Buckinghamshire County Council

Cuddington Traffic Calming

Feasibility Study Report

PRIV18003 / FEA / DOC / 01

June 2018

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Revision box

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0		First Issue for Comment	AB	VG	KB

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1 Introduction

1.1 Background

1.1.1 Cuddington Parish Council commissioned Ringway Jacobs (Transport for Buckinghamshire) to undertake a feasibility study to assess a number of traffic calming measures throughout the village.

1.1.2 An original scope for the study was identified by the parish council and is contained within Appendix A.

1.2 Local Objectives

1.2.1 A number of key objectives were identified from both the scope of the study and during a site visit with residents on 14th June 2018. The objectives are as follows:

- To make an assessment of pedestrian safety using the 3 main trafficked roads into the village (Aylesbury Road, Dadbrook & Bridgeway/The Green);
- To consider traffic calming measures for the aforementioned roads, particularly close to the 30mph limit signs and at the main crossing point at the central junction of the village;
- To consider the planning application 18/00137/APP, particularly the proposed crossing detailed within the proposal.

2 Collision Data

2.1 Within the 5-year period between 01/04/13 and 31/03/18, there has been one reported injury collision within Cuddington village. This collision was described as serious in severity. A plan of the collision location is shown in Figure 2-1.

2.2 The single collision at the central junction of the village, involving a car and a motorcycle. The collision was not seen as speed related, but attributed partially to the car following too close and failing to look properly.

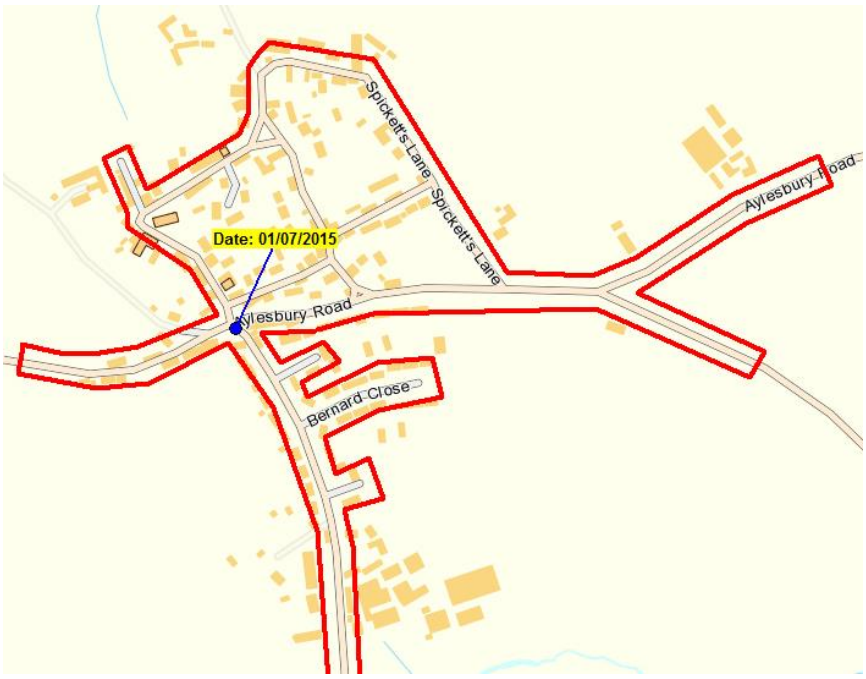

Figure 2-1 – Plan of collision location within Cuddington Village

2.3 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 Buckinghamshire County Council (BCC) are addressing the sites with the highest severity collisions. Following this criteria, Cuddington would not be a priority for BCC and is unlikely to be awarded funding from a road safety budget to implement any traffic calming.

3 Traffic Speed Data

3.1 Initial Survey – July 2016

3.1.1 Speed data was originally obtained at three locations at the extents of Cuddington from 11th to 25th July 2016, which can be seen in Figure 3-1. The three locations that were chosen are:

- 1 – The Green, 145m West of The Crown Pub, next to the existing Vehicle Activated Sign (VAS).
- 2 – Aylesbury Road, just east of Holly Tree Lane at 30mph repeater sign.
- 3 – Dadbrook, south of the central junction of the village, next to the entrance to Dadbrook Farm Cottage.

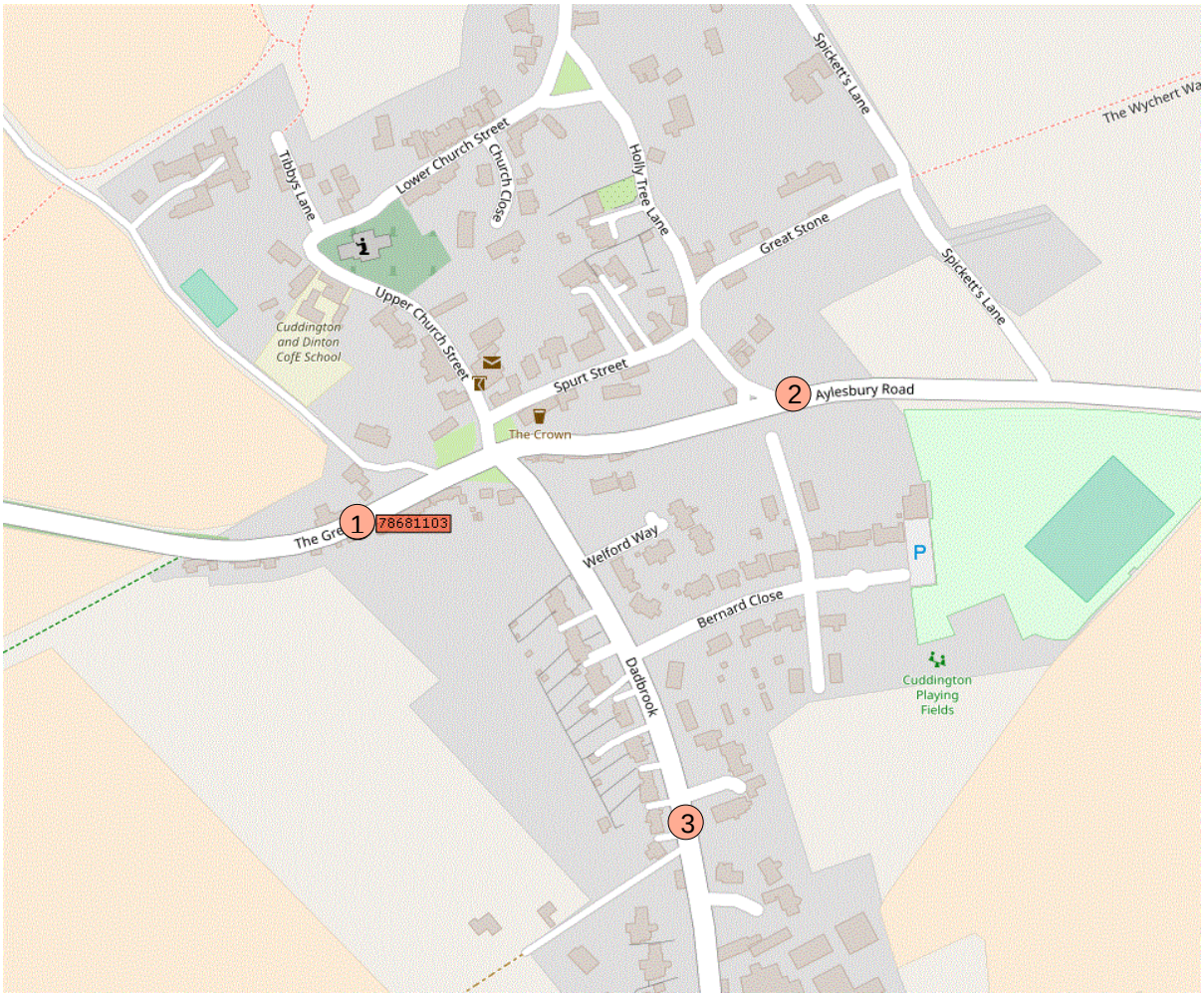

Figure 3-1 – Speed Survey locations

3.1.2 The traffic data in Table 3-1, 3-2 & 3-3 show the weekday average values for each location over the total of the two weeks. The data has been shown for both the 24-hour average and the average AM and PM peak hours (peak by volume of recorded traffic). The 85th%ile speed measurement is the speed exceeded by only the fastest 15% of drivers thus expected to be higher than the values, which are given for average speeds and are not as an accurate a representation of the overall speed through the village.

3.1.3 The full survey data can be found within Appendix B. Please note the data contained in 'Bin 13' found in the speed data is likely to be spurious; this is caused when two vehicles, travelling in opposite directions, make contact with the tubes at the same time.

Table 3-1 – Location 1 Summary of Speed Data – The Green, Cuddington

Direction	Time Period	Volume (vehicles)		85th %ile Speed (mph)		Average Speed (mph)	
		Week 1	Week 2	Week 1	Week 2	Week 1	Week 2
Eastbound (Entering Village)	24-hour period	1867	2038	32	32	29	29
	AM Peak (8:00)	195	190	32	31	29	29
	PM Peak (17:00)	213	215	33	33	29	30
Westbound (Leaving Village)	24-hour period	1955	2096	32	33	29	29
	AM Peak (8:00)	304	286	32	32	29	29
	PM Peak (17:00)	171	182	32	33	29	29

Table 3-2 – Location 2 Summary of Speed Data – Aylesbury Road, Cuddington

Direction	Time Period	Volume (vehicles)		85th %ile Speed (mph)		Average Speed (mph)	
		Week 1	Week 2	Week 1	Week 2	Week 1	Week 2
Westbound (Entering Village)	24-hour period	1308	1221	34	34	30	30
	AM Peak (8:00)	160	147	34	34	30	30
	PM Peak	117 (15:00)	105 (17:00)	33 (15:00)	35 (17:00)	29 (15:00)	30 (17:00)
Eastbound (Leaving Village)	24-hour period	1376	1307	37	37	31	32
	AM Peak (8:00)	187	172	37	36	32	32
	PM Peak	122 (15:00)	117 (17:00)	36 (15:00)	37 (17:00)	31 (15:00)	32 (17:00)

Table 3-3 – Location 3 Summary of Speed Data – Dadbrook, Cuddington

Direction	Time Period	Volume (vehicles)		85th %ile Speed (mph)		Average Speed (mph)	
		Week 1	Week 2	Week 1	Week 2	Week 1	Week 2
Northbound (Entering Village)	24-hour period	1438	1394	36	36	32	31
	AM Peak (8:00)	104	91	36	36	31	32
	PM Peak (17:00)	171	168	36	36	31	31
Southbound (Leaving Village)	24-hour period	1468	1390	38	38	33	33
	AM Peak (8:00)	203	192	37	38	32	33
	PM Peak	103 (16:00)	104 (17:00)	37 (16:00)	37 (17:00)	32 (16:00)	32 (17:00)

3.1.4 As anticipated, speeds recorded at locations 2 and 3 are higher than those at location 1, as they are further from the centre of the village.

3.1.5 85th %ile speeds leaving the village are comparatively higher than the speeds on approach to the village at all locations, particularly those at location 2. This is an anticipated result due to the outward visibility of Aylesbury Road that is more likely to encourage higher speeds from drivers when compared to the other two locations.

3.1.6 In order to assess the results of the survey, comparisons can be drawn from the Department for Transport's yearly speed compliance statistics[1]. From the 2016 statistics, it is stated that on 30mph roads, the average actual speed is 28-32mph for all vehicle types. From the results shown for average speed, it can be seen that traffic entering the village from the three locations largely adhere to this statistic, with outbound traffic at location 3 being the only exception to this statistic at 33mph averaged over the two-week period.

3.1.7 At all three locations there is a correlation between traffic volume and speed. During busier periods, speeds drop - this occurs during the daytime period between 07:00 and 18:00. This also coincides with pedestrian activity, which is likely to be at its highest during this period.

3.1.8 Figures 3-2, 3-3 and 3-4 show the percentage of speed compliance below two thresholds for each of the two weeks of surveys. The first threshold shown is the percentage of vehicles which travelled at speeds which were <32mph, as show in light and dark blue. The second threshold shown is the percentage of vehicles which travelled at speeds <35mph, which are shown in orange and red.

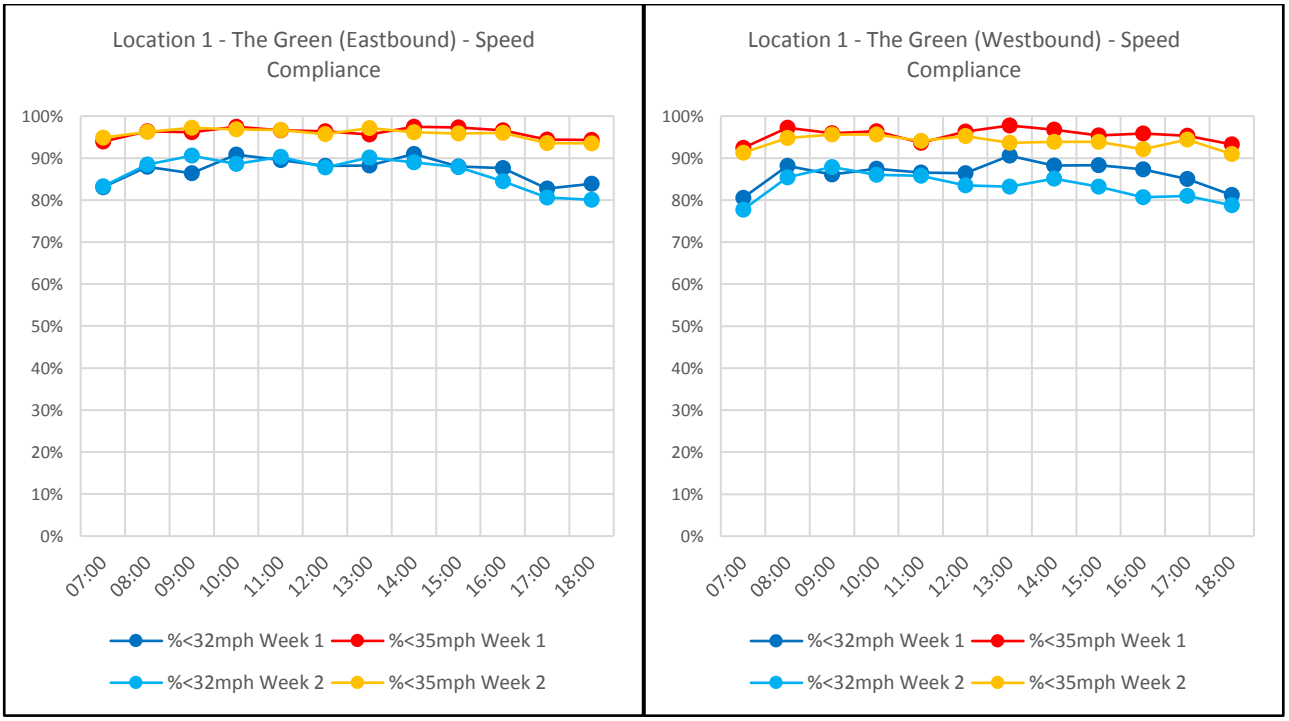

Figure 3-2 – Speed compliance at Location 1 in each direction

[1] Speed Compliance Statistics, Great Britain: 2016 – Department for Transport June 2017.

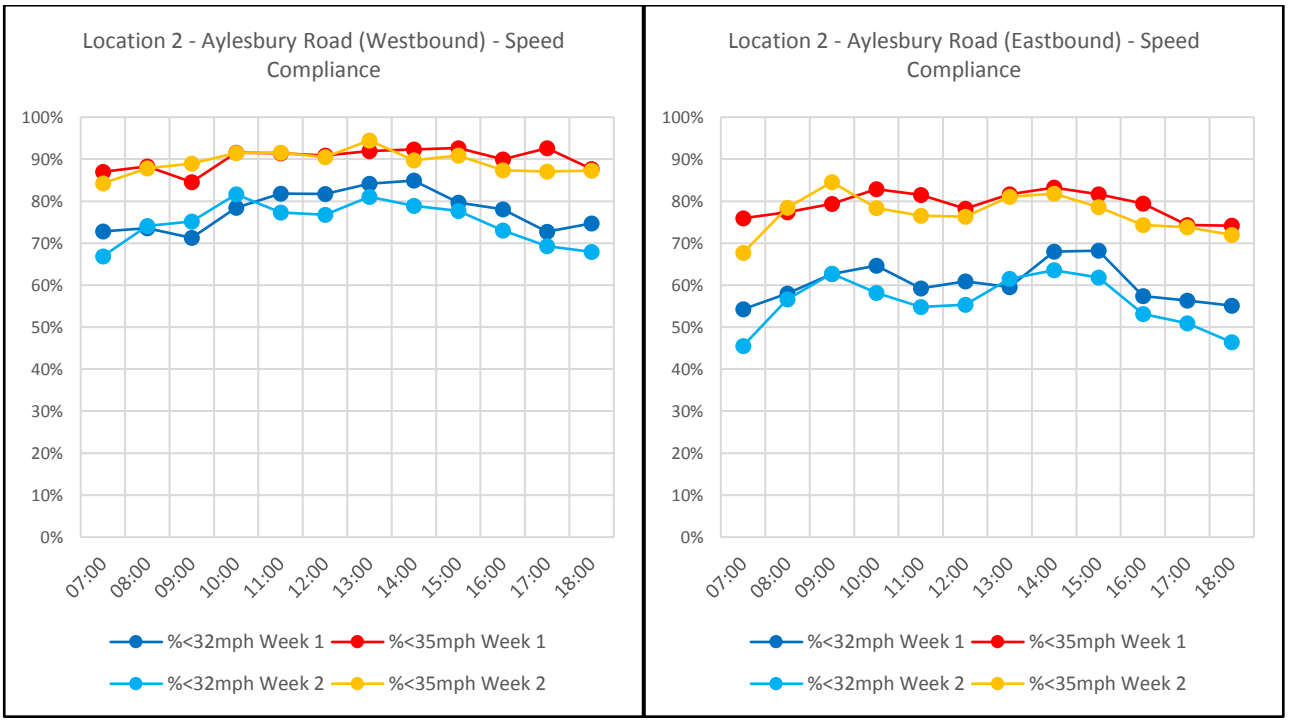

Figure 3-3 – Speed compliance at Location 2 in each direction

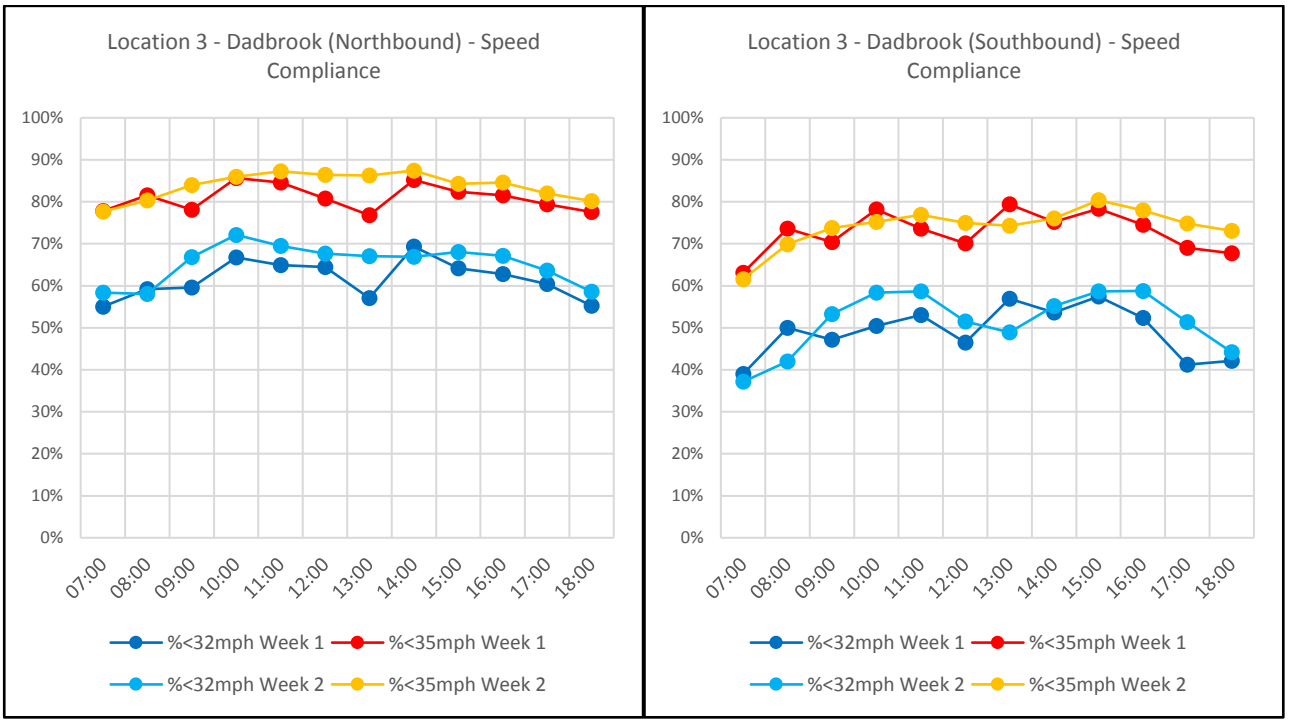

Figure 3-4 – Speed compliance at Location 3 in each direction

3.1.9 As expected, the flows at location 1 within the village are comparable between eastbound and westbound as the environment characteristics are similar for drivers in both directions. For the other two locations, there is a more pronounced difference between inbound and outbound flows that reflect the difference in nature of drivers' behaviour leaving and entering the village. At each of the two remaining locations, the data shows that traffic entering the village is slower than traffic exiting.

3.2 Follow-up Survey – July 2018

3.2.1 As part of this feasibility study, a follow-up speed survey was commissioned for the same 3 locations from Figure 3-1 and was carried out between the 2nd and 9th July 2018.

3.2.2 The objective of this second speed survey was to gain an understanding of the current speed conditions within the village, in order to allow comparisons to be drawn between both surveys. This would further highlight any changes in result that may occur over the previous two years. In order to draw these comparisons, values from within Table 3-1, 3-2 & 3-3 have been translated into Table 3-4, 3-5 & 3-6 to also include the new data which has been recorded.

3.2.3 The full survey results can also be found in Appendix B.

3.2.4 As a way of highlighting the results and for ease of comparison, the most recent values have been given a colour which relates to the previous values. Increases in value have been annotated in green, reductions in red and consistent values are in blue.

3.2.5 From these results, it can be seen that the volume of traffic travelling in and out of the village has grown over the 2-year period, particularly with traffic entering the village from each direction.

3.2.6 As a direct result of this increase in volume of traffic, paragraph 3.1.7 has been further shown in practice, with the average speeds in each of the locations either staying consistent or going down as a result of this increase in traffic volume both at peak times and over a 24-hour period.

Table 3-4 – Location 1 Summary of Speed Data – The Green, Cuddington

Direction	Time Period	Volume (vehicles)			85th %ile Speed (mph)			Average Speed (mph)		
		2016 W1	2016 W2	2018	2016 W1	2016 W2	2018	2016 W1	2016 W2	2018
Eastbound (Entering Village	24-hour period	1867	2038	2529	32	32	33	29	29	28
	AM Peak (8:00)	195	190	404	32	31	32	29	29	27
	PM Peak (17:00)	213	215	201	33	33	33	29	30	28
Westbound (Leaving Village)	24-hour period	1955	2096	2426	32	33	33	29	29	27
	AM Peak (8:00)	304	286	221	32	32	32	29	29	27
	PM Peak (17:00)	171	182	303	32	33	33	29	29	28

Table 3-5 – Location 2 Summary of Speed Data – Aylesbury Road, Cuddington

Direction	Time Period	Volume (vehicles)			85th %ile Speed (mph)			Average Speed (mph)		
		2016 W1	2016 W2	2018	2016 W1	2016 W2	2018	2016 W1	2016 W2	2018
Westbound (Entering Village	24-hour period	1308	1221	1285	34	34	35	30	30	29
	AM Peak (8:00)	160	147	151	34	34	35	30	30	30
	PM Peak	117 (15:00)	105 (17:00)	129 (17:00)	33 (15:00)	35 (17:00)	35 (17:00)	29 (15:00)	30 (17:00)	30 (17:00)
Eastbound (Leaving Village)	24-hour period	1376	1307	1436	37	37	38	31	32	31
	AM Peak (8:00)	187	172	199	37	36	38	32	32	32
	PM Peak	122 (15:00)	117 (17:00)	137 (15:00)	36 (15:00)	37 (17:00)	37 (15:00)	31 (15:00)	32 (17:00)	30 (15:00)

Table 3-6 – Location 3 Summary of Speed Data – Dadbrook, Cuddington

Direction	Time Period	Volume (vehicles)			85th %ile Speed (mph)			Average Speed (mph)		
		2016 W1	2016 W2	2018	2016 W1	2016 W2	2018	2016 W1	2016 W2	2018
Northbound (Entering Village	24-hour period	1438	1394	1727	36	36	35	32	31	30
	AM Peak (8:00)	104	91	122	36	36	35	31	32	30
	PM Peak (17:00)	171	168	229	36	36	35	31	31	30
Southbound (Leaving Village)	24-hour period	1468	1390	1697	38	38	38	33	33	32
	AM Peak (8:00)	203	192	275	37	38	37	32	33	32
	PM Peak	103 (16:00)	104 (17:00)	121 (17:00)	37 (16:00)	37 (17:00)	37 (17:00)	32 (16:00)	32 (17:00)	32 (17:00)

3.2.7 As a comparison to the speed compliance of the 2016 survey results, figures 3-5, 3-6 and 3-7 graphically portray the compliance of vehicles at each location below the threshold of 35mph, shown in green, with the 2016 data for the same threshold being shown in red and orange, as they were in the previous figures.

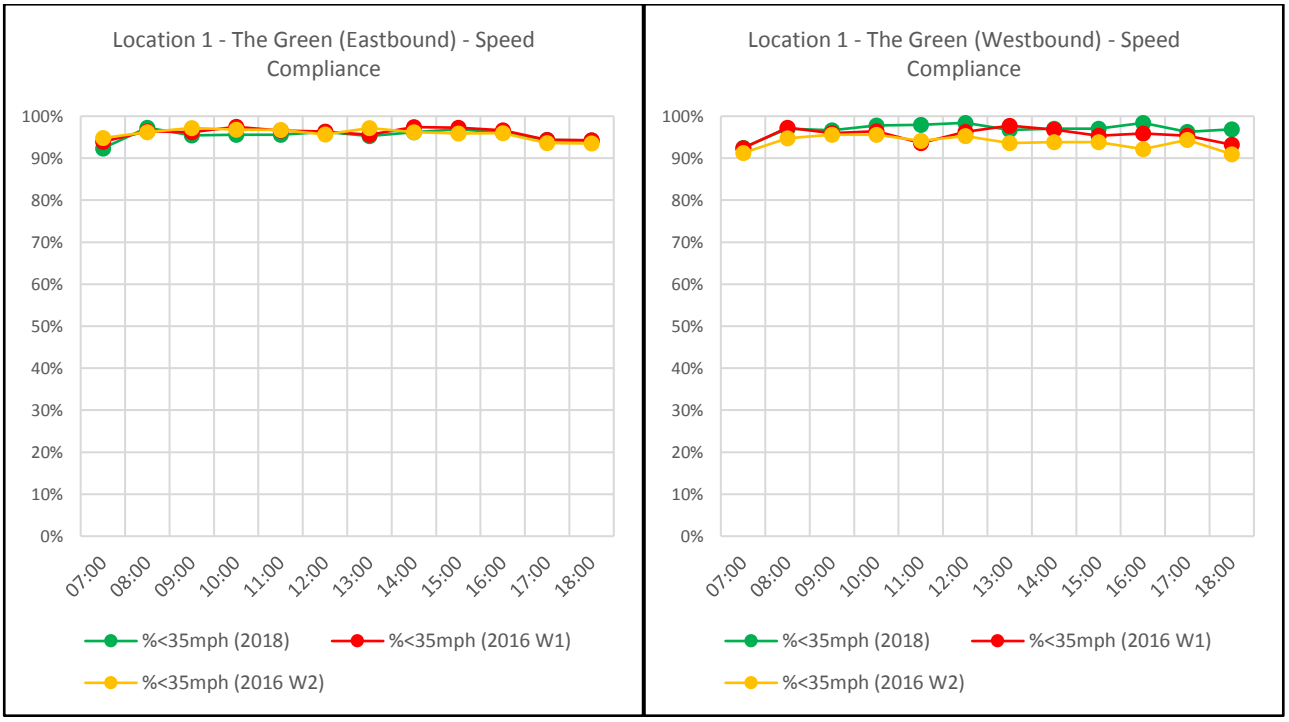

Figure 3-5 – Speed Compliance comparison at Location 1 in each direction

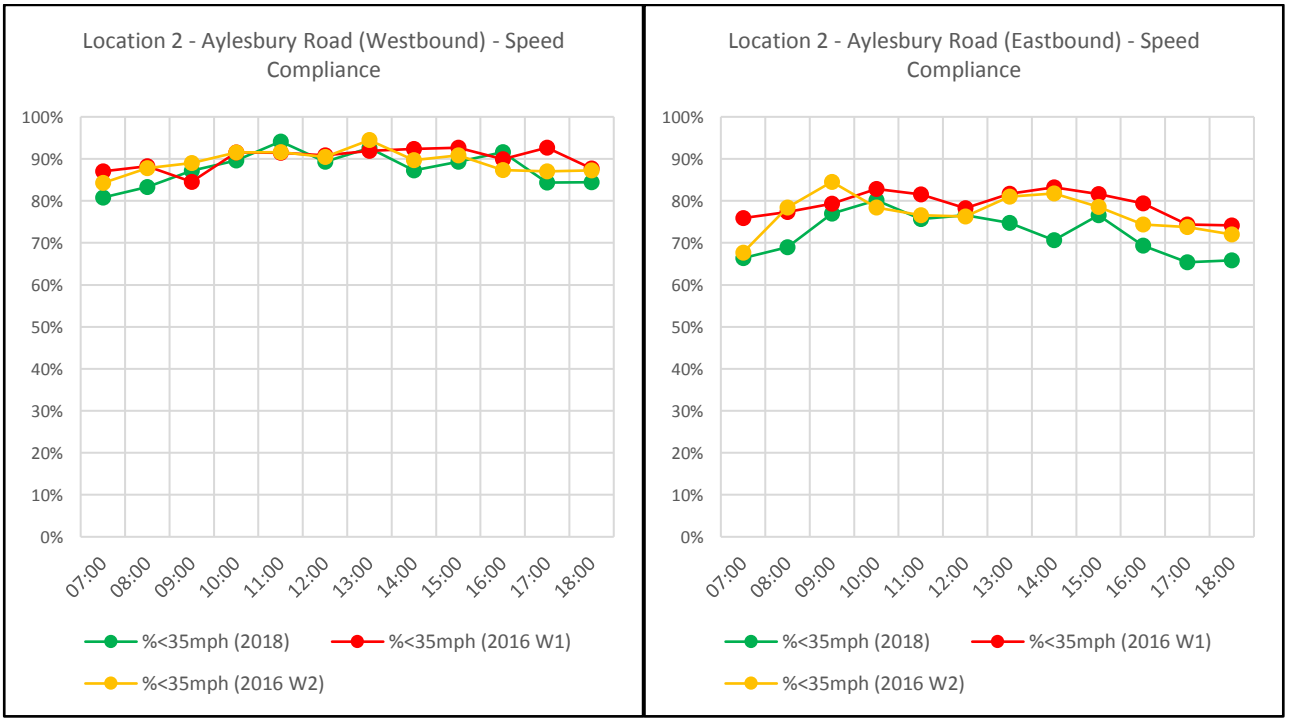

Figure 3-6 – Speed Compliance comparison at Location 2 in each direction

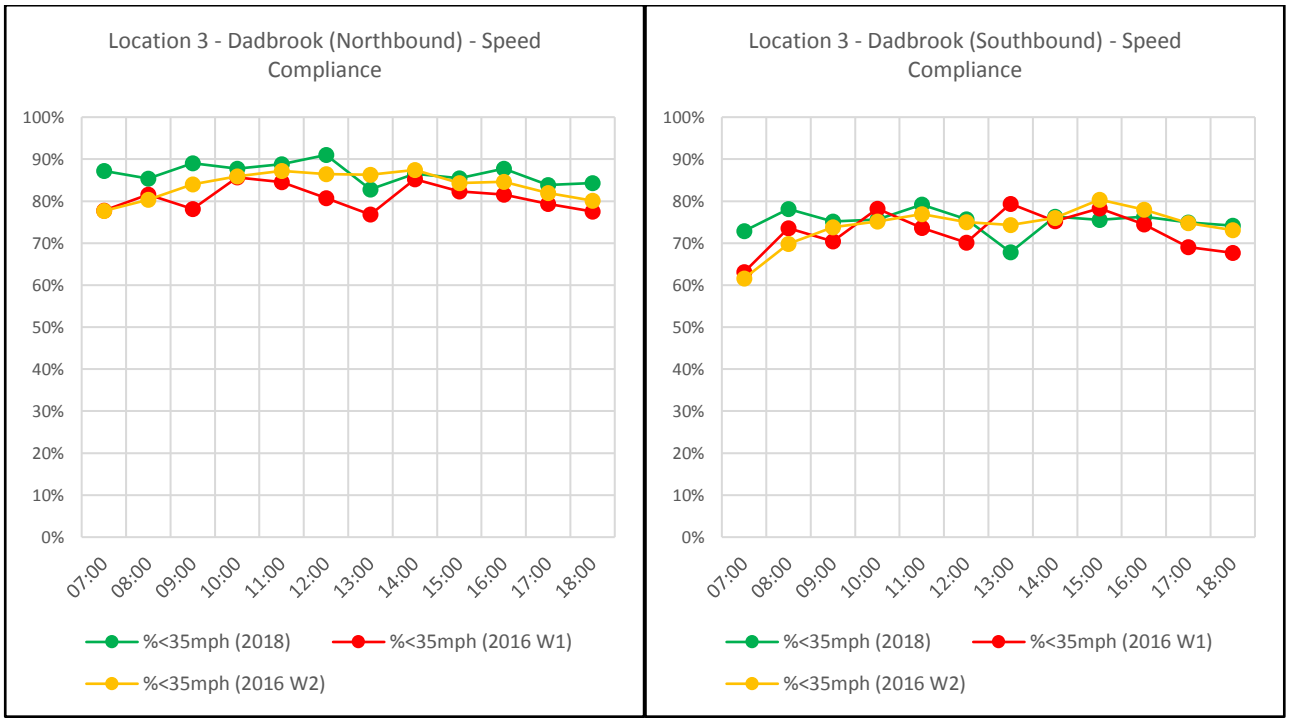

Figure 3-7 – Speed Compliance comparison at Location 3 in each direction

3.2.8 In summary of the most recent survey, it can be seen that speed compliance across the three sets of results at each of the three locations is relatively consistent despite the 2-year difference. At least 60% of all vehicles are compliant with speeds of less than 35mph within the most active 12-hour window at each location.

4 Vehicle Class Counts

4.1 Traffic class counts were undertaken at each of the 3 locations over the same 7-day period, between the 2nd and 9th July 2018. The purpose of these counts were to address concerns raised within the Scheme Brief regarding increased flow of HGV traffic through the village, and to aid in the decision making process of potential traffic calming suggestions within this report.

4.2 For reference of vehicle size, a total of 13 classes were measured. The classifications are described in Figure 4-1:

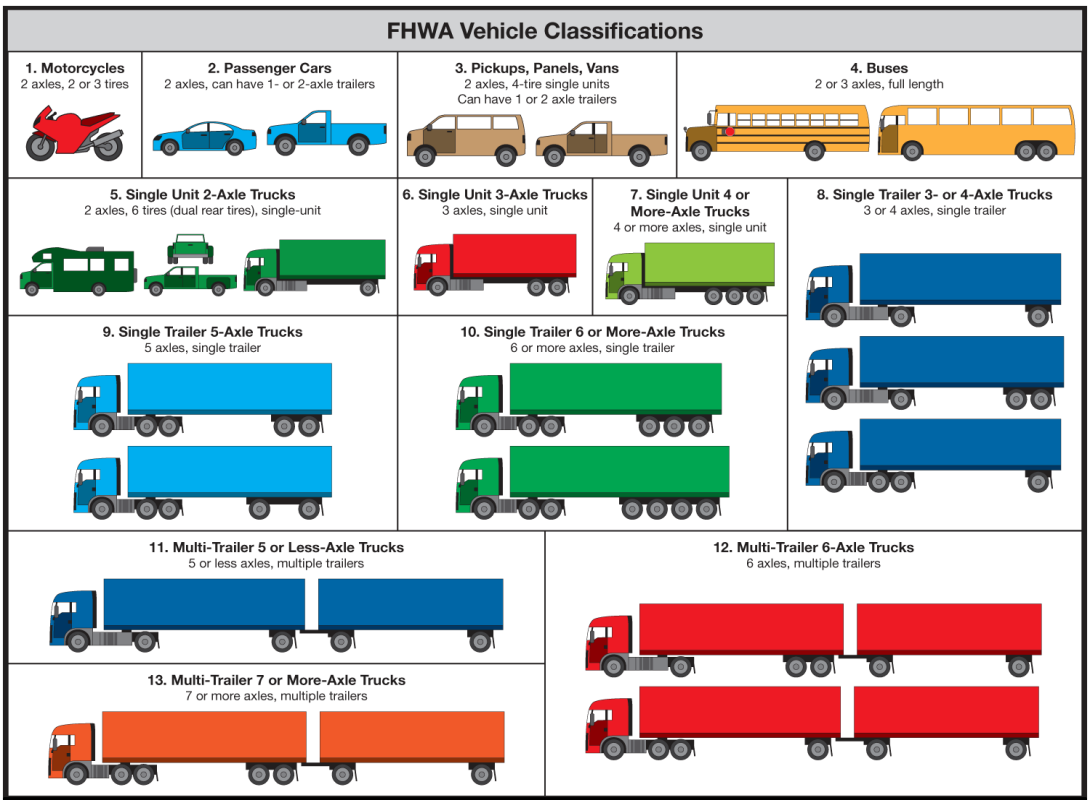

Figure 4-1 – Vehicle Classifications used for survey

4.3 The full survey data can be found within Appendix C. In order to summarise the results for each of the 3 locations, the 13 classifications from Figure 4-1 have been grouped together into 3 sub-groups. Group A consists of Classes 1-3, which are smaller vehicles ranging from motorcycles to small vans; Group B consists of Classes 4-7, which are medium sized vehicles such as buses and trucks; and Group C consists of Classes 8-13, which are the larger and heavier vehicles such as HGVs. These groupings give a representative of the volume of each size of vehicle travelling through the village over the full 7-day survey.

4.4 Table 4-1, 4-2 & 4-3 show a summary of the average results for the 24-hour period, along with average AM and PM peak values that coincide with the peak times from the speed data used in Section 3 of this report.

Table 4-1 – Location 1 Summary of Class Data – The Green, Cuddington

Direction	Time Period	Volume (vehicles)					
		Group A		Group B		Group C	
Eastbound (Entering Village	24-hour period	2077	95.4%	97	4.5%	4	0.1%
	AM Peak (8:00)	293	95.1%	14	4.5%	1	0.4%
	PM Peak (17:00)	166	97.1%	5	2.9%	0	0%
Westbound (Leaving Village)	24-hour period	2019	95.5%	91	4.3%	1	0.2%
	AM Peak (8:00)	166	94.9%	9	5.1%	0	0%
	PM Peak (17:00)	236	97.9%	5	2.1%	0	0%

Table 4-2 – Location 2 Summary of Class Data – Aylesbury Road, Cuddington

Direction	Time Period	Volume (vehicles)					
		Group A		Group B		Group C	
Westbound (Entering Village	24-hour period	1086	95.8%	47	4.1%	1	0.1%
	AM Peak (8:00)	111	94.9%	6	5.1%	0	0%
	PM Peak (17:00)	103	99%	1	1%	0	0%
Eastbound (Leaving Village)	24-hour period	1188	95.3%	57	4.6%	2	0.1%
	AM Peak (8:00)	144	93.5%	10	6.5%	0	0%
	PM Peak (17:00)	98	98%	2	2%	0	0%

Table 4-3 – Location 3 Summary of Class Data – Dadbrook, Cuddington

Direction	Time Period	Volume (vehicles)					
		Group A		Group B		Group C	
Northbound (Entering Village	24-hour period	1438	95.7%	61	4%	3	0.2%
	AM Peak (8:00)	91	93.8%	6	6.2%	0	0%
	PM Peak (17:00)	178	97.8%	4	2.2%	0	0%
Southbound (Leaving Village)	24-hour period	1412	96.1%	54	3.7%	3	0.2%
	AM Peak (8:00)	205	96.7%	7	3.3%	0	0%
	PM Peak (17:00)	101	97.1%	3	2.9%	0	0%

4.5 Next to the value for number of vehicles within each of the tables, an associated percentage represents the comparison of each group with the total volume.

4.6 As it can be seen, ~95% of all traffic over each 24-hour period, in both directions at each location, is made up of vehicles in Group A. This shows that the vast majority of traffic travelling through the village are small vehicles, such as motorcycles or cars.

4.7 Group B, comprised of medium sized vehicles such as buses and trucks, make up ~4/5% of the traffic travelling through the village, with the remaining number being Group C vehicles. This remaining number can be seen to be <0.5% in all instances, which portrays a very infrequent use of the village by heavier vehicles over the duration of the survey.

4.8 Analysis of this data reveals that the traffic calming measures should largely focus on reducing the speed for cars, but should ensure that medium and large vehicles can manoeuvre the already difficult roads without any problems.

5 Site Visit – 14th June

5.1 A site visit was carried out on 14th June 2018 with Parish Councillors Ken Trew and Ravern Stevens, along with a number of local residents of the village. The purpose of this visit was to get local insight into the particular issues felt by the village, and potentially observe the conditions first hand.

5.2 From an initial drive-through of the village, it became apparent that space and visibility issues could potentially be major safety concerns within the centre of the village, highlighted by narrow footways, tight bends and overgrown vegetation on approach to the central junction at The Crown from the east (Aylesbury Road).

5.3 On approach from Aylesbury Road, there are a number of properties with concealed entrances in areas where driver's visibility may restrict them from being aware until the last minute, including a bridleway on the left-hand side as drivers approach the village. It was raised as a potential issue by residents, that suggested possibly introducing signage to make drivers aware of these possible risks.

5.4 Traffic entering the village from Bridgeway/The Green do so at an apparent lower speed due to two bends on the approach, visibility issues caused by the proximity of properties on both sides of the road along with the presence of High Friction Surfacing (HFS) at the 30mph limit. There is also a patch of HFS on the approach to the village from Dadbrook, with both patches being in relatively poor condition.

5.5 There are currently three Vehicle Activate signs within the village, roughly situated at each of the 3 locations which were used for the speed and traffic surveys in Sections 3 & 4. Along with these Vehicle Activated signs, there are a number of existing speed reduction measures found within the village, such as; warning signage (Figure 5-1) and "SLOW" road markings.

Figure 5-1 – Existing warning signage on Aylesbury Road approach to village

5.6 The Green and Aylesbury Road have footway on at least one side of the carriageway, which is to serve all properties within the inner village, but a small number of properties on the outer limits have no dedicated footway into the village. Dadbrook has footway on both sides of the carriageway which serve all domestic properties, stopping prior to the Vehicle Activated Sign on the eastern side.

5.7 It was raised by the residents that the kerbing of the footway outside of the properties adjacent to The Crown are low, with cars accidentally mounting the kerb whilst travelling through the village particularly in winter when there is a build-up of snow.

5.8 There are no formalised crossing points within the village, which is one of the major concerns raised by the residents and parish councillors. With Cuddington and Dinton Church of England School on the northern side of the village, and the majority of housing on the southern side, the only main crossing location that is available is at the central junction shown in Figure 5-2, which has major visibility issues towards Aylesbury Road.

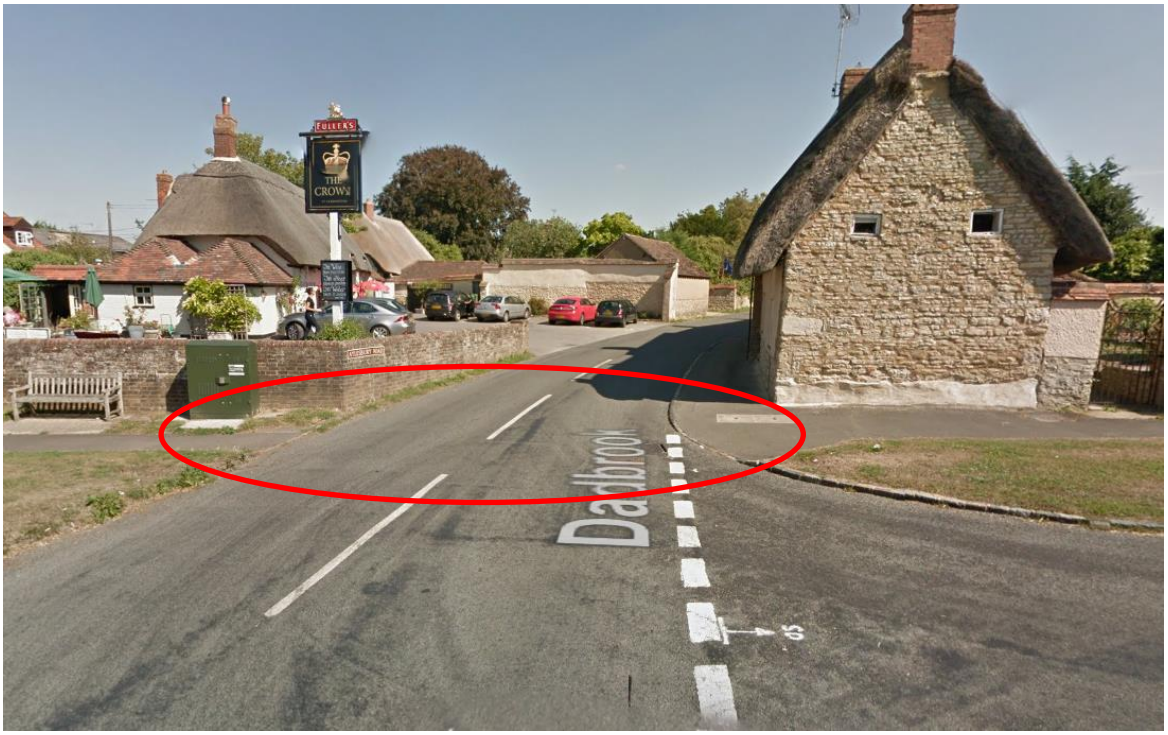

Figure 5-2 – Current crossing point used in relation to The Crown

5.9 On approach to the village via Aylesbury Road, there are a number of traffic signs currently present within the 30mph limits, including “Pedestrians in road ahead”, “Road narrows on both sides ahead”, “Crossroads ahead” and a 30mph repeater sign.

6 Planning Application 18/00137/APP – Review

6.1 A review of a planning application currently awaiting decision was requested by the Parish Councillors during the site visit. The application consists of the erection of 8 dwellings, along with alterations to the existing access and associated landscaping, on a site to the north of Aylesbury Road, shown in Figure 6-1.

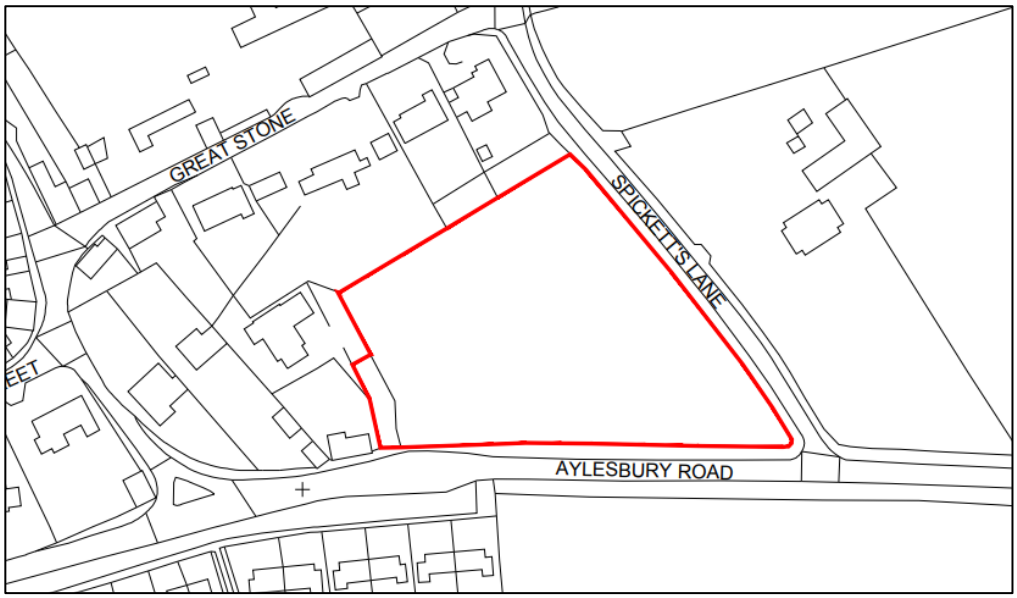

Figure 6-1 – Location plan of proposed development

6.2 Figure 6-2 is taken from the most recent revision of the site plan drawing, produced by Rectory Homes. The proposed pedestrian crossing, highlighted within the red circle, is an informal crossing with tactile paving on both footways, providing access to the existing footway.

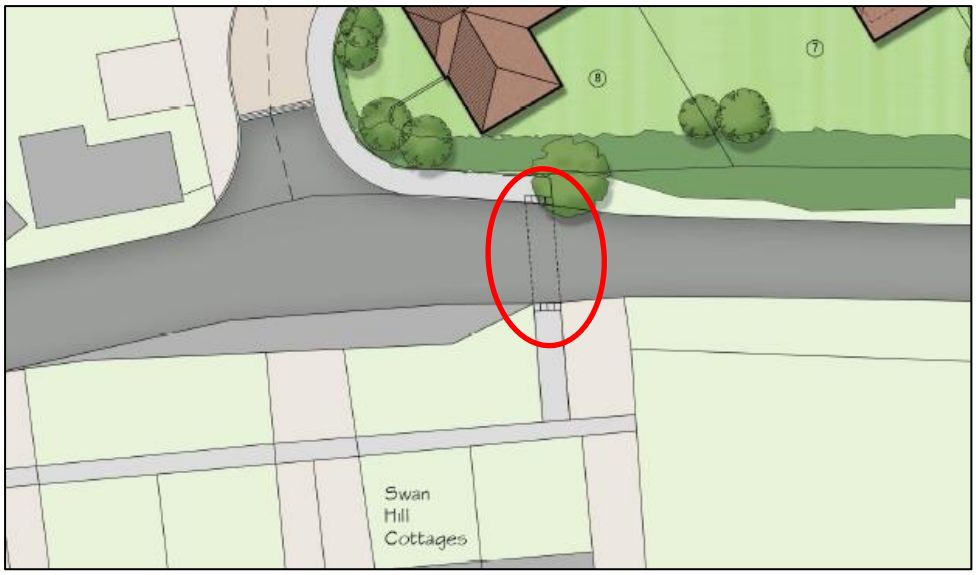

Figure 6-2 – Entrance to proposed development, showing proposed crossing

6.3 As this crossing is not formalised, it will not have an impact on the traffic flow to and from the village. From the crossing point on either footway, there would be sufficient visibility in both directions to cross the carriageway safely, with vehicles reducing their speed as they enter into the 30mph limits to the east of the crossing.

6.4 During the site visit, a question of the potential traffic impacts was raised and whether the development would cause a noticeable increase in traffic coming in and out of the village. Figure 6-3 is taken from the Transport Statement which was prepared by Glanville Consultants on behalf of Rectory Homes for their application, and it highlights that potential traffic generation from the development could reach 37 vehicles across a 12-hour period in both directions. When these values are compared to the current results of vehicles travelling through the village from the speed and class surveys, it is clear that this increase would be negligible and would have "no material impact on the local and wider highway network", as described in Paragraph 6.39 of the Planning Statement by Rectory Homes.

Period	Traffic Generation (Vehicles)		
	Inbound	Outbound	Two-Way
AM Peak (08:00 to 09:00)	1	3	5
PM Peak (17:00 to 18:00)	3	1	4
Daily (07:00 to 19:00)	19	18	37

Figure 6-3 – Potential traffic generated by proposed development

6.5 From the Highway Authority's final comments, dated 14th March 2018, Sarah Hearn from BCC expressed support for this feasibility study, "subject to the inclusion of a £15,000 contribution towards a Cuddington traffic calming scheme feasibility study within the S106 Agreement". It is worth highlighting this as potential funding towards this feasibility study as outlined and requested by the Highways Authority in support of the planning application.

7 Traffic Calming Measures – Potential Options

7.1 Option 1 – Physical Buildouts

7.1.1 Priority systems with physical buildouts involve narrowing the carriageway width such that drivers travelling in one direction must give way to opposing traffic. To be deemed successful, roads must have high traffic flow in both directions and must have sufficient width to accommodate large vehicles carrying out the manoeuvre.

7.1.2 From the three approaches, Aylesbury Road and Dadbrook would benefit most from the inclusion of priority systems, due to the higher approach speeds at these locations. Due to the restrictive road width, poor forward visibility and increased use by farming vehicles, Dadbrook can be deemed unsuitable for physical buildouts.

7.1.3 Drawing PRIV18003/FEA/DWG/001 within Appendix D shows the potential layout of a build-out located on the Aylesbury Road. The location of this build-out, along with finalised dimensions, would be confirmed as part of the detailed design if the option was taken forward.

7.1.4 After consultation with the Street Lighting Team regarding this design, a major issue was highlighted. There are illumination requirements on approach to a physical buildout and for the signage involved, and there are currently no street lighting columns within 250m radius of the potential buildout location. In order to resolve this, ducting would need to be introduced from the nearest power source, along with the introduction of lighting columns in either direction. This would incur large costs to design and implement, hence would not be recommended unless significant funding and support would be raised by the Parish Council.

7.2 Option 2 – Enhanced Signing & Lining (including gateway features)

7.2.1 After a review of the village and the roads leading into it, there are a number of options that may be considered in terms of signs, road markings and gateway features, which would be more effective if used in combination with one another.

7.2.2 To begin, there is the potential to introduce gateway features for the village. Gateways are used to highlight the change from a rural road to a more populated area. They are commonly introduced at either, the nameplate of the village or at the start of a speed limit and can commonly include road surface treatments or markings, such as High Friction Surfacing, dragon's teeth or speed limit roundels.

7.2.3 Due to the lack of required verge width at the current speed limit locations and the village nameplates being located at too great a distance from the village centre to provide an effective speed reduction method, new gateway installations are not suitable for the village. Despite this, one recommendation would be to clear vegetation around existing speed limit gateways and village nameplates. Vegetation overgrowth at these locations can reduce the effectiveness of the measures, as drivers do not see them from a distance, which is currently the case on the Aylesbury Road and Dadbrook approaches.

7.2.4 Despite not being suitable for the inclusion of new gateway features at each approach, the potential to include other road treatments or markings at each location could be beneficial at reducing speeds entering the village. Dragon's teeth, 30mph roundels and improved HFS on each approach are all possible options to be included, and can be seen in drawing PRIV18003/FEA/DWG/002 as preliminary ideas.

7.2.5 Chevron signage prior to the village at The Green could potentially be increased in size, with vegetation being removed from around them. This will promote further caution from drivers as they approach the bend as they come to and from the village.

7.2.6 With concerns raised regarding the current crossing point used by school pupils from the south of the village, it is suggested that Figure 7-1 could be introduced within the village limits on approach to the central junction. Drivers would recognise these signs with the possibility of younger children being in the area, and would promote the reduction of speed and increase pedestrian safety.

Figure 7-1 – Diagrams 545 & 546 used in combination

7.2.7 At the central junction of the village, on approach from Dadbrook, all lining should be refreshed as it has now become faded. The fresh markings will be more visible to drivers approaching the junctions, and the junction could benefit with the introduction of a Stop sign to work in conjunction with the Give Way sign, which is currently present as shown in Figure 7-2, due to the poor visibility available to the right of the junction.

Figure 7-2 – Central junction with Give Way signage

7.3 Option 3 – Speed Limit Extensions

7.3.1 Aylesbury Road approach – the current speed limit terminals are located between Spickett's Lane and Holly Tree Lane, around 700m away from the village nameplate further out from the village. This limit coincides with the first group of properties of Cuddington on the left hand side. Prior to the start of the 30mph speed limit, there are a number of property accesses, which come directly onto the 50mph carriageway with no footway and limited visibility. In addition to this, the aforementioned planning application's site entrance is located between Spickett's Lane and Holly Tree Lane. If this is to be approved and developed, it is recommended that the speed limit should be reviewed with a view to extending the 30mph limit to a safe distance away from the new access, potentially moving it closer to the village nameplate, thus including all outer properties safely within the 30mph limit zone. However, due to the forward visibility on approach between the village nameplate and the current location of the speed limit signs, vehicle users may still be encouraged to maintain their speeds until closer to the village.

7.3.2 At the western side of the village, the terminal signs for the speed limit are located prior to the first properties of the village, on a slight bend, as shown in Figure 7-3. The location of the current terminal limit signs, along with the yellow backing and HFS on the carriageway are all provided at a sufficient distance from the centre of the village to ensure appropriate approach speeds from incoming vehicles, which is shown in the speed results from Section 3.

Figure 7-3 – Terminal signs on approach to the village from The Green

7.3.3 On approach from the south of the village, the current terminal signs for speed limit are prior to the residential housing and farmhouse on the right side, with sufficient distance to allow drivers to slow down on approach to the central junction of the village. If the terminal signs are moved further from the village on this approach, drivers may still maintain their current speed due to the nature of the rural surroundings and available forward visibility, so it is not recommended that they are to be moved on this approach.

7.4 Option 4 – Speed Limit Reduction within Village

7.4.1 During the site visit, residents raised the question regarding having the speed limit of the village reduced to 20mph. However, speeds are not low enough to be acceptable for a 20mph speed limit to be introduced. Speeds must average at or below 24mph, which is achieved through signing only, whereas the speeds on approach are well in excess of these values.

7.4.2 To create a 20mph zone would require significant traffic calming, including a number of physical measures, to achieve speeds of 24mph or below, which would be impractical and incur high costs. Therefore, Thames Valley Police and Buckinghamshire County Council would not not support this.

7.5 Option 5 – Signalised Crossing

7.5.1 As outlined within the scope of this study, one option to be considered is that of a more formalised crossing point within the centre of the village, to be used particularly within school times when pedestrian use would be at its highest.

7.5.2 Whilst carrying out the site visit, a number of locations were looked at in person as a possibility for the introduction of a formalised crossing point, but there were no suitable locations with available space, width or visibility.

7.5.3 The current uncontrolled crossing point does not have sufficient footway width, and is right next to the Dadbrook junction, making it unsuitable to be used. The introduction of any kind of signalling equipment could also be dangerous due to the lack of visibility available to drivers that are approaching from the east, along with the traffic build-up it would cause at peak times.

7.5.4 Further to the west, towards The Green, the combination of lack of footway and two bus stops have ruled out any location as being suitable for a signalised crossing.

7.5.5 The introduction of dropped kerbing and tactile paving at the current crossing location, similar to that of the planning application crossing point, would also be discouraged. The introduction of these at this location would give pedestrians a false sense of safety to cross without as much care and attention, and with the poor visibility mentioned previously; drivers may not see them until it is too late.

7.6 Alternative Options

7.6.1 Other traffic calming options have also been considered and discounted by TfB as they are deemed less appropriate for this study.

7.6.2 Vertical speed reduction measures, such as rumble strips and speed cushions, were discounted immediately. These measures are more intrusive than those mentioned previously, and can also create an urbanised feel and take away from the character of the village. Noise and vibration created by the vertical measures would also create issues with residents if they were to be introduced into the centre of the village.

8 Road Safety – Comments on potential options

8.1 As outlined in the project initiation document, comments regarding road safety for each of the proposed options were requested from TfB's Network Safety Team. The comments have been made prior to any formal Road Safety Audit being carried out.

8.2 Upon review of this report and drawings PRIV18003/FEA/DWG/001-002, the following comments were made:

8.2.1 Option 1 – Physical Buildouts – "*Drawing PRIV18003/FEA/DWG/001 outlines an idea of what may be proposed to bring forward to further stages of design. Initial thoughts are that if there is known cycle usage in the area, there is no cycle by-pass present within the buildout's design, therefore cyclists may be at risk given the available width through the narrowing. Should this option be preferred and progressed beyond feasibility, the design would be subject to the Road Safety Audit process.*"

8.2.2 Option 2 – Enhanced Signing & Lining (including gateway features) – "*Paragraph 7.2.7 mentions use of a 'Stop' sign in conjunction with the existing give way sign. The placing of the stop sign would need to meet restricted visibility criteria and follow the guidance given in the traffic signs manual. It's unlikely that it would meet the criteria and given the collision history I wouldn't support its introduction (subject to a site visit to look at available visibility splays).*"

8.2.3 Option 3 – Speed Limit Extensions – "*The extension of speed limits out of the village would be subject to formal assessment. The surfacing, roundels, dragon's teeth and signage shown on drawing PRIV18003/FEA/DWG/002 do not raise any safety problems, subject to final positioning and design.*"

8.2.4 Option 5 – Signalised Crossing – "*This proposal would be subject to the Road Safety Audit process should it be pushed and progressed beyond feasibility.*"

8.3 Further recommendations made by the Network Safety Team were that a Stage 1 Road Safety Audit is carried out on the option(s) which are preferred by the Parish Council, prior to detailed design and a Stage 2 Road Safety Audit.

9 Budget Estimates

9.1 All budget cost estimates within this report are initial budget estimates based upon recent TfB experience on similar schemes and brief correspondence with contractors.

9.2 The full cost estimates can be found in Appendix E, and have been created based upon the proposals and recommendations outlined in this report. The estimates are indicative costs, any variations to the work could cause the cost to change either positively or negatively.

9.3 Costs have also been included for staff fees which would cover TfB's fees associated with design, procurement, supervision and progression of the scheme. These are based on the recommended work and will vary depending on scheme complexity if altered.

9.4 Any works carried out in the future may be subject to a rate of inflation, as the estimates outlined are have been based upon work being carried out in 2018-19 financial year.

9.5 A percentage contingency of has been applied to all costs within the budget estimate. This is representative of a feasibility stage budget estimate and reflects the nature of many of the unknown features that will/may be identified through further detailed design and implementation. Contingency would reduce following the detailed design as the risks are identified and resolved.

9.6 Table 9-1 shows a summary breakdown of the budget cost estimate.

Table 9-1 – Budget Cost Estimate Summary

Item	Cost
Previous Costs (Initiation & Feasibility Stage)	£6,912
Road Closures & Traffic Management	£7,772
High Friction Surfacing	£4,394
Signing & Lining	£862
TfB Staff Fees	£3180
Contingency (at 20%)	£1,393
Anticipated Total Cost	£24,513

10 Conclusions and Recommendations

10.1 TfB have requested, obtained and collated surveys in both speed and traffic types to portray a realistic image of the current situation within Cuddington village. The results of these surveys have allowed us to accurately assess the need for traffic calming measures and to help advice on which methods are believed to be most suitable and effective at each of the three areas outlined within the scoping document.

10.2 A number of recommendations have been made within the previous sections, with drawings PRIV18003/FEA/DWG/001 & 002 detailing the alternative options. These include the physical buildout and improved signage and lining at each of the 3 terminal speed limit signs.

10.3 The features begin at location 1, The Green, where it is recommended that the existing chevrons be increased in size and have vegetation removed to increase their visibility to road users. Dragon's teeth and a 30mph roundel on approach to the high friction surfacing are also recommended, to promote reduced speeds, along with increase of HFS length to 12m.

10.4 After entering the village from The Green, and from each of the other two locations, it is recommended that signage be introduced to make drivers aware of potential school children in the area, as shown in Figure 7-1.

10.5 Road markings at the central junction of the village are recommended to be refreshed, particularly at the give way line on Dadbrook. The junction has visibility issues toward Aylesbury Road, so it is essential that cars do not stop too late and get in the way of oncoming traffic from this direction. It is important to note that the installation of road markings can only be completed in dry weather, which means it can be difficult to do in the winter.

10.6 At the Aylesbury Road approach, the potential introduction of a physical buildout has been shown in drawing PRIV18003/FEA/DWG/001. However, the location of the buildout is such that it would require the installation of additional illumination on approach and at the buildout itself. The cost of lighting equipment and power installation for this option would be very high, therefore would require significant support and funding from the Parish Council if progression to detailed design is desired.

10.7 At the terminal speed signs, as with the approach at The Green, there is the potential to introduce dragon's teeth, HFS and 30mph roundel to further promote the reduction of speed into the village.

10.8 Dependant on the success of the planning application which has been put forward and summarised in Section 6, a further study into the moving of the terminal speed signs further out of the village could be considered.

10.9 On approach to the village from Dadbrook, HFS is to be introduced at the terminal speed sign along with dragon's teeth and a 30mph roundel. These measures will aid in the reduction of speed on approach to the village in combination with the lack of forward visibility, making drivers be more cautious as they enter into the village.

10.10 At each of the three terminal speed signs on approach to the village, there is potential to clear some vegetation in the form of overhanging branches around each of the existing signs which may reduce driver visibility on approach. All signs should be cleaned when any work is complete.

10.11 To conclude, TfB recommend progressing the scheme further by developing the proposed options that the Parish Council feel are most suitable for the village, to a detailed design and implementation stage dependent on funding raised.

Appendix A. Scope and Project Initiation Document

Appendix B. Cuddington Speed Data

Appendix C. Cuddington Traffic Class Data

Appendix D. Drawings

Appendix E. Budget Estimates