



**Buckinghamshire County Council**

# **Rose Avenue, Hazlemere Pedestrian Crossing Feasibility Study**

**Feasibility Study Report**

**CHA13IDH / FEA / DOC / 01**

**31 May 2013**

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## 1 Introduction

- 1.1 Hazlemere Parish Council successfully proposed a pedestrian crossing feasibility study to be undertaken for Rose Avenue, Hazlemere to the Chepping Wye Valley Local Area Forum (LAF) under the 2012-13 Localities Budget.
- 1.2 This study aims to identify potential crossing provisions and identify solutions to other traffic and safety concerns raised by the Parish Council and local schools.

## 2 Background

- 2.1 A meeting was held on 18 December 2012 with Hazlemere Parish Council (Ali Banham and Brian Mapletoft) and County Councillor David Carroll to gather information and objectives for the improvements. The main aim of this request would be to enable pedestrians to cross Rose Avenue more safely, ideally adjacent to Sir William Ramsey School. Elderly people also find it difficult to cross the carriageway at this location.
- 2.2 Generally, Rose Avenue has traffic issues, especially during peak hours and during school opening and closing times. In particular, traffic often backs up from the junction with the B474 Penn Road past the school. Also, during school opening and closing times, it is probable that parents with children deposit and collect their children in this area. This, along with the close proximity of public bus stops further complicates the issue.
- 2.3 At this location, these issues are exacerbated by the alignment of the carriageway which consists of a series of tight bends which in places limit visibility for pedestrians crossing. Whilst, in isolation, the alignment of the carriageway tends to have a calming effect on the traffic, this, in conjunction with the above makes crossing of the carriageway difficult.
- 2.4 Taking the entire length of Rose Avenue into consideration it is also used as an alternative route for vehicles avoiding the congestion along the B474 Penn Road towards Hazlemere Crossroads. Again during school opening and closing times, congestion is also encountered adjacent to Manor Farm junior and Infant Schools which is also located near to the local shops. The shops have limited parking, therefore numerous cars park outside the schools when visiting the shops.
- 2.5 The alignment along sections of Rose Avenue is wide and straight. This in combination with the more congested areas will have an effect on driver behaviour. It is therefore prudent that this feasibility study may need to take into account the wider issues of Rose Avenue and not just the immediate areas of concern.
  - 2.5.1 There are a number of key facilities in this area including:
    - Sir William Ramsey Secondary School
    - Hazlemere Community Centre and Social Club
    - Youth Club
    - Manor Farm Infant School
    - Manor Farm Junior School

- Playground and Recreation Field
- Local Shops (opposite Manor Farm Schools)
- Retirement/Sheltered Housing
- Bus Services – no. 31 (4 per hour) no.577 (3 per day) and no.337 (3 per day)
- School bus services

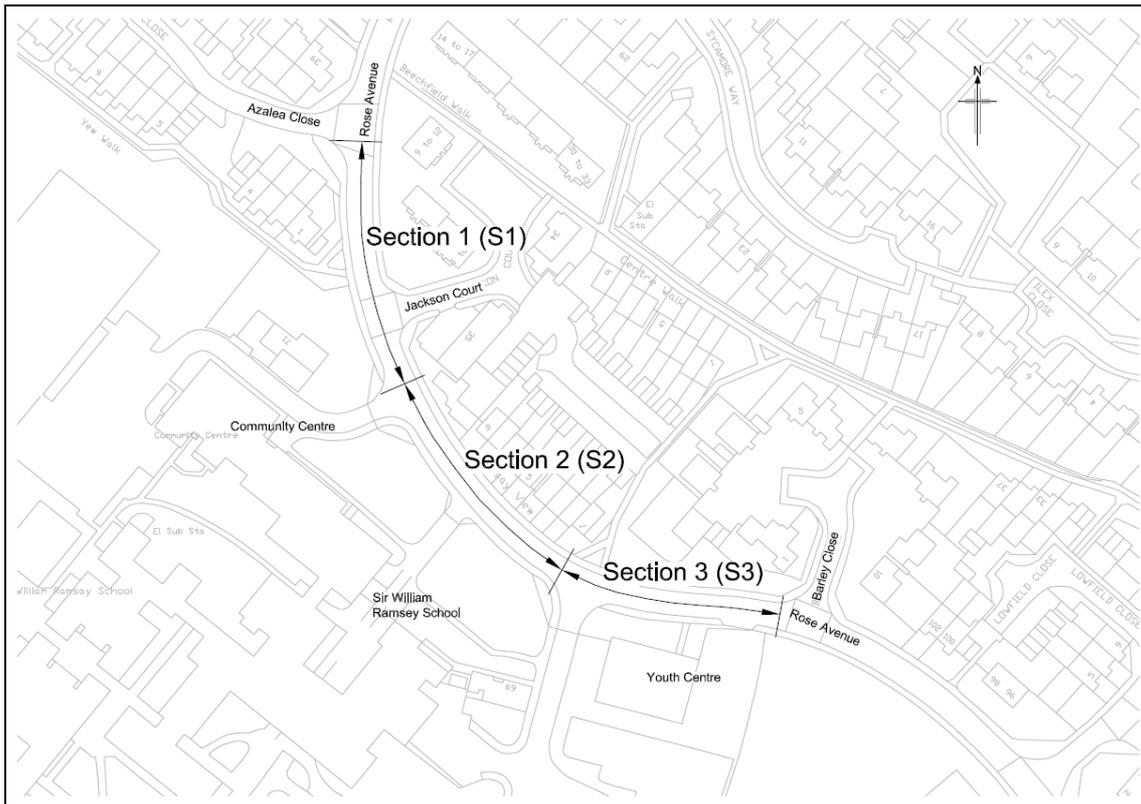
### **3 Casualty Data**

- 3.1 On Rose Avenue (whole length) there have been 7 recorded injury collisions in the 5 year period between 01/10/07 and 30/09/12. All of these collisions were slight in severity.
- 3.2 None of these injury recorded collisions involved a pedestrian.
- 3.3 Three of the collisions occurred at junctions and were attributed to driver misjudgement/error.
- 3.4 Four of the collisions involved drivers losing control and did not involve other vehicles. It is noted that all of these vehicles were travelling in a south-easterly direction.
- 3.5 Transport for Buckinghamshire's current method of identifying local safety scheme sites is by identifying routes that have a high rate of fatal or serious injury collisions per km. or sites where at least 5 injury collisions (of any severity) have occurred within a 50m radius, in the last 5 years. These collision 'cluster' sites are ranked by a 3,3,1 weighting for fatal, serious and slight to ensure that we are addressing the sites with the highest severity collisions. Within the five year period between 01/10/07 and 30/09/12, 7 slight injury collisions occurred on Rose Avenue over a length of near 900m. Only two of the accidents occurred within 50m of each other. Therefore Rose Avenue would not meet these criteria for routes or 'cluster' sites.

### **4 Pedestrian and Traffic Volume Data**

- 4.1 A manual pedestrian and traffic count was undertaken on Thursday 14<sup>th</sup> March 2013 on Rose Avenue adjacent to the Sir William Ramsey School. This survey recorded the volume of traffic and pedestrian numbers. It also recorded where pedestrians crossed into 3 different sections of Rose Avenue – see Figure 4-1 and Table 4-1 below. Note that for the purpose of pedestrian surveys, a secondary school pupil is considered an adult.

**Figure 4-1 – Pedestrian Crossing Sections**



**Table 4-1 – Summary of Pedestrian and Vehicle Count**

Hour Ending	Vehicle Count (2 way flow)	Pedestrian Count Adult (A) / Child (C)							
		S1		S2		S3		Total	
		A	C	A	C	A	C	A	C
08:00	320	38	0	41	0	16	0	95	0
09:00	624	323	31	228	3	228	2	779	36
10:00	268	29	0	27	0	22	0	78	0
11:00	225	34	0	32	0	74	0	140	0
12:00	245	55	0	50	0	30	0	135	0
13:00	251	12	0	19	0	12	0	43	0
14:00	246	4	0	9	0	10	0	23	0
15:00	277	5	0	1	0	2	0	8	0
16:00	423	20	4	21	0	21	6	62	10
17:00	474	3	1	9	6	9	2	21	9
18:00	399	4	0	5	0	22	0	31	0
19:00	379	6	0	0	0	4	0	10	0
<b>Sub-Total</b>	<b>4131</b>	<b>533</b>	<b>5</b>	<b>442</b>	<b>9</b>	<b>450</b>	<b>10</b>	<b>1425</b>	<b>55</b>
<b>Total</b>		<b>538 (37%)</b>		<b>451 (31%)</b>		<b>460 (32%)</b>		<b>1449</b>	

- 4.2 These figures show a clear AM peak period between 8am and 9am for both pedestrians and traffic. From site visits during the peak periods, the level of the pedestrian flows between 8am and 9am is unrealistic. In correspondence with Sir William Ramsey School, they have stated that the school coaches are able to enter onto the school site and drop children off. Further investigations to determine the reason for the significant increase in pedestrians has been made, but has not been confirmed at the time of publishing this report. Only the local buses (route 31, 577 and 337) stop on the opposite side of the school and school the majority of school children walking to school are on the correct side of the road before reaching this area. Therefore the pedestrian data between 8am and 9am is to be disregarded.
- 4.3 The PM peak for traffic is more spread out and the levels of pedestrians correspond with site observations.
- 4.4 The distribution of crossing location is relatively evenly spread between the three sections, with Section 1 having slightly higher pedestrian crossing numbers.

## 5 Traffic Speed Data

- 5.1 A Speed survey was undertaken between Wednesday 13 March and Wednesday 20 March 2013 at three locations along the length of Rose Avenue. The results of this show:

**Table 5-1 – Rose Avenue Speed Data Summary (mph)**

Direction	7am till 7pm weekday speeds (mph)	Location 1	Location 2	Location 3
		Outside Sir William Ramsey School	Adjacent to Lowfield Way Junction	Outside Manor Farm School
Eastbound	85 <sup>th</sup> %ile speed	30.1	33.6	30.4
	mean average	24.8	27.6	23.0
Westbound	85 <sup>th</sup> %ile speed	30.2	31.3	31.4
	mean average	25.1	26.2	24.8

- 5.2 The 85<sup>th</sup> percentile is a commonly used speed statistic for which 85% of the traffic goes below the stated speed.
- 5.3 The speeds show that highway alignment (tighter curves) at locations 1 and 3 reduce speed compared with Location 2. This is evident throughout the day and not just at peak times or school start and end times. The data shows that speeds adjacent to the Sir William Ramsey School only reduce slightly during the school start and end times. Though this may be due to traffic congestion from the Penn Road junction. The speed adjacent to the Manor Farm Junior and Infant School does reduce more significantly during the school drop-off and pick-up and this may be due to parents dropping and picking up their children.

## 6 Pedestrian Crossing Improvement Options

### 6.1 Controlled Pedestrian Crossing

- 6.1.1 There are two types of controlled crossing, a signal controlled Puffin crossing and a Zebra crossing. Drawing CHA 35MLH/FEA/OPT1 in Appendix A shows a zebra crossing layout, but the same location and arrangement would be identical for a signalised Puffin crossing.
- 6.1.2 The numbers of pedestrians throughout the day from the pedestrian survey is moderate excluding the misleading flow between 8am and 9am. The demand for a controlled pedestrian crossing is largely based upon ease of crossing judging the numbers of gaps in traffic where pedestrians could cross. From site observations during both AM and PM peak periods, there are adequate opportunities for pedestrians to cross and pedestrians did not appear to have difficulty crossing the road and were not delayed for very long. This observation, together with the absence of any recorded injury collisions involving pedestrians, would not provide a demand to introduce a controlled pedestrian crossing.
- 6.1.3 The survey did show a very high number of pedestrians between 8am and 9am. Even if this high number did occur regularly, there would be the opportunities for pedestrians to cross the road.
- 6.1.4 The critical factor at this location when crossing the road is pedestrian visibility, particularly when crossing towards the school. Visibility both left and right is restricted by a number of hedgerows in front gardens. This restricts the visibility to a pedestrian crossing point down to absolute minimum values for a controlled pedestrian crossing based upon the speed data obtained (LTN 2\_95 - Design of Pedestrian Crossings). A zebra crossing would not resolve this issue as pedestrians on the northern side of the footway would still have the same problems with visibility. A signal controlled Puffin crossing would help this problem as a the traffic signal on the southern side of the road would be more visible to traffic and is activated irrespective of the side of the road a pedestrian is on.
- 6.1.5 The reduced visibility in both directions on Rose Avenue directly outside the school may cause problems for vulnerable road users who take more time to cross the road. They cannot see far enough down the road to ascertain whether they would have enough time to cross the road if they cross on a particular desire line, without walking a diversion. A signal controlled crossing would tackle this problem.
- 6.1.6 Introducing a controlled crossing would not necessarily mean that pedestrians would use it. Site observations indicate that there are ample opportunities for pedestrians to cross in peak periods and pedestrian would probably continue to cross the road away from the controlled crossing point. This has disadvantages as drivers would potentially focus on the crossing point and not anticipate pedestrians crossing nearby.
- 6.1.7 A signalised puffin crossing would be able to regulate the flow of pedestrians to prevent unacceptable delays to traffic. A big disadvantage of a signalised crossing is that it can change driver behaviour to lessen the response of the driver to their surroundings and only focus on the green light. This would be at a disadvantage for pedestrians choosing to cross away from the controlled crossing.

- 6.1.8 The 85<sup>th</sup> percentile speeds in both directions are below the required limit of 35mph to allow the introduction of a zebra crossing.
- 6.1.9 Due to visibility issues, a signalised Puffin crossing would be preferable to a Zebra crossing. However, from site observations there would be little overall benefit in providing a controlled crossing as the majority of pedestrians do not appear to have difficulty in crossing the road.
- 6.1.10 For an indicative guidance, a budget cost estimate has been provided in section of this report.

## **6.2 Refuge Island**

- 6.2.1 A refuge island would provide only an informal crossing point, where traffic does not give way to pedestrians. However, there is a significant advantage in pedestrians being able to cross the road in two stages. This is particularly advantageous at this location as pedestrians on the island would have greater visibility along the road to see oncoming traffic than they would if they were on the footway on the inside of the bend in the road. This would provide a good facility for vulnerable road users.
- 6.2.2 However, the existing road width of approximately 6.5m is insufficient to accommodate a central pedestrian refuge. Drawing CHA35MBH/FEA/OPT2 in Appendix A shows a layout for a central pedestrian refuge, which provides 3.5m traffic lanes and a 2.0m wide refuge.
- 6.2.3 The drawing shows the most suitable and also most feasible location for a refuge. There would be a requirement to obtain land from outside of the highway boundary. This can be a very costly process. At this location, no trees would need to be removed in widening the road, but with other adjacent locations, tree would be removed.
- 6.2.4 When the pedestrian flow is higher, such as a group of children from local bus, there is concern that there would be a large congregation of children on the central island.
- 6.2.5 As the existing pedestrian crossing movements are not restricted to one location and are spread out evenly along Rose Avenue, the attraction of a single refuge would be less likely to change pedestrians' behaviour; compared with the introduction of a controlled crossing. Multiple refuges are not realistic due the additional cost and impact on surrounding land.
- 6.2.6 There is a risk when widening carriageways, that adjacent underground services would need to be diverted. A preliminary search at this location has been carried out and identified that a gas pipe runs under the footway nearest the school. This would potentially need diverting to remain in the relocated footway. The cost for this is unknown at this stage but has the potential to be very high. No other services were identified in this footway, as BT's cable is already located in the verge within school grounds.
- 6.2.7 Due to the additional costs of carriageway widening, land purchase and potential underground utility diversions, refuge islands are not recommended.
- 6.2.8 For an indicative guidance, a budget cost estimate has been provided in section 8 of this report.

### **6.3 Informal Crossing Point**

- 6.3.1 Informal crossing points could be introduced and undergo treatments to make them more conspicuous. Such treatments include coloured surfacing and a raised crossing area. Through placing more emphasis on the pedestrians crossing point, drivers are more likely to informally give-way to pedestrians waiting to cross the road. However at this location, there is no one specific crossing point.
- 6.3.2 If a crossing point was treated as above, the improvements would be unlikely to change the behaviour of pedestrians in crossing on their specific desire line. Traffic is relatively low and from site observations, pedestrians generally have little difficulty in crossing the road. An effect of designating a single crossing point would be that drivers may become more frustrated by pedestrians crossing away from the designated crossing point.
- 6.3.3 This solution does not improve the visibility problems, particularly for vulnerable users.
- 6.3.4 For the reasons above it is not recommended to provide an informal crossing point.

### **6.4 Build-out**

- 6.4.1 A build-out would reduce crossing width and give marginally better visibility along Rose Avenue when crossing from north to south, towards the school. A potential layout is shown on Drawing CHA35MBH/FEA/OPT3 in Appendix A.
- 6.4.2 A build-out does have a traffic calming effect and is typically used to reduce speeds on the approach to another feature such as a series of cushions. On its own it would not have a significant effect on speeds over a long length. Only a series of build-outs or chicanes would achieve this. Priority has been shown to northwest bound traffic, as it is southeast bound traffic that crosses onto the opposing lane. Consideration could be given to reversing the priority; however this is unusual and would probably be raised as a problem in a road safety audit.
- 6.4.3 A build-out is not normally recommended where there is a particular desire line as drivers may be concentrating more on opposing traffic flows and manoeuvring through the feature than on the movement of pedestrians. Also it can be confusing for pedestrians understanding when vehicles are slowing to give way for opposing traffic and not slowing to allow them to cross. This would be exacerbated in the school start and end periods due to the presence of coaches and right turning traffic into the school car park. Any queues created in and around the build-out have the potential to 'clog' up the road creating a poor environment for pedestrians to cross the road. Therefore a build-out at this location is not recommended.
- 6.4.4 For an indicative guidance, a budget cost estimate has been provided in section of this report.

### **6.5 Visibility Improvements**

- 6.5.1 There is restricted visibility when crossing Rose Avenue towards the school and community centre. Generally the front gardens of the properties only have low level planting which allows pedestrians to see along Rose Avenue in both directions. However, there are two locations where tall hedges restrict visibility significantly.

- 6.5.2 At minimum these hedges should be trimmed back to the boundary, however there would be greater pedestrian comfort when crossing the road if these hedges were removed, or cut down to height of 1.0m or below. These hedges are on private property and the Highway Authority does not have power to carry out work on private land without compulsory purchase order. The Parish Council could approach the property owners to discuss potential measures.
- 6.5.3 The downside of removing this obstruction to visibility would be that vehicles would also have better forward visibility and the current restricted forward visibility is probably a large factor in keeping speeds down.

## **6.6 Dropped Kerbs**

- 6.6.1 Currently there are a number of locations on Rose Avenue where there is no provision for dropped kerbs. Whilst this does not impact the majority of users, it can significantly restrict the movement of vulnerable users including wheelchairs and to lesser extent pushchairs. Table 6-1 shows a review of the dropped kerbs along Rose Avenue and adjacent side roads. An approximate cost is £2,000 per pair of dropped kerbs.

**Table 6-1 – Rose Avenue Dropped Kerb Provision**

Location	Dropped Kerb	Flush Kerb	Tactile Paving	Comments
Penn Road Junction (west)	Y	Y	Y	
Elder Way	Y	N	N	
Highfield Way	Y	N	N	
Sycamore Way	Y	N	N	
Beechfield Way (footpath)	Y	N	N	Dropped kerbs are not opposite one another
Azalea Close	N	N	N	
Yew Walk	N	N	N	
Jackson Court	Y	N	N	
Community Centre Vehicle Entrance	N	N	N	
Rose Avenue, near sir William Ramsey School	N	N	N	Could potentially be located at same location as crossing point on drawing CHA35MBH/FEA/OPT1
Sir William Ramsey School vehicle entrance	N	N	N	
Barley Close	Y	Y	N	
Lowfield Way	Y	Y	N	
Playground/Park Pedestrian Entrance	N	Y	N	
Ashfield Way	N	N	N	
Hayfield Drive	Y	N	N	
Access Road	N	N	N	
Firs View Road	Y	Y	N	
Firs Close	Y	Y	N	
Hawthorn Cres (west)	Y	Y	N	
Manor Farm Schools Crossing Point	Y	N	Y	
Hawthorn Cres (east)	N	N	N	
Rose Ave. near shops	N	N	N	
Ashley Drive	N	N	N	
Tylers Rd	Y	Y	N	
Coppice Farm Rd	Y	Y	N	
Curzon Close	Y	Y	N	
Penn Road (east)	Y	Y	N	

## 6.7 Speed Reduction

- 6.7.1 The recorded collision data did not show any pedestrian collisions, but it did show 3 collisions involving vehicles travelling along Rose Avenue in isolation leaving the road. Whilst these problems are largely attributed to driver error, it is unusual to have three such accidents within a relative short length of road. Therefore, consideration has been given to how to improve this situation. Speed reduction would also have a benefit on pedestrian safety and therefore could address the objective of this study.
- 6.7.2 A chicane or build-out with priority working is not recommended on Rose Avenue adjacent to the school as discussed Section 6.4. Such build-outs would only provide a local speed reduction and are typically used on the entrance to other speed reducing features. To provide a more consistent speed reduction along the whole length of Rose Avenue a speed cushion scheme would be more appropriate. Speed cushions allow cars travelling at an appropriate speed to straddle the cushion. The design speed can be adjusted by altering the width and height of the cushions.

- 6.7.3 Drawing CHA35MBH/FEA/OPT4 shows potential locations for the cushions along the whole length of Rose Avenue between the Sir William Ramsey School and Manor Farm Schools. Whilst the sections of road outside the two schools are the most obvious locations to install the cushions, the Parish Council have raised concerns of speeds between these two locations and therefore the cushions have been continued along this section. Without these cushions, speed would potentially increase between these two sections.
- 6.7.4 The height and width of the cushions can be varied to find the compromise between speed reduction and comfort for buses. Speed cushions do not significantly reduce speeds of large vehicles with a wide wheelbase (including emergency vehicles) or motorcycles as they can avoid travelling over the raised cushion.
- 6.7.5 A full road width speed hump would not be appropriate as it would cause discomfort to bus passengers and an increase noise, particularly from heavy vehicles. Speed cushions aim to remove/reduce these disadvantages.
- 6.7.6 The cost of these cushions is significant and is largely due to cost of potential carriageway resurfacing at the cushion location and street lighting. Cost estimates have been provided in section of this report.
- 6.7.7 It is recommended that pre-fabricated speed cushions are used for the ease of maintenance and consistency of size. Where the speed cushions are installed, the existing carriageway should be resurfaced to provide a secure surface to bolt the cushions to and a robust surface to withstand the extra stress causes by the vertical deflection. Whilst much of the existing carriageway is currently in good condition, an allowance within the cost estimate has been made to ensure that the carriageway surface is improved as part of the scheme. The cost estimate assumes a worst case scenario that a 15m length patch adjacent to each pair of cushions is resurfaced. This has been reflected and clearly identified in the cost estimate breakdown.
- 6.7.8 Standards dictate that speed cushions need to be illuminated. Currently the lighting along Rose Avenue is Parish owned and if it became part of a traffic calming scheme it would need to be adopted by Buckinghamshire County Council. Where possible, the speed cushions should be located adjacent to an existing lighting column.

## 7 Conclusion and Recommendations

- 7.1 The initial brief for this report was to investigate the provision of a **controlled pedestrian crossing** on Rose Avenue near to the Sir William Ramsey School. There appears to be little demand for this crossing and Buckinghamshire County Council would not place high priority on this crossing location based upon site observations, traffic and pedestrian numbers and recorded collision data. If a controlled crossing were to be located here it is recommended that a signal crossing would be in preference to a zebra due to the limited visibility from the northern side of the footway. This would provide assist vulnerable road users crossing on this pedestrian desire line without diverting them to a easier crossing point. The cost for this type of crossing is high and is therefore not recommended due to the limited benefit of the scheme.
- 7.2 Other provisions have been considered but not recommended as follows:
- **Refuge Island** – allows crossing in two stages, but is not recommended due to limited benefit against high costs related to carriageway widening, land costs and potential underground services diversions.
  - **Informal Crossing Point** (raised or coloured) – highlights a specific crossing point, but is not recommended as it provides little benefit where there are a number of pedestrian desire lines across this section of Rose Avenue.
  - **Build-out** – provides shorter crossing point and marginally better visibility, but not recommended as it has the potential to cause congestion in front of the school in peak periods where traffic and pedestrians flows are highest, which may make the pedestrian environment worse.
- 7.3 On Rose Avenue, opposite Sir William Ramsey School, there are two sections of well established and maintained hedgerow which restrict **visibility for pedestrians** crossing towards the school. Trimming these back in line with the highway boundary can be achieved, but any trimming/clearance works within private land would need to be agreed with the landowner.
- 7.4 It has been identified on Rose Avenue that there is a lack in provision of good **quality dropped kerbs** on many of the junctions with side road roads and at key locations across Rose Avenue such as outside the Sir William Ramsey School and shops. Many of these crossing points do have dropped kerbs, but they do not provide a flush (or close to flush) surface with the carriageway and do not have tactile paving. These provision assist the visually and mobility impaired. The cost for rectifying each of the dropped kerbs is approximately £2,000 per pair/location. Discussion with vulnerable users, such as the resident of Jackson Court would assist in identifying priority locations in need of improvement.

7.5 Without providing specific pedestrian facilities on Rose Avenue the greatest benefit to pedestrian safety would be through **reducing traffic speeds**. The speeds on Rose Avenue are generally good for a 30mph speed limit with a 85<sup>th</sup> percentile speed of approximately 30mph in both directions. Speeds are restricted by the carriageway alignment and reduced forward visibility. In addition the recorded collision in the past five years data revealed that three collisions involved cars leaving the carriageway in isolation. Whilst these problems are largely attributed to driver error, it is unusual to have three such accidents within a relative short length of road. The most effective way of consistently reducing vehicle speeds along Rose Avenue would be through the introduction of speed cushions. These are relatively expensive as they involve upgrading the lighting to an adoptable standard for Buckinghamshire County Council and any necessary improvement to the carriageway surface to ensure the cushions can be bolted down and can withstand the additional stress caused by traffic hitting the vertical deflection.

## 8 Cost Estimates

- 8.1 All budget cost estimates within this report are initial budget estimates based upon recent Transport for Buckinghamshire experience and recent similar schemes. All costs will include a value for fees associated with the design, procurement, supervision and progression of a scheme. This will vary depending on a scheme complexity.
- 8.2 The cost estimate has assumed that generally the road resurfacing is in good condition apart from Option 4 – Speed Cushions. The reason for resurfacing for this option is outlined in paragraph 6.7.7. The carriageway condition will need to re-assessed prior to implementation to ensure that it has not deteriorated further.
- 8.3 The fees shown below are a broad estimate for carrying out the work as a single scheme.
- 8.4 Where the acquisition of land is required in Option 2 it is assumed Sir William Ramsey School would be happy to allow the additional land become part of the highway for no additional cost. We have not allowed for any legal costs which may be incurred as part of such an agreement.
- 8.5 We have not included any Statutory diversion costs for any of the options as any potential works are difficult to predict at this stage. We would anticipate that most of the Options, apart from Option 2, will have little or no associated Statutory Diversion costs.
- 8.6 The costs below include a 10% contingency

**Table 8-1 Summary of Budget Cost Estimate – Option 1****Zebra Crossing**

<b>ITEM</b>	<b>COST</b>
0 Prelims and Traffic Management	£2,300
1 Zebra Crossing (kerbs, road markings, belisha beacons, pavement, electrical supply, signs, etc)	£12,100
2 Street Lighting (4No columns, ducting, cable and connection)	£19,600
3 Buff Antiskid (360m2)	£6,600
4 Fees (prelim and detailed design, consultation, procurement, supervision and completion)	£9,600
<b>TOTAL</b>	<b>£50,200</b>

**Puffin Crossing**

<b>ITEM</b>	<b>COST</b>
0 Prelims and Traffic Management	£2,300
1 Puffin Crossing (kerbs, road markings, belisha beacons, pavement, electrical supply, signs, etc)	£11,400
2 Street Lighting (4No columns, ducting, cable and connection)	£19,600
3 Buff Antiskid (360m2)	£6,600
4 Traffic Signals	£15,100
5 Fees (prelim and detailed design, consultation, procurement, supervision and completion)	£9,600
<b>TOTAL</b>	<b>£64,600</b>

**Table 8-2 Summary of Budget Cost Estimate – Option 2****Pedestrian Refuge**

<b>ITEM</b>	<b>COST</b>
0 Prelims and Traffic Management	£2,300
1 Pedestrian Refuge (kerbs, road markings, pavement, electrical supply, signs, pedestrian guardrail, etc)	£16,900
2 Carriageway Widening (excavation and removal, new carriageway, and footway, fencing, new hedge, etc)	£19,900
3 Fees (prelim and detailed design, consultation, procurement, supervision and completion)	£9,600
<b>TOTAL</b>	<b>£48,700</b>

**Table 8-3 Summary of Budget Cost Estimate – Option 3**

**Build - Out**

<b>ITEM</b>	<b>COST</b>
0 Prelims and Traffic Management	£1,200
1 Build Out (kerbs, road markings, pavement, electrical supply, signs, bollards, pedestrian guardrail, etc)	£17,700
2 Street Lighting (excavation and removal, new carriageway, and footway, fencing, new hedge, etc)	£12,300
3 Fees (prelim and detailed design, consultation, procurement, supervision and completion)	£9,600
<b>TOTAL</b>	<b>£40,800</b>

**Table 8-3 Summary of Budget Cost Estimate – Option 4**

**Speed Cushions**

<b>ITEM</b>	<b>COST</b>
0 Prelims and Traffic Management	£1,250
1 Supply and Install Cushions	£43,298
2 Supply and install illuminated road signs for cushions	£6,250
3 Supply and install street lighting (26No columns)	£52,000
3 Fees (prelim and detailed design, consultation, safety audits, procurement, supervision and completion)	£7,700
4 Carriageway resurfacing	£64,660
<b>TOTAL</b>	<b>£175,158</b>

# APPENDIX A Drawings