / 31 = 26

And

$\sum(v-m)^2 = \sum v^2 - (\sum v)^2/n$ = 21345 - 651249 / 31 = 337

s = 3.4

85th Percentile (v) = m + s = 29 MPH

= 13 m/s

High St (Nr West End) - Westbound

Calculation of 85th Percentile Speed

Standard Deviation (s) =

$$s = \sqrt{\sum(v-m)^2 / n-1}$$

Where

Sum of Speeds $\sum v$ = 732

Number of Recordings n = 28

$m = \sum v/n$ = 732 / 28 = 26

And

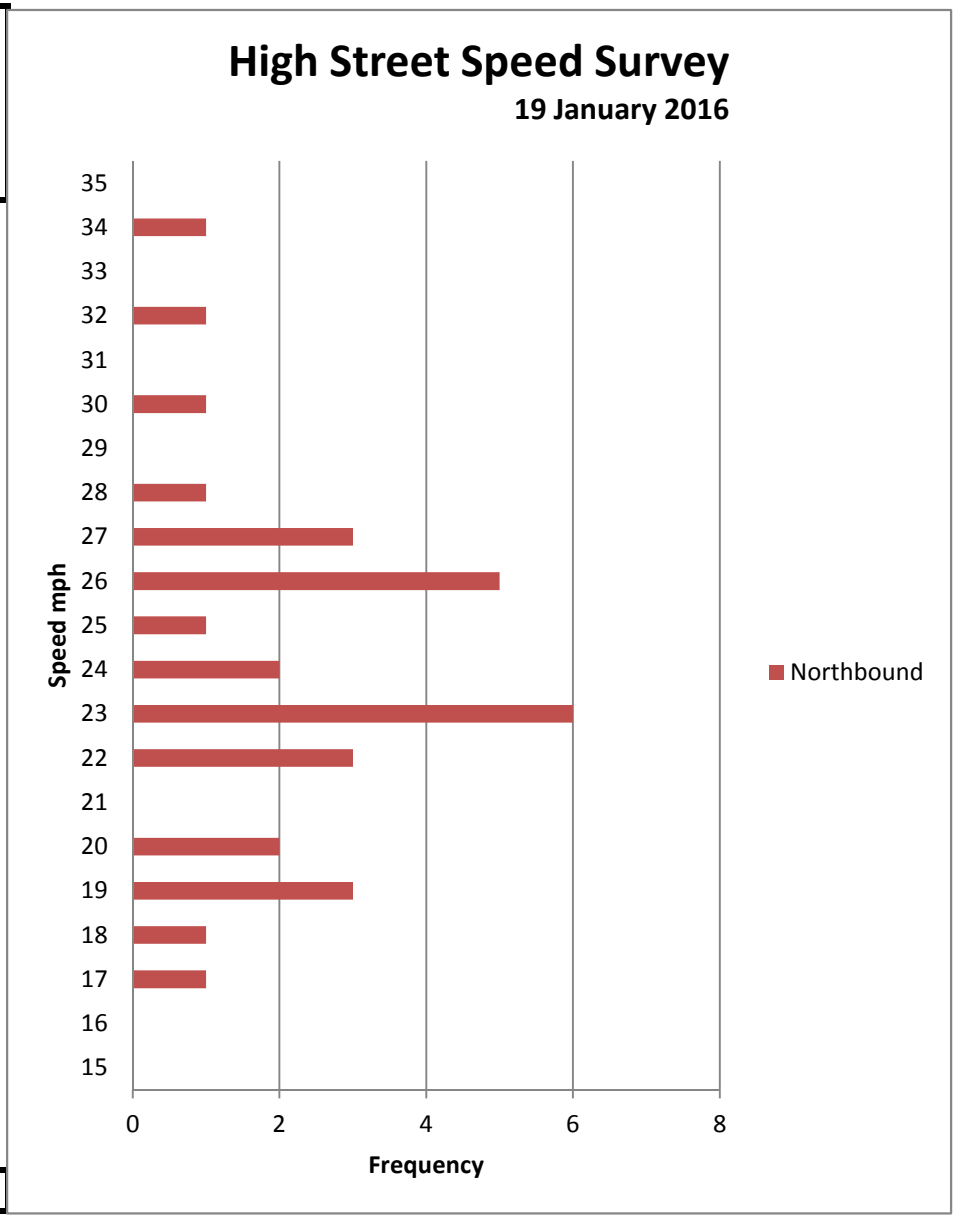
$\sum(v-m)^2 = \sum v^2 - (\sum v)^2/n$ = 19424 - 535824 / 28 = 287

s = 3.3

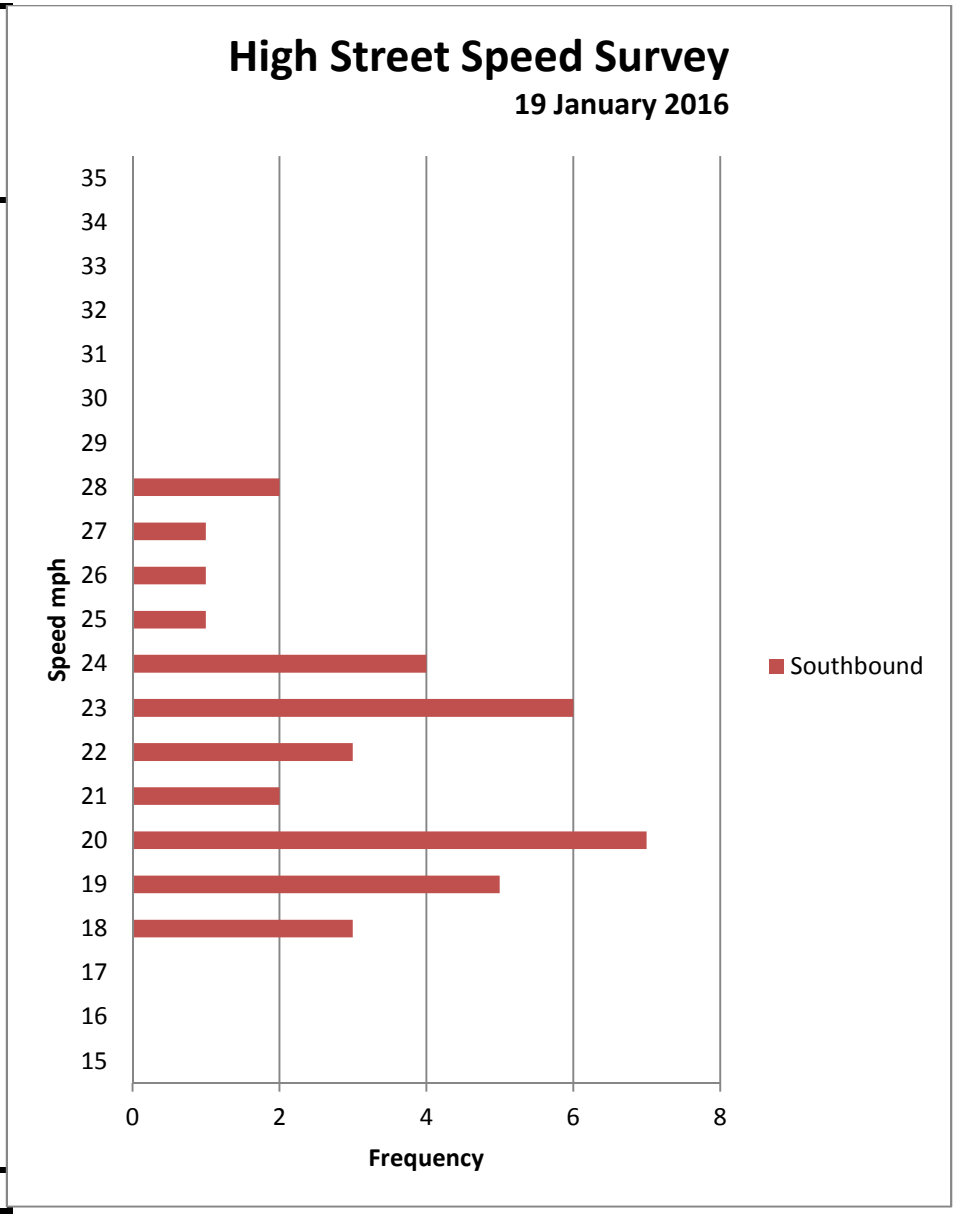
85th Percentile (v) = m + s = 29 MPH

= 13 m/s

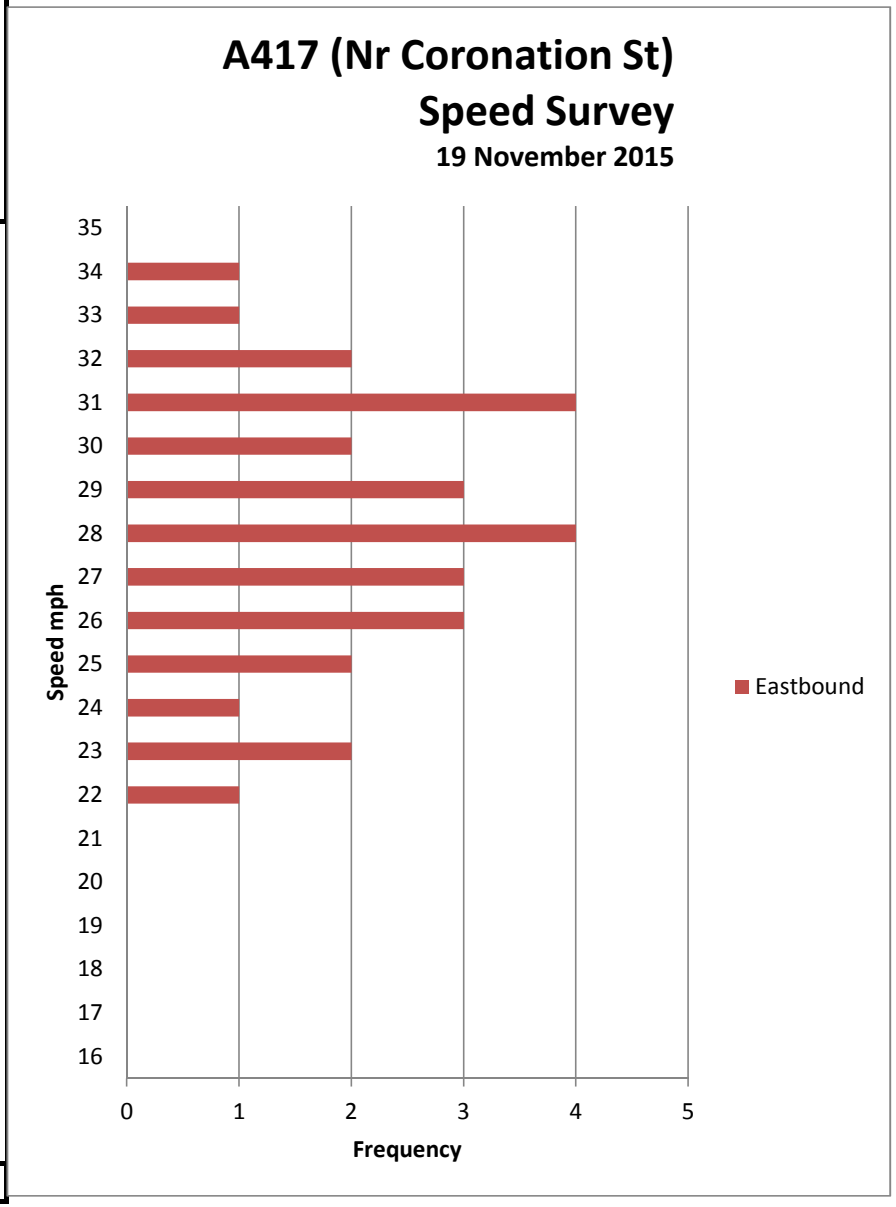
Speed	Frequency	Sum of Speeds Σv	Σ v²
15	0	-	-
16	0	-	-
17	1	17	289
18	1	18	324
19	3	57	1083
20	2	40	800
21	0	-	-
22	3	66	1452
23	6	138	3174
24	2	48	1152
25	1	25	625
26	5	130	3380
27	3	81	2187
28	1	28	784
29	0	-	-
30	1	30	900
31	0	-	-
32	1	32	1024
33	0	-	-
34	1	34	1156
35	0	-	-
Total	**31**	**744**	**18330**



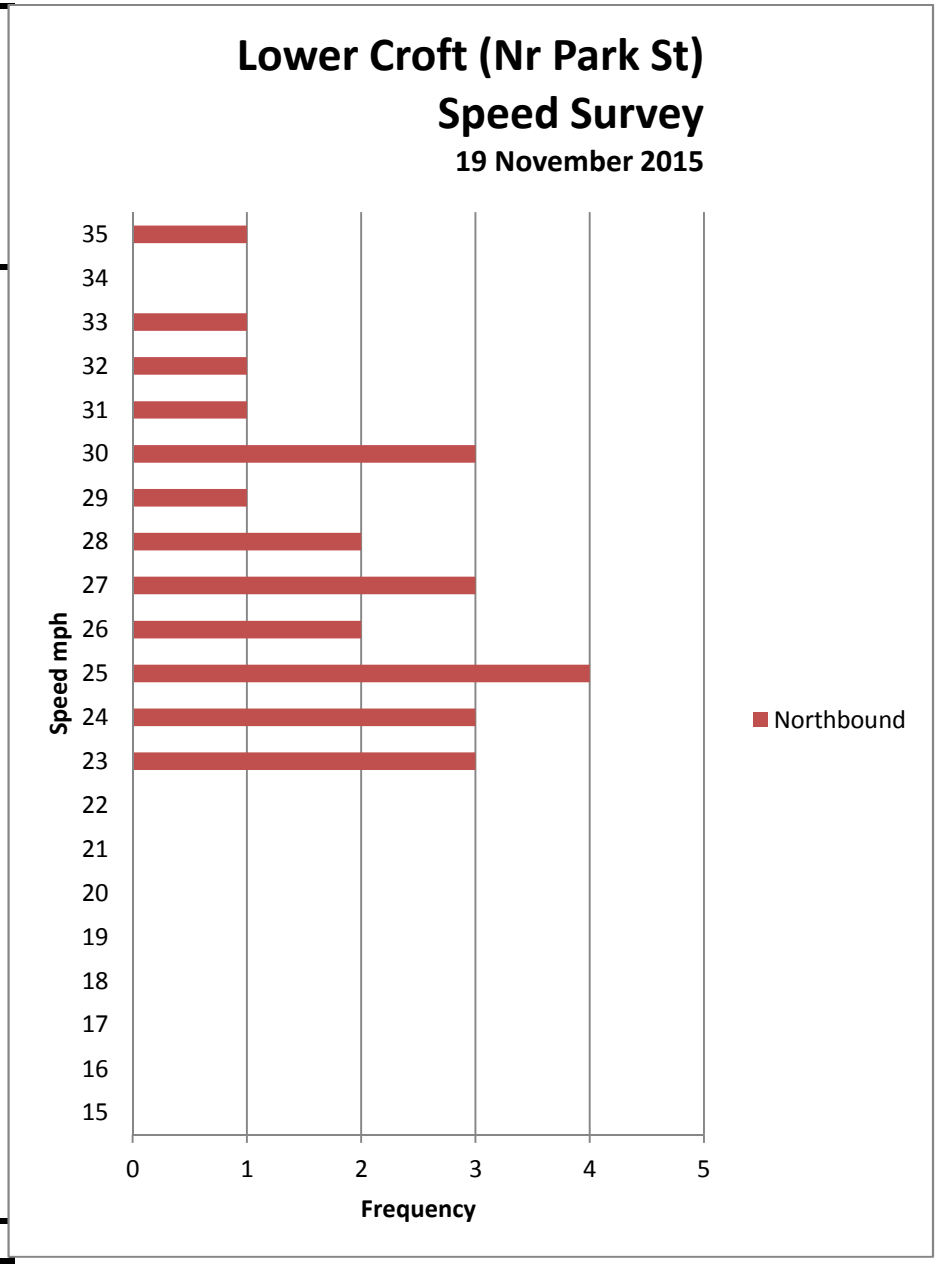
Speed	Frequency	Sum of Speeds Σv	Σ v²
15	0	-	-
16	0	-	-
17	0	-	-
18	3	54	972
19	5	95	1805
20	7	140	2800
21	2	42	882
22	3	66	1452
23	6	138	3174
24	4	96	2304
25	1	25	625
26	1	26	676
27	1	27	729
28	2	56	1568
29	0	-	-
30	0	-	-
31	0	-	-
32	0	-	-
33	0	-	-
34	0	-	-
35	0	-	-
Total	**35**	**765**	**16987**



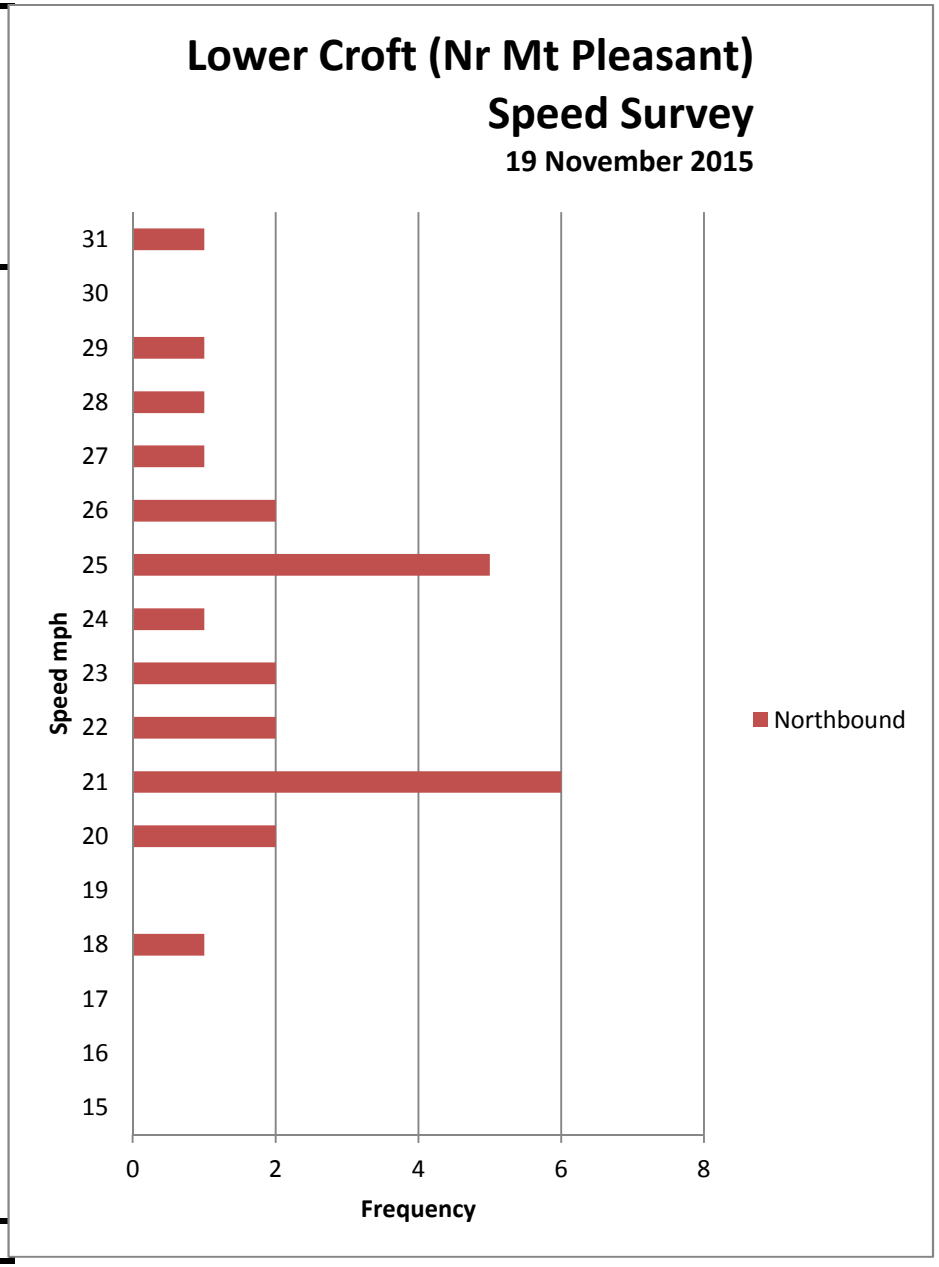
Speed	Frequency	Angle Correction (1.015)	Wet/Dry Correction (-2.49)	Sum of Speeds $\sum v$	$\sum v^2$
15	0	-	-	-	-
16	0	-	-	-	-
17	0	-	-	-	-
18	0	-	-	-	-
19	0	-	-	-	-
20	0	-	-	-	-
21	0	-	-	-	-
22	1	22	20	20	394
23	2	23	21	42	870
24	1	24	22	22	478
25	2	25	23	46	1047
26	3	26	24	72	1714
27	3	27	25	75	1862
28	4	28	26	104	2689
29	3	29	27	81	2178
30	2	30	28	56	1564
31	4	31	29	116	3358
32	2	32	30	60	1799
33	1	33	31	31	961
34	1	35	32	32	1025
35	0	-	-	-	-
Total	**29**			**755**	**19940**



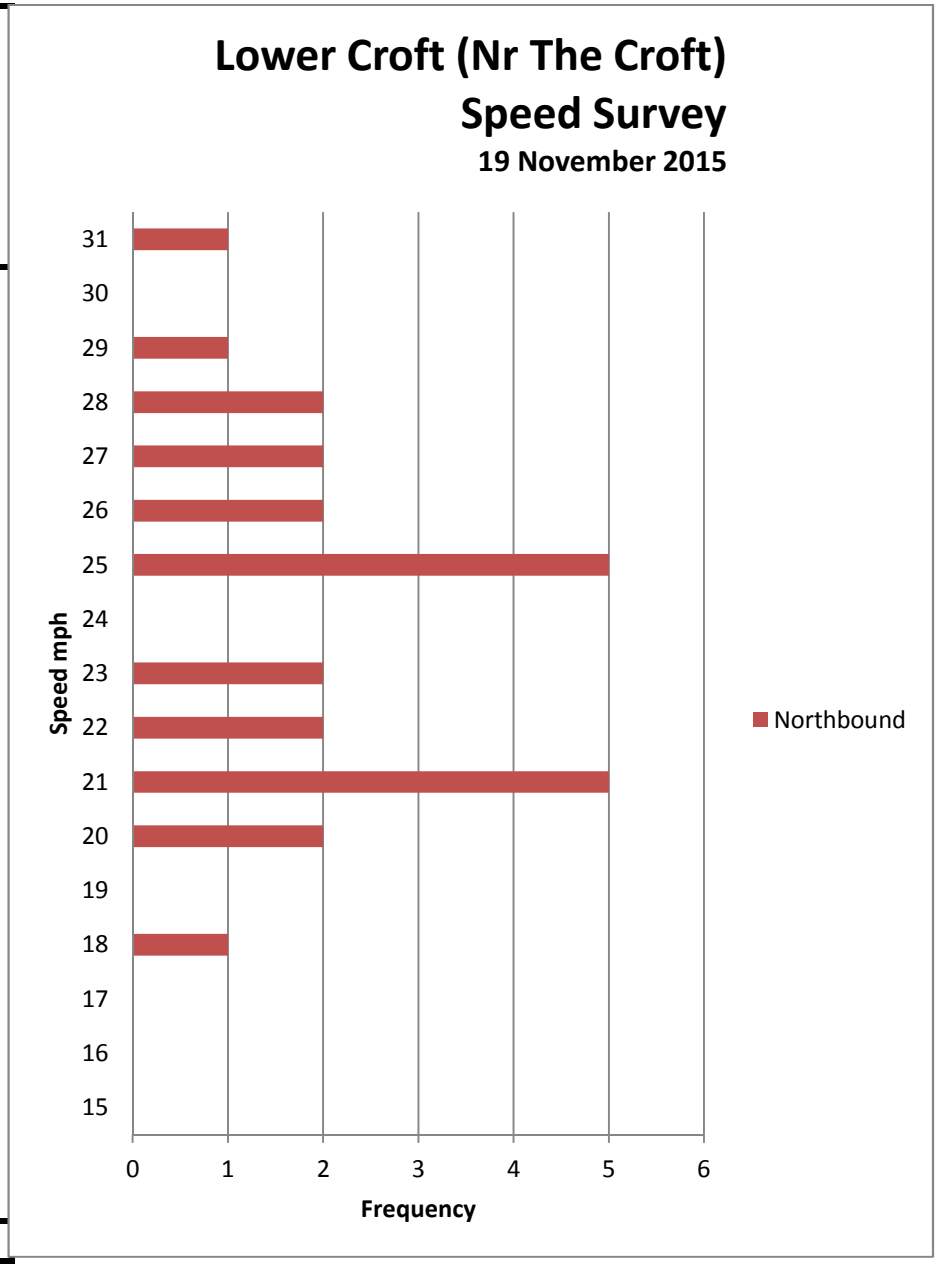
Speed	Frequency	Angle Correction (1.015)	Wet/Dry Correction (-2.49)	Sum of Speeds $\sum v$	$\sum v^2$
15	0	-	-	-	-
16	0	-	-	-	-
17	0	-	-	-	-
18	0	-	-	-	-
19	0	-	-	-	-
20	0	-	-	-	-
21	0	-	-	-	-
22	0	-	-	-	-
23	3	23	21	63	1305
24	3	24	22	66	1435
25	4	25	23	92	2095
26	2	26	24	48	1142
27	3	27	25	75	1862
28	2	28	26	52	1345
29	1	29	27	27	726
30	3	30	28	84	2345
31	1	31	29	29	840
32	1	32	30	30	899
33	1	33	31	31	961
34	0	-	-	-	-
35	1	36	33	33	1091
Total	**25**			**628**	**16047**



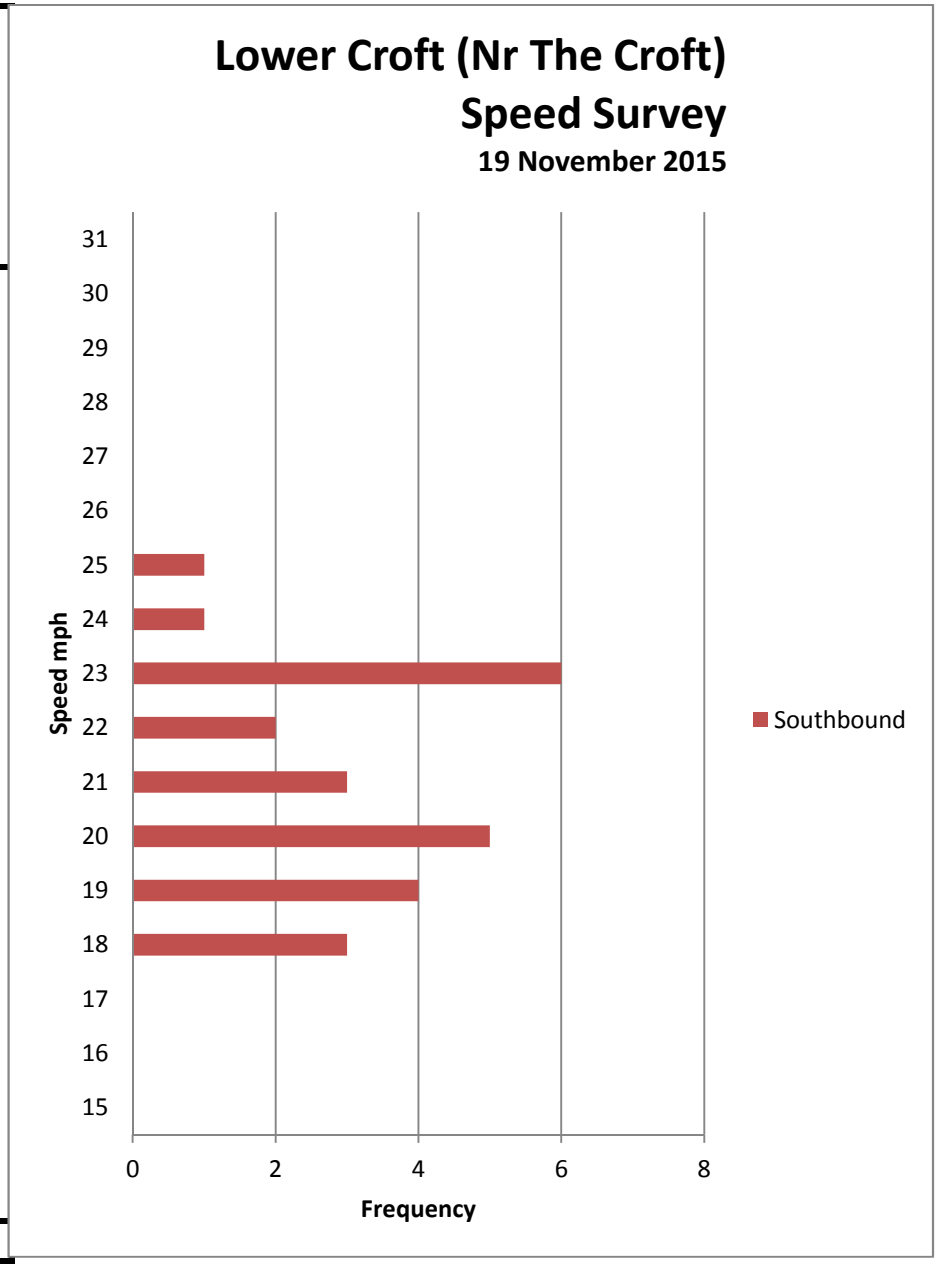
Speed	Frequency	Angle Correction (1.015)	Wet/Dry Correction (-2.49)	Sum of Speeds $\sum v$	$\sum v^2$
15	0	-	-	-	-
16	0	-	-	-	-
17	0	-	-	-	-
18	1	19	16	16	258
19	0	-	-	-	-
20	2	21	18	36	656
21	6	22	19	115	2198
22	2	23	20	40	814
23	2	24	21	42	899
24	1	25	22	22	494
25	5	26	23	116	2705
26	2	27	24	49	1180
27	1	28	25	25	641
28	1	29	26	26	694
29	1	30	27	27	750
30	0	-	-	-	-
31	1	32	29	29	867
Total	**25**			**545**	**12155**



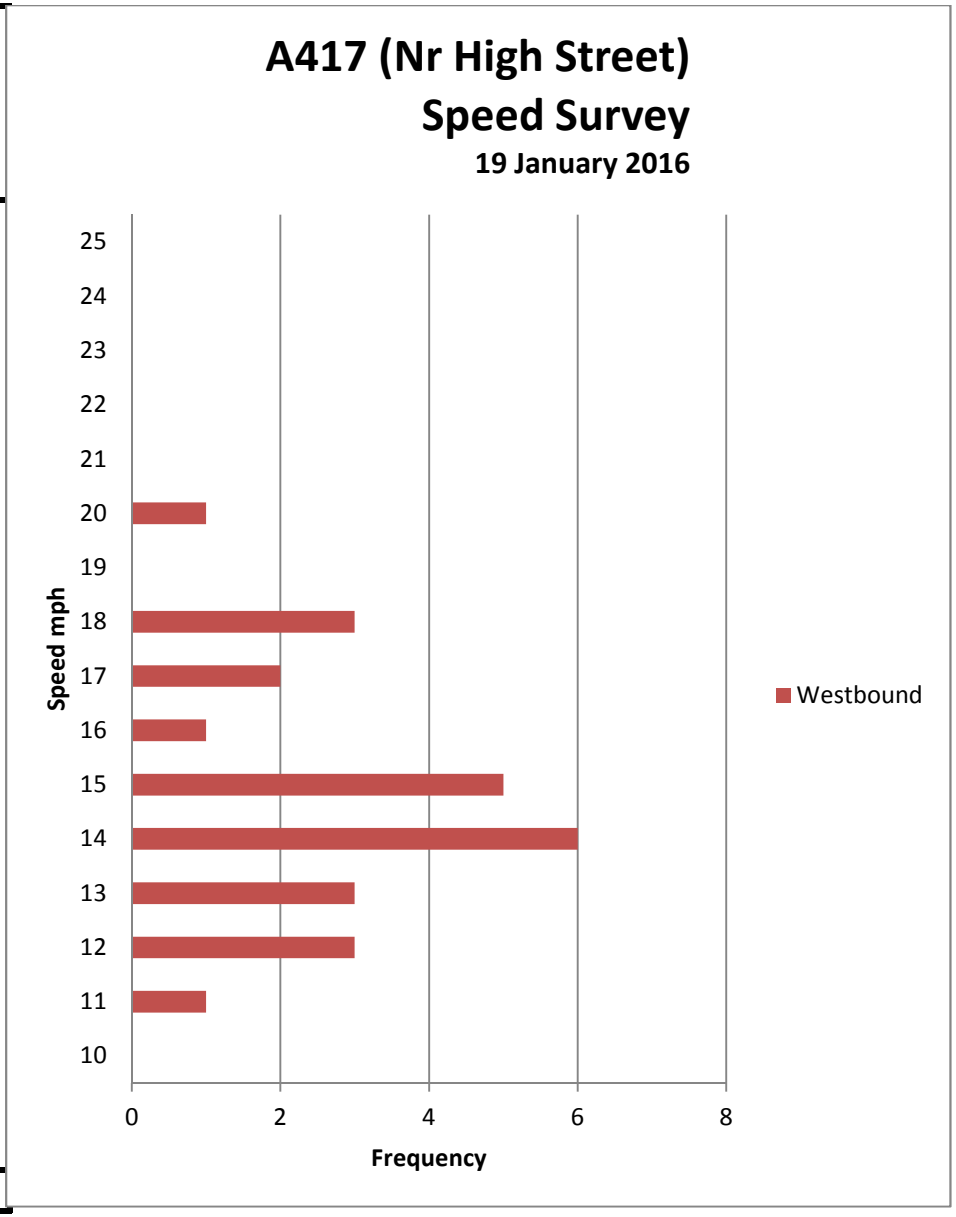
Speed	Frequency	Angle Correction (1.015)	Wet/Dry Correction (-2.49)	Sum of Speeds $\sum v$	$\sum v^2$
15	0	-	-	-	-
16	0	-	-	-	-
17	0	-	-	-	-
18	1	18	16	16	249
19	0	-	-	-	-
20	2	20	18	36	634
21	5	21	19	94	1772
22	2	22	20	40	787
23	2	23	21	42	870
24	0	-	-	-	-
25	5	25	23	114	2619
26	2	26	24	48	1142
27	2	27	25	50	1242
28	2	28	26	52	1345
29	1	29	27	27	726
30	0	-	-	-	-
31	1	31	29	29	840
Total	**25**			**547**	**12225**



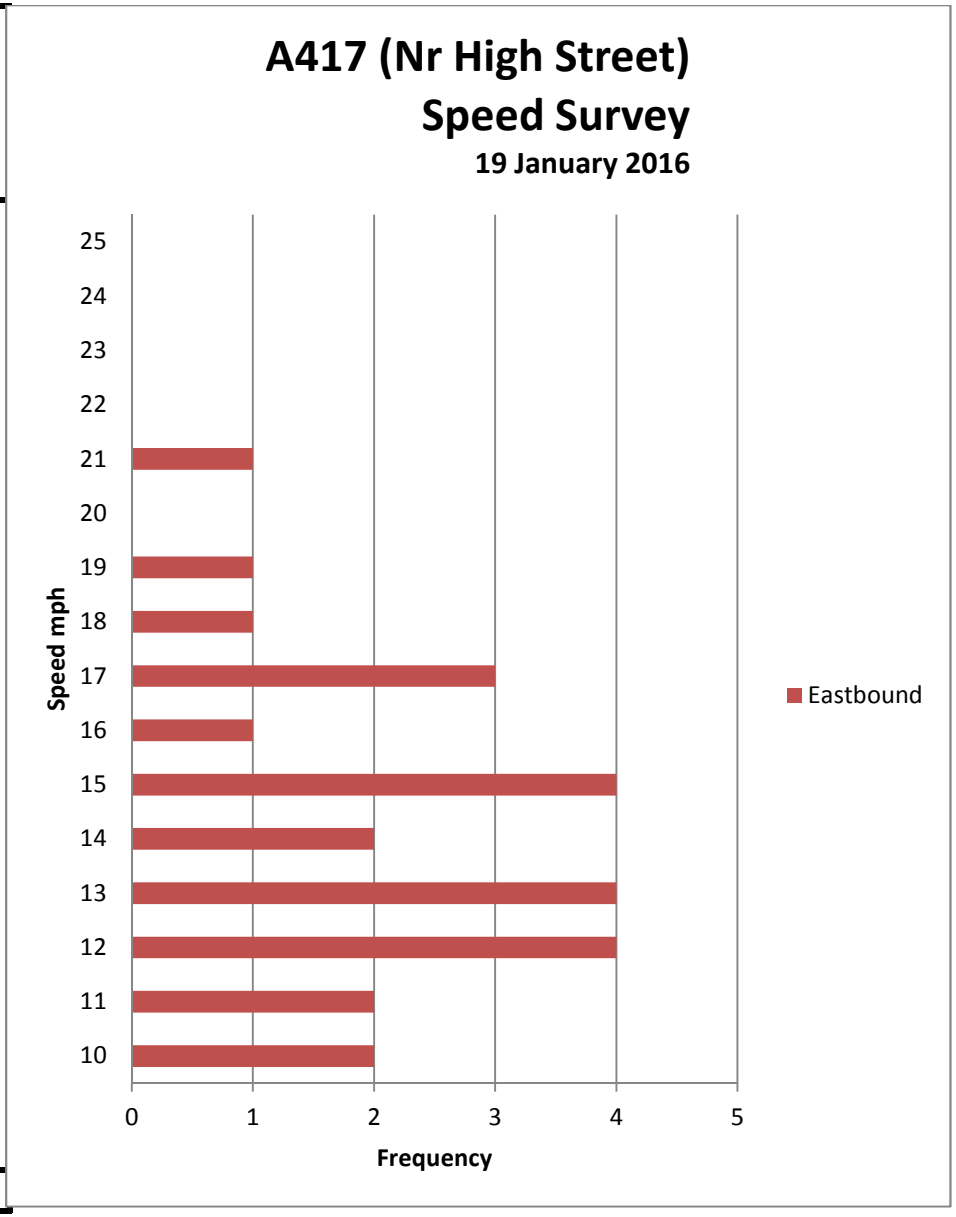
Speed	Frequency	Angle Correction (1.015)	Wet/Dry Correction (-2.49)	Sum of Speeds $\sum v$	$\sum v^2$
15	0	-	-	-	-
16	0	-	-	-	-
17	0	-	-	-	-
18	3	18	16	47	747
19	4	19	17	67	1128
20	5	20	18	89	1586
21	3	21	19	56	1063
22	2	22	20	40	787
23	6	23	21	125	2610
24	1	24	22	22	478
25	1	25	23	23	524
26	0	-	-	-	-
27	0	-	-	-	-
28	0	-	-	-	-
29	0	-	-	-	-
30	0	-	-	-	-
31	0	-	-	-	-
Total	**25**			**470**	**8923**



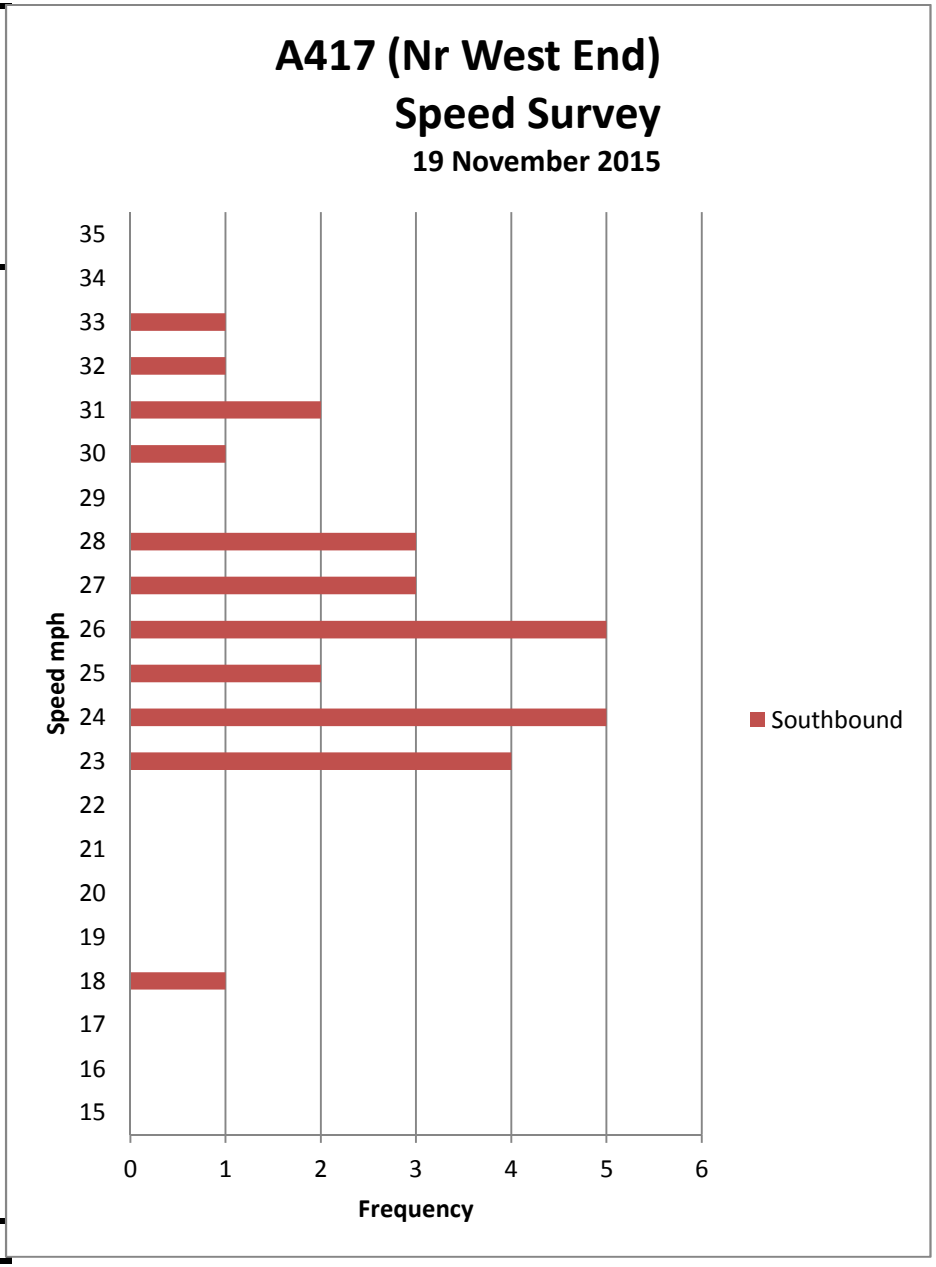
Speed	Frequency	Angle Correction	Wet/Dry Correction	Sum of Speeds Σv	Σ v²
10	0	-	-	-	-
11	1	11	9	9	75
12	3	12	10	29	282
13	3	13	11	32	344
14	6	14	12	70	824
15	5	15	13	64	811
16	1	16	14	14	189
17	2	17	15	30	436
18	3	18	16	47	747
19	0	-	-	-	-
20	1	20	18	18	317
21	0	-	-	-	-
22	0	-	-	-	-
23	0	-	-	-	-
24	0	-	-	-	-
25	0	-	-	-	-
Total	**25**			**312**	**4025**



Speed	Frequency	Angle Correction	Wet/Dry Correction	Sum of Speeds Σv	Σ v²
10	2	10	8	16	122
11	2	11	9	18	156
12	4	12	10	39	390
13	4	13	11	44	475
14	2	14	12	24	285
15	4	15	13	52	672
16	1	16	14	14	196
17	3	18	15	45	677
18	1	19	16	16	258
19	1	20	17	17	292
20	0	-	-	-	-
21	1	22	19	19	366
22	0	-	-	-	-
23	0	-	-	-	-
24	0	-	-	-	-
25	0	-	-	-	-
Total	**25**			**303**	**3888**



Speed	Frequency	Sum of Speeds ∑v	∑ v²
15	0	-	-
16	0	-	-
17	0	-	-
18	1	18	324
19	0	-	-
20	0	-	-
21	0	-	-
22	0	-	-
23	4	92	2116
24	5	120	2880
25	2	50	1250
26	5	130	3380
27	3	81	2187
28	3	84	2352
29	0	-	-
30	1	30	900
31	2	62	1922
32	1	32	1024
33	1	33	1089
34	0	-	-
35	0	-	-
Total	**28**	**732**	**19424**



Speed	Frequency	Sum of Speeds Σv	Σ v²
15	0	-	-
16	0	-	-
17	0	-	-
18	0	-	-
19	0	-	-
20	0	-	-
21	2	42	882
22	3	66	1452
23	2	46	1058
24	3	72	1728
25	6	150	3750
26	2	52	1352
27	5	135	3645
28	2	56	1568
29	1	29	841
30	2	60	1800
31	0	-	-
32	1	32	1024
33	1	33	1089
34	1	34	1156
35	0	-	-
Total	**31**	**807**	**21345**