Scheme Name	**Traffic Calming and Extension of 20mph zone to include Gravel Path, Berkhamsted** Speed Compliance	
Scheme Reference	36	
	B31	Cycling on Gravel Path is dangerous, especially on the ascent and becomes a Level 3+ due to its steep ascent and subsequent slow speed of cyclists on the narrow carriageway
	S8	Speeding vehicles on Gravel Path
		Numerous incidents along Gravel Path in recent years
Links to other UTP schemes:		05, 08, 11

Context

Location Plan

Gravel Path is a local distributor road, providing a main route between Berkhamsted and areas to the northeast (most notably Potten End and western suburbs of Hemel Hempstead). Approximately 1.1km in length, Gravel Path falls approximately 300ft between its junctions with The Common and Station Road, and therefore creates a naturally hazardous environment for both motorised and non-motorised modes of transport.

The route has a complex structure having three sections, each posing specific safety issues:

1. Section one comprises a straight section at the northern end of Gravel Path, leading to/from a higher speed trident junction with The Common and Nettleden Road. The existing speeds along this section (adjacent to Lanrick Copse) demonstrate that vehicles are regularly travelling above the specified 30mph speed limit. The maximum identified speed at this location was 51.4mph, with an average speed of

35.1mph northbound and 33.4mph southbound (based on 2,725 and 2,988 vehicles throughout 2011, respectively).[1] Speed data for each section along Gravel Path is demonstrated in **Table 1**. In addition, a number of accidents have occurred at the junction in recent years, with a perception that further serious traffic accidents may occur without mitigation and speed management along this section.[2] The location of accidents along Gravel Path between 2007 and 2011 is demonstrated in **Figure 5**.

2. Section two is a series of blind bends between Hunters Park and the railway bridge. A number of safety issues have been highlighted along this section relating to the width of carriageway, lack of pedestrian facilities on its western edge, blind corners, gradient and speeding vehicles. Along this section, existing average speeds vary between 23.6mph and 28.3mph, reaching 49.8mph northbound.
3. Section three is a straight section between the single lane railway bridge crossing and Millfield cul-de-sac. Speed data suggests that the vast majority of vehicles travel along this section within the speed limit (potentially due to the priority single lane highway across the railway bridge). Located adjacent to the proposed extension to the Berkhamsted Town Centre 20mph Zone, there is scope to extend the zone into this section without the requirement for further speed management infrastructure.

Having consulted with local stakeholders[3], it has been suggested that speeding along Gravel Path is a concern. The combination of geometry, gradient and vehicle speeds contribute to the impression of an unsafe atmosphere for all road users (both motorised and non-motorised modes). However, accident analysis exposes only one PIA accident along Gravel Path in the most recent 5 year period. Added to which, alcohol was cited as a contributory factor in the aforementioned accident, not prominently speed or environment. A recommendation that has been made in this proforma is to establish speed and vehicle counts along Gravel Path, further to the indicative TrafficMaster data used to compile this report (see the *Preferred Option*). A number of transport improvement options have been developed for the Gravel Path corridor between Station Road and the junction with The Common. It is envisaged that a combination of options could be proposed, once comprehensive speed and vehicle counts have been completed, to deliver a scheme that will enhance local transport, and ensure reduced vehicle speeds through blind corners and adjacent to residential access points. It should be noted that due to the highway geometric constraints and gradient of the route, significant infrastructure improvements are limited in scope. However, further measures will be provided to ensure maximum impact of improvements along Gravel Path.

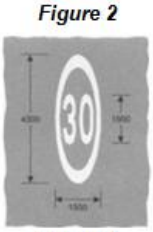
The options have been developed to fulfil the following overarching LTP Objectives:

- Improve the safety and security of residents and other road users
- Enhance quality of life, health and the natural, built and historic environment for all residents
- Reduce transport's contribution to greenhouse gas emissions and improve its resilience

[1] Speeds calculated from TrafficMaster data collected throughout 2011, and presented in Table xxx.

[2] Accident data extracted from STATS19 raw data, provided by the Department for Transport. http://data.gov.uk/dataset/road-accidents-safety-data

[3] and through the review of the paper "20mph limit for Gravel Path, to improve road safety", created for and on behalf of Safer Gravel Path Action Group (submitted to the Transport and Environment Committee of Berkhamsted Town Council in June 2012

Measures/Components			
Ref	Description	Assessment of Suitability	Cost
36.1	Extend the 20mph zone in Berkhamsted along Gravel Path to the junction with The Common, with associated repeater signs	"Speed limits should be evidence-led and self-explaining and seek to reinforce people's assessment of what is a safe speed to travel. They should encourage self compliance. Speed limits should be seen by drivers as the maximum rather than a target speed." – *DfT Circular 01/2013*  20mph zones are effective in reducing collisions and injuries. **Figure 5** shows where on Gravel Path there have been collisions in recent years (1 serious, 2 slight). Speeding was not sighted as being the primary cause of the serious accident, but elevated speeds in conjunction with poor visibility and the highway's geometry has the potential to raise accident (even if it is damage only) risk. It is proposed that the extension of Berkhamsted 20mph zone will improve the safety of Gravel Path for both motorised and non-motorised transport users. *'Road Traffic Regulations Act 1984 – Sections 64 and 65 Special Directions' directs that (regarding 20mph zones):* 1. *Notwithstanding the provisions of Direction 16(1) of 2002 Directions, the sign shown in diagram 674 (**Figure 1**) in Schedule 2 to the 2002 Regulations may be placed on a road if no point on any road to which the speed limit indicated by the sign applies is situated more than 50 metres from:* a. *A traffic calming feature;*  *Figure 1*  *Figure 2*  *Figure 3*	

		b. *A sign shown in diagram 670 (**Figure 2**), when varied to "20" in Schedule 2;* c. *A sign shown in diagram 1065 (**Figure 3**), when varied to "20", in Schedule 6.* 2. *At least one traffic calming feature as defined in Direction 16(2) shall be placed within the zone indicated by the sign shown in diagram 674 (**Figure 1**) in Schedule 2.* At this point in time it is not feasible to recommend this measure. A full speed survey and traffic count will ideally be undertaken to validate this proposal before it can be implemented. Once this has been completed signage (as seen in **Figure 1)** is proposed at the northern end of Gravel Path (see full details in Measure 36.2), to be included within the proposed Gateway features. In addition, repeater 20mph signs (as demonstrated in **Figure 2** (when varied to "20") be placed at 100m intervals in both directions along Gravel Path (where no other traffic calming features are located). NOT DELIVERABLE	
36.2	Provide Gateway features on Gravel Path near junction with The Common	Coloured surfacing should be considered at this location to ensure that each gateway feature is as conspicuous as possible. It is proposed to replace the existing features at the northern end of Gravel Path to includes gateway features, including signs demonstrated in **Figure 1** (with text "Welcome to Berkhamsted, Please Drive Carefully") and coloured surfacing. The proposals will enhance the entrance to Berkhamsted, but also raise awareness of the proposed 20mph Zone along Gravel Path.  Deliverability – 1 to 2 years STANDARD	£11,000 to £13,000

36.3	Introduction of 6 metre long Plateaus along Gravel Path between the junctions with Lanrick Copse and Meadway	*'Setting Local Speed Limits – Department for Transport Circular 01/2013'* demonstrates that 20mph zones require traffic calming measures (e.g. speed humps, chicanes, plateaus) or repeater speed limit signing and/or roundel road markings at regular intervals, so that no point within a zone is more than 50m from such a feature. Due to the existing speeds along Gravel Path between its junctions with The Common and Meadway (see **Table 1**), it is proposed that plateaus are implemented. These are preferred to speed bumps by bus operators (Gravel Path is a bus route) and almost certainly by the emergency services, who also use the route. It is suggested, given these expected road users, that these plateaus are 6 metres in length. Plateaus are preffered to both round topped speed bumps and speed cushions owing to the width of Gravel Path. It is so narrow in places that the introduction of adjacent speed cushions would not be feasible and the provision of the required tappered end round topped speed bumps would effectively further reduce the width of the carrigeway. This may encourage drivers to travel more towards the centre of the road, increasing the risk of head on conflicts, which is particularly undesirable. Six plateaus are required along the length of the section, at a spacing of between 60 and 80 metres, based on access points to the carrigeway. Signs to diagram 557.1 of the Traffic Signs Regulations and General Directions would also be required on approach to the section in both northbound and southbound directions. The proposals include the northern section of Gravel Path only for the following two reasons: 1. The existing speeds on this section suggest that extensive speed management would be required to reduce the average speeds to 24mph; 2. The sections of Gravel Path to the south of Meadway are too steep for vertical speed management measures. Deliverability – 1 to 2 years STANDARD	£60,000 to £65,000

36.4	Vehicle Activated Signs on approach to hazardous bends on Gravel Path between junctions with Gilpin's Ride and Meadway	It is proposed to provide vehicle activated warning signs to diagram 513 of the Traffic Signs Regulations and General Directions at the following locations; 1. Southbound – south of Meadway; 2. Northbound – south of White Hill. The proposals will enhance the safety for road users and encourage reduced speeds through the hazardous corners. Given that the number of accidents on Gravel Path has not been excessive over the most recent 5 year period studied, coupled with the fact that only one accident in the time period was a PIA it does not actually meet the criteria for the installation of VAS in Hertfordshire county. At present there must be at least 3 recorded PIA, with at least one being related to speed to warrant VAS introduction. **Figure 5** demonstates this not to be the case. NOT DELIVERABLE	
36.5	Coloured surfacing and painted speed limit roundels on the carriageway on the southern section between Millfield and the railway bridge crossing	It is proposed to add coloured surfacing at the southern section of Gravel Path to enhance other measures along the route such as gateways, roundels or road humps. Due to the location and gradient of the southern section between Millfield and the railway bridge crossing, it is not recommended that any vertical speed management is introduced. However, 30mph signs should be provided at 100m intervals. Deliverability – 1 to 2 years STANDARD	£5,000 to £6,000
Supporting Evidence of Measures/Components			

Figure 4 – Gravel Path Proposals

Figure 5 – Existing Average Speeds along Gravel Path

Location	Direction	Length (m)	Observations	Total Time (1/100s)	Average Time (s)	Max Time (s)	Min Time (s)	85th%ile	Min Speed (mph)	Max Speed (mph)	85th%ile Speed (mph)	Average Speed (mph)
Meadway to Hunters Park	NB	164.4	2841	3691741	12.99	107.62	7.38	10.93	**3.4**	**49.8**	**33.7**	**28.3**
Meadway to Hunters Park	SB	164.4	2860	3941926	13.78	73.8	8.2	12.05	**5.0**	**44.9**	**30.5**	**26.7**
White Hill to Winton House	NB	92.7	3461	3042368	8.79	10.46	4.52	6.98	**19.8**	**45.9**	**29.7**	**23.6**
White Hill to Winton House	SB	92.7	3084	2487209	8.06	55.8	4.65	7.28	**3.7**	**44.6**	**28.5**	**25.7**
Gilpin's Ride to White Hill	NB	55.6	2292	1189574	5.19	50.4	2.88	4.2	**2.5**	**43.2**	**29.6**	**24.0**
Gilpin's Ride to White Hill	SB	55.6	3331	1729180	5.19	40.32	2.96	4.2	**3.1**	**42.0**	**29.6**	**24.0**
Millfield to Gilpin's Ride	NB	93.4	2936	2262789	7.71	334.8	4.29	6.2	**0.6**	**48.7**	**33.7**	**27.1**
Millfield to Gilpin's Ride	SB	93.4	3451	2680211	7.77	669.6	4.72	6.2	**0.3**	**44.3**	**33.7**	**26.9**
Beech Hill Ct to Millfield	NB	132.1	2958	3177377	10.74	475.2	6.25	8.49	**0.6**	**47.3**	**34.8**	**27.5**
Beech Hill Ct to Millfield	SB	132.1	3520	3733111	10.61	158.4	6.79	8.97	**1.9**	**43.5**	**32.9**	**27.9**
George St to Station Rd	NB	41.8	2862	1657149	5.79	302.4	2.44	3.44	**0.3**	**38.3**	**27.2**	**16.1**
George St to Station Rd	SB	41.8	3261	1618313	4.96	302.4	2.36	3.44	**0.3**	**39.6**	**27.2**	**18.8**
Station Rd to Ellesmere Rd	NB	17.7	3198	827222	2.59	64.80	0.91	1.38	**0.6**	**43.5**	**28.7**	**15.3**
Station Rd to Ellesmere Rd	SB	17.7	3831	907770	2.37	64.80	1.01	1.51	**0.6**	**39.2**	**26.2**	**16.7**
Over railway	NB	48.8	3092	1500326	4.85	176.4	2.18	3.6	**0.6**	**50.1**	**30.3**	**22.5**
Over railway	SB	48.8	3717	2111729	5.68	35.28	2.94	4.64	**3.1**	**37.2**	**23.5**	**19.2**
Woodlands to Beech Hill Ct	NB	35.0	3080	923399	3.00	126	1.66	2.38	**0.6**	**47.2**	**32.9**	**26.1**
Woodlands to Beech Hill Ct	SB	35.0	3686	2184925	5.93	126	1.75	3.15	**0.6**	**44.8**	**24.9**	**13.2**
Winton House to Meadway	NB	77.4	3432	2492160	7.26	277.2	3.7	5.78	**0.6**	**46.8**	**30.0**	**23.8**
Winton House to Meadway	SB	77.4	3052	2262612	7.41	277.2	3.85	6.03	**0.6**	**45.0**	**28.7**	**23.4**
North of Hunters Park	NB	172.4	2600	3071299	11.81	77.4	7.55	9.99	**5.0**	**51.1**	**38.6**	**32.6**
North of Hunters Park	SB	172.4	2925	3798037	12.98	103.2	7.55	11.26	**3.7**	**51.1**	**34.2**	**29.7**
South of Lanrick Copse	NB	46.7	2719	835018	3.07	169.2	2.06	2.56	**0.6**	**50.7**	**40.8**	**34.0**
South of Lanrick Copse	SB	46.7	2987	945244	3.16	169.2	2.06	2.73	**0.6**	**50.7**	**38.2**	**33.0**
Adjacent to Lanrick Copse	NB	28.3	2725	490706	1.80	7.75	1.23	1.548	**8.2**	**51.4**	**40.9**	**35.1**
Adjacent to Lanrick Copse	SB	28.3	2988	565823	1.89	9.16	1.23	1.65	**6.9**	**51.4**	**38.3**	**33.4**
Lanrick Copse to The Common	NB	125.4	2741	3579758	13.06	75	6.25	9.57	**3.7**	**44.9**	**29.3**	**21.5**
Lanrick Copse to The Common	SB	125.4	2971	3323041	11.18	40.91	6	9.78	**6.9**	**46.8**	**28.7**	**25.1**

Table 1 – Existing Speeds along Gravel Path (obtained from TrafficMaster Data)

Preferred Option
The preferred option includes all measures 36.2, 36.3 and 36.5. It is recommended that these measures are introduced during the UTP period to ensure that speeds are reduced along the whole length of Gravel Path. The proposals have been specifically focussed on the existing speeds at the three sections of Gravel Path, with 6m plateaus, along with gateway features, provided along the northern section and coloured surfacing at the lower section. These measures will support the future extension of the 20mph zone into Gravel Path (if speed surveys provide sufficient validation), with a view that existing speeds need to be reduced significantly to reduce the risk of accidents, and to improve conditions for both motorised and non-motorised transport users.

Contribution to Objectives / Indicators	UTP Objectives	• Promote active travel modes throughout the study area to encourage active and healthy lifestyles • Address signage issues within the towns to enable effective and efficient navigation of the town • Reduce congestion in key traffic hotspots throughout the study area

Outline Cost Analysis of Preferred Option or Options		
Design and Implementation	**Indicative Cost***	**Notes**
36.2	£11,000 to £13,000	
36.3	£60,000 to £65,000	
36.5	£5,000 to £6,000	
TOTAL COST FOR DELIVERY	**£76,000 to £84,000**	

*Costs provided by HCC

Maintenance Liability	~~High~~ ~~Medium~~ Low	

Deliverability of Preferred Option	~~Simple – 'quick win', could be delivered within1 year~~
	Standard – could be delivered in 1 to 2 years, in line with IWP
	~~Complex – could not be delivered in 2 years, has some issues that require resolution before design~~
Delivery Issues	

Other Information/Additional Notes:

TrafficMaster Data has been provided via the Department for Transport (DfT) in order to complete an assessment of speeding at particular locations. In raw form, TrafficMaster data relates to satellite navigation journey times. Specifically for Tring and Berkhamsted, the data was available for the whole of 2011, providing sufficient journey time information for the assessment of all links across the local highway network. The journey time was translated into speed based on highway link length information (see **Table 1**). TrafficMaster data provides an average speed across a link, including congestion at junctions, thus providing only an insight into speed conditions on highway sections, without reflecting actual speeds that vehicles reach between junctions. As a result, further speed surveys would be required to validate the TrafficMaster data and to fulfil the requirements for changes to speed limits. However, the proposals for this scheme include speed management measures that should mitigate against existing speeds.

Scheme Name	**Traffic Calming and Extension of 20mph zone into the Castle Road / Mill Road area of Berkhamsted** Highways and Congestion	
Scheme Reference	38	
Problem References	CH8	Charles St and Castle St school time congestion (drop-off areas)
		Roads unsafe outside school entrances
Links to other UTP schemes:		05, 17, 34

Context

Figure 1 - Location Plan

The area that has been examined includes the connector and access roads between Station Road and High Street, Berkhamsted. The roads covered within these proposals serve the town centre, two local schools, a residential area and Berkhamsted railway station. It is important to consider all of these when proposing speed management measures.

In terms of existing infrastructure within surrounding highway sections, footways have been built out and raised crossings with central islands provided to create a narrowing effect. In addition, traffic humps with stone setts are located either side of the Kings Road Junction and speed cushions have been used in Mill Street. These measures have successfully reduced traffic speeds and therefore provide a key factor in the provision of additional features proposed.

The existing 20mph zone extends along the High Street from Three Close Lane to Boxwell Road. Following discussions with local stakeholders, there is a perception that an extension

to the current 20mph zone would enhance the town centre environment, but also improve the safety for vulnerable road users.

Since July 1999, the Road Traffic Regulation Act Order 1999 has given traffic authorities the powers to introduce both 20mph speed limits and 20mph zones without obtaining the consent of the Secretary of State, and that once introduced, successful 20mph zones and 20mph speed limits should be self-enforcing.

Figure 2 - 20mph Zone Berkhamsted High Street

20mph speed limits are unlikely to be complied with on roads where vehicle speeds are substantially higher than this and, unless such limits are accompanied by the introduction of traffic calming measures, they are unlikely to be self enforcing and police forces may find it difficult to routinely enforce the 20mph limit. Traffic authorities should therefore always consult the local police force when considering possible 20mph limits or zones, and thereafter as part of the formal consultation process.

In addition, Hertfordshire County Councils Speed Management Strategy suggests a 20mph zone not be introduced where current speeds exceed the threshold of 25mph at the 85th percentile level. Where speeds do exceed this threshold, self enforcing speed reducing measures should be considered to ensure 85th percentile speeds fall to 24mph, or less, once they are implemented.[1] (It is acceptable that the introduction of signage for a 20mph zone will reduce that the maximum 85th percentile speeds by 1mph.)

With existing speed data in mind, it is important to consider speed reducing measures that will serve as self enforcing, in order to achieve the target of introducing a 20mph zone in the study area. The multi-modal nature of Berkhamsted must be considered to ensure that measures cater for all users including pedestrians, drivers' parking, servicing and the potential impact on trade.

The options have been developed to fulfil the following overarching LTP Objective:

- Improve transport opportunities for all and achieve behavioural change in mode choice;
- Enhance quality of life, health and the natural, built and historic environment for all residents
- Improve the safety and security of residents and other road users

[1] Extract from Highways and Transport - Speed Management Strategy, Hertfordshire Highways, November 2009.

Measures/Components			
Ref	Description	Assessment of Suitability	Cost
38.1	**Extend the 20mph zone in Berkhamsted** to include the area of Castle Street, Chapel Street and Mill Street (see **Figure 1**)	20mph zones are predominantly used in urban areas, both town centres and residential areas – and in the vicinity of schools.[2] This specific area within Berkhamsted is a prime candidate for a 20mph zone given this DfT guideline, encompassing both Berkhamsted School and residential areas. 20mph zones are very effective at reducing collisions and injuries. This is confirmed in research that shows that the number of collisions involving injury to children may be reduced by up to two-thirds (Webster and Mackie, 1996). The hope and expectation is that an extension to the 20mph zone, from part of the High Street to cover more of the Berkhamsted area should assist in the reduction of the number and severity of speed associated collisions. An additional benefit of the zone would be its contribution to improving the environment for non-motorised users and conditions more conducive to cycling. A review of TrafficMaster data revealed that the 85th percentile speeds for many of the roads under investigation here fall well below the 25mph threshold given in the Hertfordshire Highways directive, with the inference of this being a 20mph limit in these areas would be self enforcing. Despite the benefits reducing the speed limit for many of these roads would bring, it is not feasible to introduce a blanket 20mph zone at this stage. The TrafficMaster data shows that at 85th percentile speeds on portions of Castle Street, Station Road and Gravel Path (see **Figure 4**) exceed the 25mph directive. It is for this reason that at this stage it is not possible to offer this as a proposal. Speed reducing measures must be considered and successfully implemented in these highlighted areas before a 20mph limit on the roads in question can be recommended. It is therefore proposed that a 20mph zone extension be	

[2] Extract from *DfT Circular 01/2006, p18*

		reviewed following the implementation of associated speed management measures. NOT DELIVERABLE	
38.2	**Introduction of round topped speed bumps in Castle Street** – in line with the recommendation that speed reducing measures are required to potentially introduce a 20mph in the future.	The review of TrafficMaster data revealed that for a 200m section of Castle Street, between Manor Close and the Fire Station the threshold for 85th percentile speeds of 25mph is exceeded. Currently this figure ranges from 25.9 - 29.3mph. ACPO guidelines state that speeds in excess of 24mph (at the 85th percentile level) in a 20mph zone represent the need for enforcement action. Given the requirement by Hertfordshire Highways that these 20mph zones should be self enforcing, it is necessary to introduce speed reducing measures on Castle Street before a 20mph zone can be implemented. It is accepted that signage would have a speed reducing effect of 1mph, bringing the recorded 85th percentile speed to 28.3mph, still in excess of the 24mph ACPO and Hertfordshire Highways guidelines.[3] It is for this reason that measures that use physical engineering are proposed to bring the speeds in the area down to a more acceptable level. Round top speed bumps have been used effectively in Mill Street, where the average speed is significantly lower than that on Castle Street. It is proposed that these be introduced on Castle Street as they can effectively reduce vehicle speeds. A disadvantage of flat or round top speed bumps is that they can be difficult to construct, particularly ensuring the correct gradient. This downside to this particular feature has lead to investigation of other ways to engineer a reduction in speed. *Deliverability - Measure 38.3 Preferred*	
38.3	**Introduction of speed cushions in Castle Street** – in line with the recommendation	Speed cushions have the same speed reducing effect on vehicles as round or flat topped speed bumps, yet also provide additional advantages. Buses can traverse cushions allowing a smooth transition for passengers, they allows cyclists to	£16,000 to £18,000

[3] Extract from Highways and Transport - Speed Management Strategy, Hertfordshire Highways, November 2009.

	that speed reducing measures are required to potentially introduce a 20mph in the future.	by-pass more easily and are quieter than road top humps.[4] It is considered that this advantage would be particularly beneficial given that Castle Street and the adjoining roads are predominantly residential.  Given that speed cushions are predominantly prefabricated and bolted in place, construction time is reduced as is disruption during their installation. PTU design guide recommends that measures need to be taken to ensure there is no parking adjacent to the cushions and that the enforcement authority is consulted. It is also recommended to ensure that the road width is sufficient to adopt the measures proposed. The recommendation is that speed cushions be implemented on Castle Street in order to reduce the 85th percentile speeds to levels that would potentially qualify this road as eligible to become a 20mph zone in the future. Their benefits over speed bumps (round or flat) contribute to this recommendation. In addition, consultation with the Fire Station (located off Castle Road) will be required to ensure good access and egress conditions onto Castle Road. *Deliverability – 1 to 2 years* STANDARD	
	Introduction of rumble strips in Castle Street	Rumble strips are predominantly used in rural areas, and have limited impact in urban environments. They are proven to reduce speeds in such places by approximately 1mph, which is not going to be adequate to bring the average speed on Castle Street down to a 'self enforcing'	

[4] Extract from Highways and Transport - Speed Management Strategy, Hertfordshire Highways, November 2009.

		level for a 20mph zone.  Rumble strips comprise of small elevated strips in the carriageway. They are predominately used to alert drivers to subsequent hazards, not solely as a speed reduction measure. Thus, reliance should not be placed solely on them when seeking speed reduction[5]. The vibratory and audible effect caused by the strips, utilised so effectively in rural areas to warn of upcoming hazards render these measures inappropriate in urban areas. As Castle Street is a residential area, the measures would fall well within the 200m minimum distance from residential property. NOT DELIVERABLE	
Supporting Evidence of Measures/Components			
Refer to Figures 5 – 10.			

[5] Extract from Highways and Transport - Speed Management Strategy, Hertfordshire Highways, November 2009.

Figure 3 – Existing 20mph zone

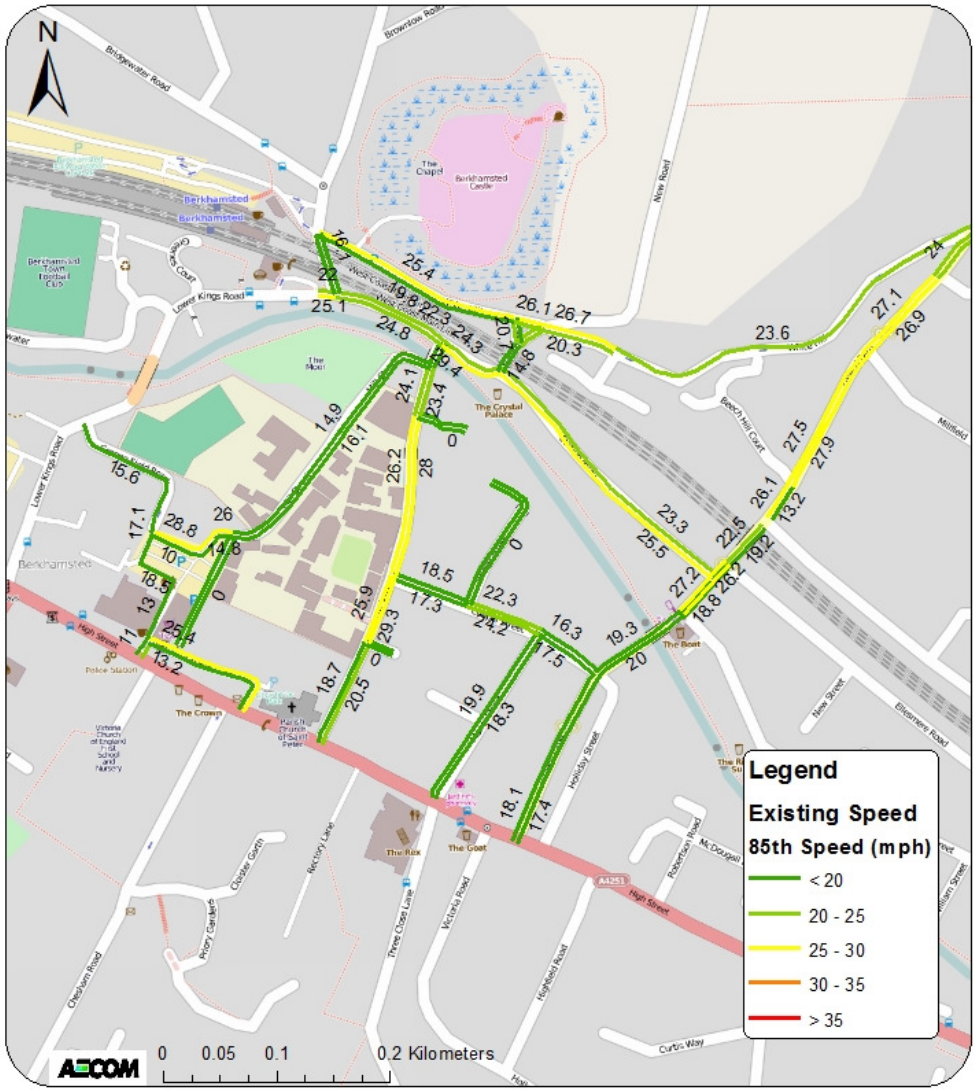


Figure 4 – 85th percentile speeds (TrafficMaster Data for 2011)

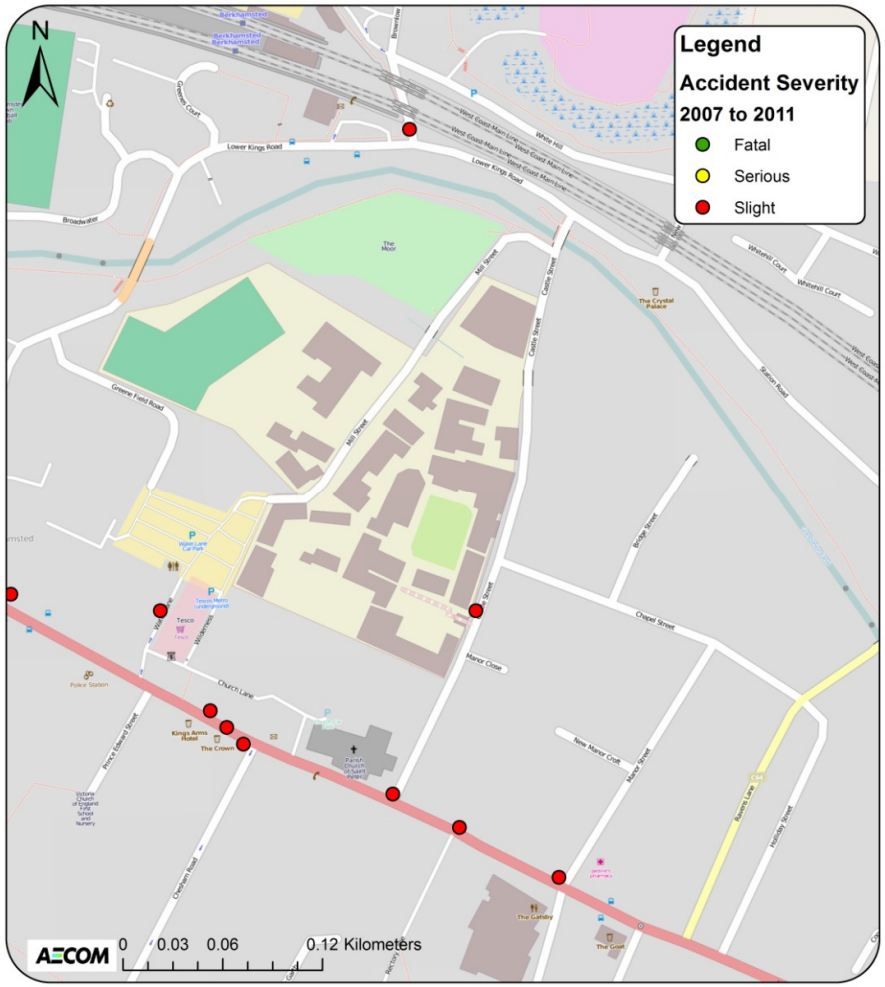


Figure 5 –Collision Locations (March 2007 – Feb 2012)

Figure 6 – Proposed Extension of 20mph zone

Preferred Option
It is recommended that 38.3 be progressed, with the introduction of speed cushions along Castle Road, between Manor Close and the Fire Station. A further recommendation of this Proforma is that the introduction of a 20mph zone, including Castle Road, be reviewed (with associated speed surveys) once the speed cushions have been installed – with reference to the ACPO guideline 85th percentile speed of 24mph and under, for 20mph zones.

Contribution to Objectives / Indicators	UTP Objectives	• Promote active travel modes throughout the study area to encourage active and healthy lifestyles; • Reduce congestion in key traffic hotspots throughout the study area.

Outline Cost Analysis of Preferred Option or Options		
Design and Implementation	**Indicative Cost***	**Notes**
38.3	£16,000 to £18,000	
TOTAL COST FOR DELIVERY	**£16,000 to £18,000**	

Maintenance Liability	~~High~~ ~~Medium~~ Low	

*All costs provided by HCC

Deliverability of Preferred Option	~~Simple – 'quick win', could be delivered within1 year~~
	Standard – could be delivered in 1 to 2 years, in line with IWP
	~~Complex – could not be delivered in 2 years, has some issues that require resolution before design~~

Delivery Issues	Traffic Regulation Order required for implementation of 20mph zone. In addition, consultation with the Fire Station (located off Castle Road) will be required to ensure good access and egress conditions onto Castle Road.

Other Information/Additional Notes:

Dacorum Borough Council approval required for any changes in Berkhamsted town centre. Berkhamsted town centre is a conservation area and all proposals must be in line with Dacorum Borough Council objectives.

TrafficMaster Data has been provided via the Department for Transport (DfT) in order to complete an assessment of speeding at particular locations. In raw form, TrafficMaster data relates to satellite navigation journey times. Specifically for Tring and Berkhamsted, the data was available for the whole of 2011, providing sufficient journey time information for the assessment of all links across the local highway network. The journey time was translated into speed based on highway link length information, and then compared against ACPO thresholds (as seen below). TrafficMaster data provides an average speed across a link, including congestion at junctions, thus providing only an insight into speed conditions on highway sections, without reflecting actual speeds that vehicles reach between junctions. As a result, further speed surveys would be required to validate the TrafficMaster data and to fulfil the requirements for changes to speed limits.

Scheme Name	**Speed management adjacent to Tring station** Highways and Congestion	
Scheme Reference	39	
Problem References	S25	Tring Station - vehicles regularly drive through the hamlet over the speed limit and it's very dangerous, particularly with traffic turning out of the station.
	T14	Northfield Road link to Pitstone is currently hazardous with no cycle facilities and high vehicle speeds - carriageway condition is poor. Particularly hazardous during the AM peak with vehicles speeding to get to the station
Links to other UTP schemes:		06, 07, 12

Context

Figure 1 - Location Plan

Tring Station is situated 2.5 kilometres to the east of Tring town centre and is operated by London Midland. It is a well used station, owing to Tring station's proximity to London, with the car park to the east of the station having been recently expanded to accommodate a second storey of parked cars.

On the approach to Tring station from the east, Station Road is a national speed limit Road until Northfield Road, where the current 30mph zone begins. The section of Station road under consideration is from here to Royal Court, the other side of the bridge traversing the railway line.

As the station is approached from the east, road markings alerting drivers of the reduction from 60mph to a 30mph limit are present, as is 30mph and station signage. Approaching from the west, this is a 30mph road at present with a number of signs on approach, warning of both cyclists and a playground in the area. Despite these measures already in place there

is concern they are not adequate in terms of keeping speeds reasonable and accident risk low adjacent to the station.

During consultation with local residents and site visits, Station Road, particularly the section adjacent to Tring Station was identified as a site were speeding was an issue.

TrafficMaster data supports this supposition, with the average speed over the bridge, in both directions, in access of the 30mph speed limit (see **Table 1**). More pertinent are the 85th percentile speeds (see **Figure 2**) which indicate the following:

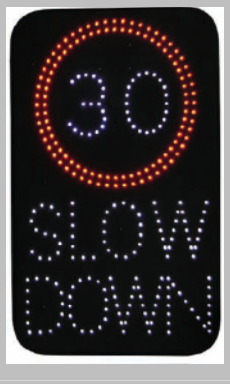
1. The speed management measures currently in place for the portion of Station Road spanning the bridge at Tring station are not 'self enforcing', given that the 85th percentile speeds are 36.0mph and 36.6mph in the westerly and easterly directions, respectively (above the ACPO requirement of 35mph for a speed limit to be self enforcing).
2. That for the entire length of the section of road outlined, the 85th percentile speeds are well in excess of 25mph, meaning this road is nowhere close to qualifying for being put forward as a 20mph zone.

Accident data, collected over the 2007-2011 period shows there to have been two slight and accidents along this stretch of road (see **Figure 3**). Although this number means that the road doesn't qualify for some speed reduction measures, such as speed activated signs, it does highlight an elevated accident risk in the area that should be addressed. This will likely be reduced by decreasing vehicle speed over the bridge.

The options have been developed to fulfil the following overarching LTP Objective:

- Improve transport opportunities for all and achieve behavioural change in mode choice;
- Enhance quality of life, health and the natural, built and historic environment for all residents
- Improve the safety and security of residents and other road users

Measures/Components			
Ref	Description	Assessment of Suitability	Cost
39.1	**Introduction of 'Road narrows on both sides' signage (TSRGD sign 516)**	There is narrowing of the carriageway on approach to, and over the bridge at Tring station. This is also the location of both of the recorded accidents at the location (see **Figure 3**). This warning sign is aimed at alerting drivers to a change in the road geometry, with the ambition to reduce approach speed.  A possible issue with the introduction of such signs owes to the number of signs already in the area. The presence of cyclists, a playground and	

		the station are all sign posted along the carriageway. *Deliverability - Measure 38.5 Preferred*	
39.2	**Introduction of horizontal and/or vertical speed reducing measures.**	These cover a range of approaches. Common vertical measures include speed bumps - round and flat topped, and speed cushions. Prevalent horizontal measures include, but are not limited to, chicanes, pinch points and central islands. These are often preferred along bus route, of which Station Road is one, given that they contribute to a smoother ride for passengers. Under normal circumstances both horizontal and vertical measures would be considered and possibly implemented to reduce speeds, but given the narrowing of the road over the bridge and the possible reduction in vision it is believed that these measures may cause safety issues on approach to the bridge. *Deliverability - Measure 38.5 Preferred*	
39.3	**Introduction of Vehicle Activated Sign Roundel (VASR)** on approach to Tring station Bridge	The signs are simple, and easy to understand. However, VASR should not be deployed unless it is clear that fixed signage does not remedy the issue. It is proposed that a VASR is located in both directions on approach to the Tring station bridge.  The key criteria for the introduction of VASR suggest that at least three accidents need to have occurred on the route, and the 85th percentile speed exceeding the threshold speed 35mph. The speeds taken from TrafficMaster data support their introduction, but the number of accidents over the bridge in the time frame studies does not. It is therefore not possible to implement this measure according to the Hertfordshire Highways' guidelines. **NOT DELIVERABLE**	
39.4	**Introduction of**	Rumble strips are predominantly used in rural	

	rumble strips in the 30 mph zone - East and west of the bridge at Tring station.	areas, and have limited impact in urban environments.  Rumble strips comprise of small elevated strips in the carriageway. They are predominately used to alert drivers to subsequent hazards, namely the bridge at Tring station and are not solely used as a speed reduction measure. Thus, reliance should not be placed solely on them when seeking speed reduction. The vibratory and audible effect caused by the strips, utilised so effectively in rural areas to warn of upcoming hazards render these measures inappropriate in urban areas. As houses to the west of the bridge fall well within the 200m minimum distance from residential property rumble strips cannot be used in this instance. **NOT DELIVERABLE**	
39.5	**Introduction of Ripple Print in the 30 mph zone -** East and west of the bridge at Tring station.	An alternative to rumble strips is to use Ripple Print in order to alert drivers to take greater care in advance of a hazard or junction.  In the case of the bridge at Tring Station, due to the location of private residences to the west, it is proposed that Ripple Print is implemented as opposed to rumble strips. Whilst reducing exterior noise pollution, the rippled effect increases noise levels within the vehicle. It is therefore proposed to implement this material within the 30mph zone to the east and	£12,000 to £14,000

		west of the bridge. In addition, it is anticipated that the proposed surfacing will mitigate the existing drainage issues, and associated safety concerns, on the northern approach to the railway bridge. Deliverability – 1 to 2 years **STANDARD**	
Supporting Evidence of Measures/Components			
Refer to Figures 2 – 3.			

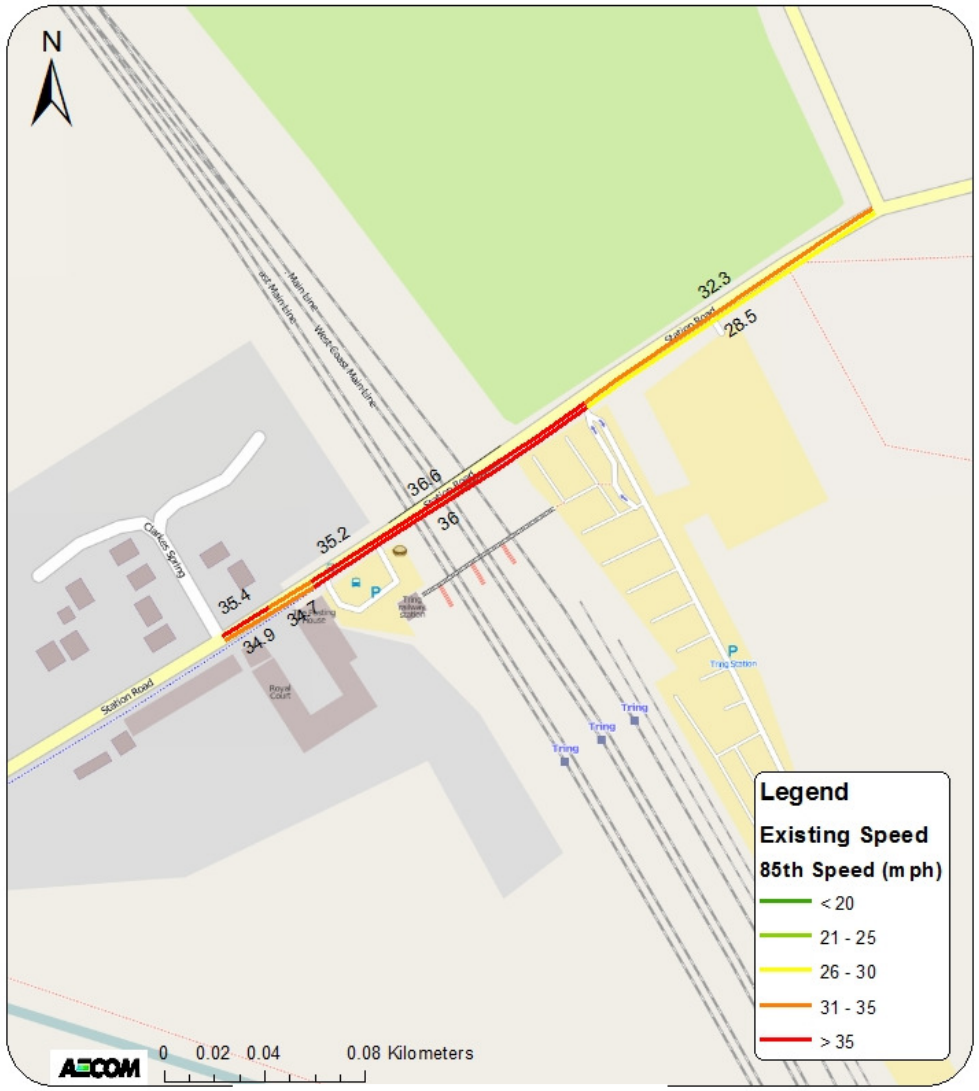


Figure 2 – 85th percentile speeds adjacent to Tring station (TrafficMaster Data for 2011)

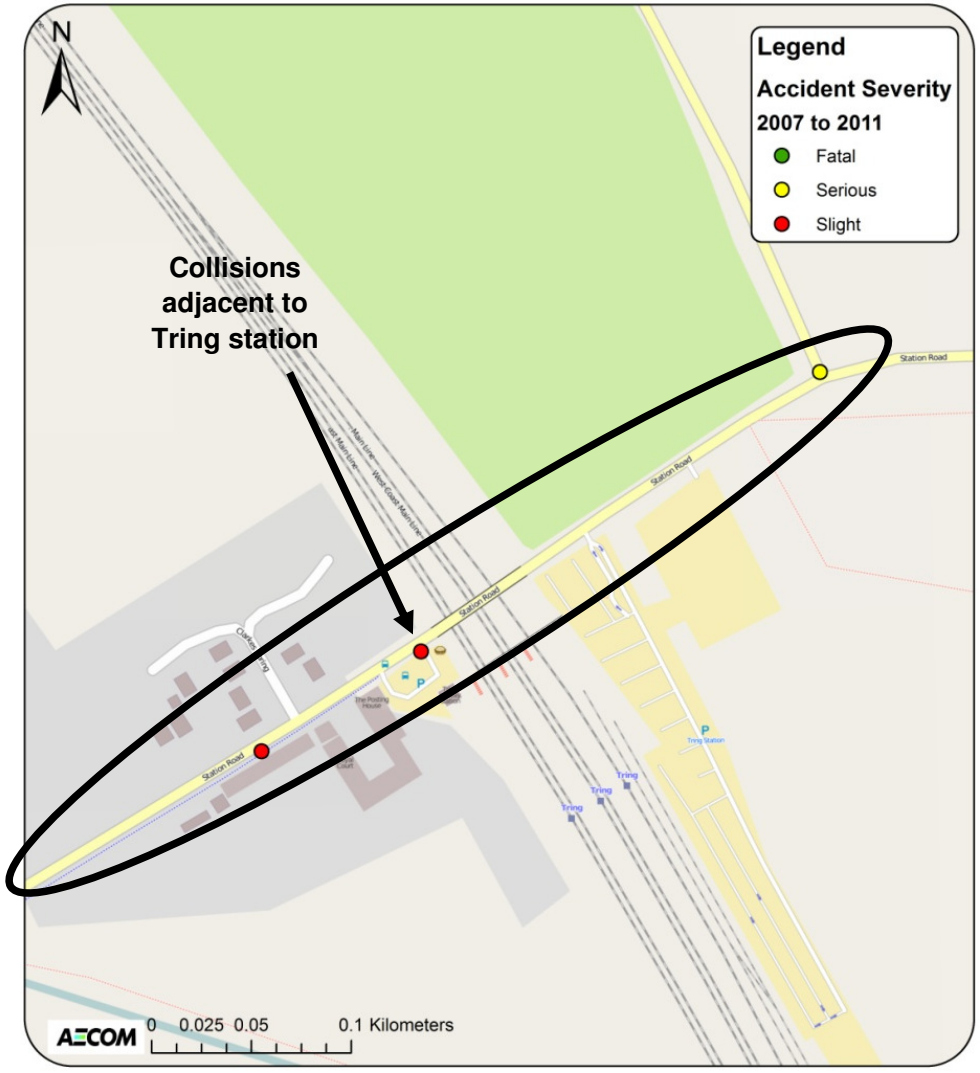


Figure 3 –Collision Locations on Station Road, Tring (March 2007 – Feb 2012)

	Location	Direction	Length (m)	Observations	Max Speed (mph)	85th%ile Speed (mph)	Average Speed (mph)
STATION RD	1.Royal Court	EB	21.7	3833	48.5	35.4	28.2
	2.Posting House	EB	20.0	3821	50.9	34.7	25.7
	3.The Station	EB	32.5	3751	51.9	35.2	21.1
	4.Over the Bridge	EB	97.8	3687	50.9	36.6	30.6
	5.Bridge to Northfield Rd	EB	138.8	3644	48.4	32.3	29.2
	1.Royal Court	WB	21.7	4596	50.0	34.9	29.3
	2.Posting House	WB	20.0	4563	50.3	34.7	28.8
	3.The Station	WB	32.5	4468	51.9	35.2	26.1
	4.Over the Bridge	WB	97.8	4453	50.2	36.0	31.6
	5.Bridge to Northfield Rd	WB	138.8	4475	48.4	28.5	23.8

Table 1 – Max, Ave and 85th percentile speeds adjacent to Tring station (TrafficMaster Data for 2011)

Preferred Option
It is recommended that 39.5 be progressed, with the introduction of ripple print on the approach to the bridge at Tring station from both the easterly and westerly directions. More specifically at the beginning of the 30mph zone to the east and just prior to Clarke's Spring to the west. A further recommendation of this Proforma is that the effectiveness of these speed reduction measures be assessed after their introduction in order to assess whether this portion of Station Road now qualifies as 'self enforcing' under ACPO guidelines.

Contribution to Objectives / Indicators	UTP Objectives	• Promote active travel modes throughout the study area to encourage active and healthy lifestyles;

Outline Cost Analysis of Preferred Option or Options		
Design and Implementation	**Indicative Cost***	**Notes**
39.5	£12,000 to £14,000	
TOTAL COST FOR DELIVERY	**£12,000 to £14,000**	

Maintenance Liability	~~High~~ ~~Medium~~ Low	

*All costs provided by HCC

Deliverability of Preferred Option	~~Simple – 'quick win', could be delivered within1 year~~
	Standard – could be delivered in 1 to 2 years, in line with IWP
	~~Complex – could not be delivered in 2 years, has some issues that require resolution before design~~

Delivery Issues	

Other Information/Additional Notes:

TrafficMaster Data has been provided via the Department for Transport (DfT) in order to complete an assessment of speeding at particular locations. In raw form, TrafficMaster data relates to satellite navigation journey times. Specifically for Tring and Berkhamsted, the data was available for the whole of 2011, providing sufficient journey time information for the assessment of all links across the local highway network. The journey time was translated into speed based on highway link length information, and then compared against ACPO thresholds (as seen below). TrafficMaster data provides an average speed across a link, including congestion at junctions, thus providing only an insight into speed conditions on highway sections, without reflecting actual speeds that vehicles reach between junctions. As a result, further speed surveys would be required to validate the TrafficMaster data and to fulfil the requirements for proposed changes to speed limits.