Document Control Sheet

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1 Introduction

1.1 Background

As part of National Highways' A12 Chelmsford to A120 widening scheme, the existing Junctions 20a and 20b, to the south and north of Hatfield Peverel, and the existing Junction 21, to the south of Witham, are to be removed. They are to be replaced with a new 'all-movements' Junction 21 constructed between Hatfield Peverel and Witham.

National Highways' modelling indicates that the proposed A12 scheme would lead to an increase in traffic on the B1137 (Main Road) through Boreham in the AM peak hour (see Figure 1: National Highways Modelling: 2027 Traffic Flow Comparison - With and without the scheme, below). There are concerns that an increase in traffic along this route would increase delay for local residents, negatively affect vulnerable road users and the chance of collisions.

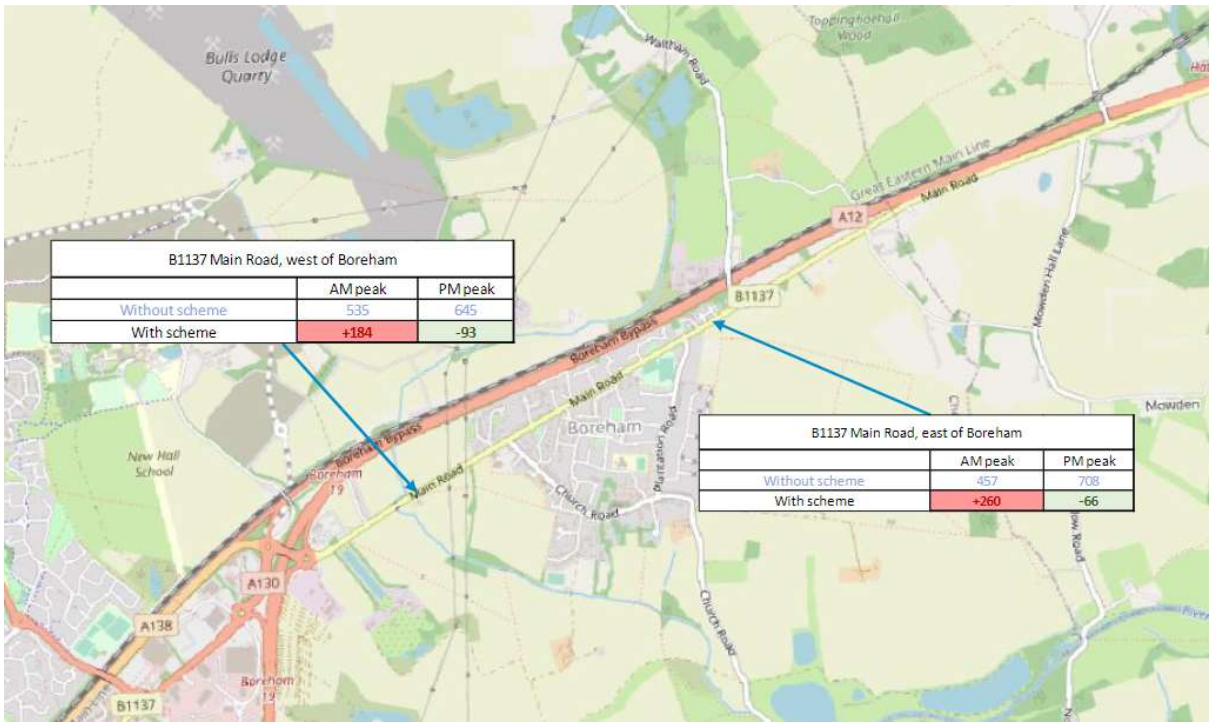

Figure 1: National Highways Modelling: 2027 Traffic Flow Comparison - With and without the scheme

The number of vehicles predicted to use Main Road, with the proposed A12 scheme in place, has been modelled assuming reduced speed limits through Boreham Village and between Boreham and Hatfield Peverel. If these speed limits are not adhered to, it is likely that the B1137 will be more attractive as a route for drivers heading to the south from Hatfield Peverel and Maldon district, which could lead to even higher traffic increases in Boreham. Essex County Council (ECC) has expressed concern about these speed limit reductions and the possibility of poor compliance with the lower speed limits in the absence of other changes to the road layout.

1.2 Need for Additional Mitigation on the B1137

National Highways is proposing to reduce the speed limit from 40mph to 30mph through Boreham village, as part of the A12 scheme, and from 60mph to 40mph between Boreham

and Hatfield Peverel. At present, National Highways proposes only to update speed limit signs in connection with the speed limit reductions.

ECC has considered the possibility of reducing the speed limit on the B1137 through Boreham previously, taking account of Circular 01/2013 and the Essex Speed Management Strategy. Its conclusion was that additional measures would be required to achieve required compliance

ECC has commissioned Essex Highways to assess the appropriateness of the National Highways proposed speed limit reductions and look into additional measures that might be required to help ensure they are adhered to. This report outlines the existing situation along the B1137, discusses potential traffic calming options and provides a list of recommendations on the way forward.

2 Characteristics of B1137, Main Road

2.1 Route function

The majority of the B1137 (Main Road), between A12 Junction 19 and Hatfield Peverel, is rural in nature with the main users being vehicular traffic. However, a section of the route runs through Boreham village, a residential settlement with shops, restaurants, a nursery, a primary school and other community facilities. Therefore, although vulnerable road users are present on the whole length of the road, they are particularly present in Boreham village.

Main Road is also an important route for larger vehicles; the road serves bus routes 71, 73, 371, 673 and 676 and HGVs made up around 3% of all vehicles in 2019[1]. All traffic that uses the A12 may, on occasions, use the B1137 for planned and unplanned incidents that occur on the A12 sometimes in both directions at the same time. As a result, vehicles should be able to pass one another without risk or hold up. Additionally, there is a need for farm traffic and emergency vehicles to use this route. The width of these vehicles, how low they sit to the ground, their turning radii and the speed at which they need to travel will all impact the type of speed reduction measures that can be implemented along this route. Vertical measures such as speed humps have been discounted as a potential traffic calming measure as they can cause damage to low-sitting vehicles such as buses.

2.2 Speed Data

Currently, speed limits along Main Road are 40mph or above with some sections set at the National Speed Limit. The straight nature of the road (being a former Roman Road) and its width, in some places, encourages higher speeds. Figure 2: Existing speed limits on the B1137, below, shows the speed limits currently in place on this route.

The 50mph speed limit on the approach to Hatfield Peverel was put in place in response to safety issues in the vicinity of the Junction 20a southbound on-slip. With Junction 20a being removed as part of the A12 DCO scheme, the original reason for the reduced speed limit will no longer be applicable, although drivers will be used to it.

[1] DfT, AADF Data – major and minor roads.

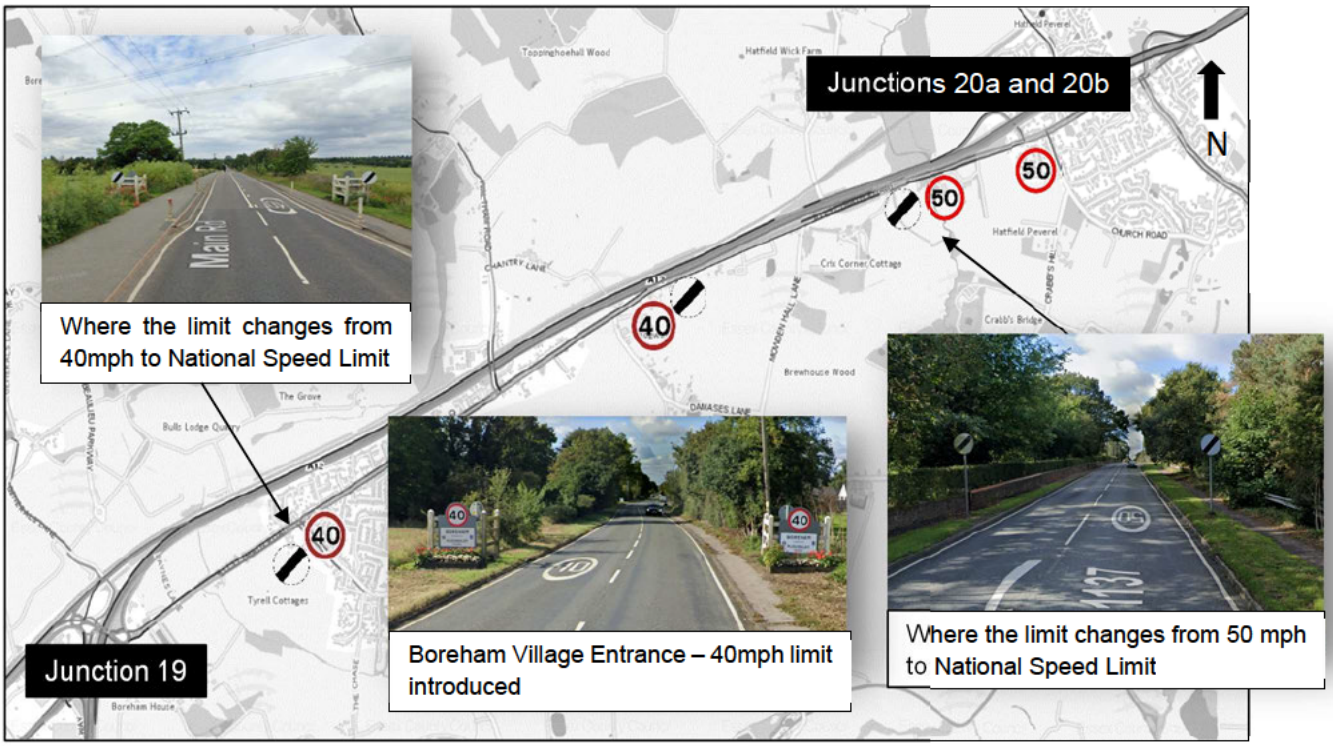

Figure 2: Existing speed limits on the B1137

Figure 3 and Figure 4 , below, show the average traffic speeds along Main Road for the morning and evening peak, respectively. Both figures also show the daily average speed and average 85th percentile speeds for both directions at two counter locations.

The colour coded AM and PM peak speeds are based on GPS data from commercial vehicles provided by Traffic Master for the whole of 2019. It provides a robust representation of typical speeds for the corridor. The daily average and 85th percentile speeds were obtained from ECC automatic traffic counters installed on the B1137 for 7 days in 2019.

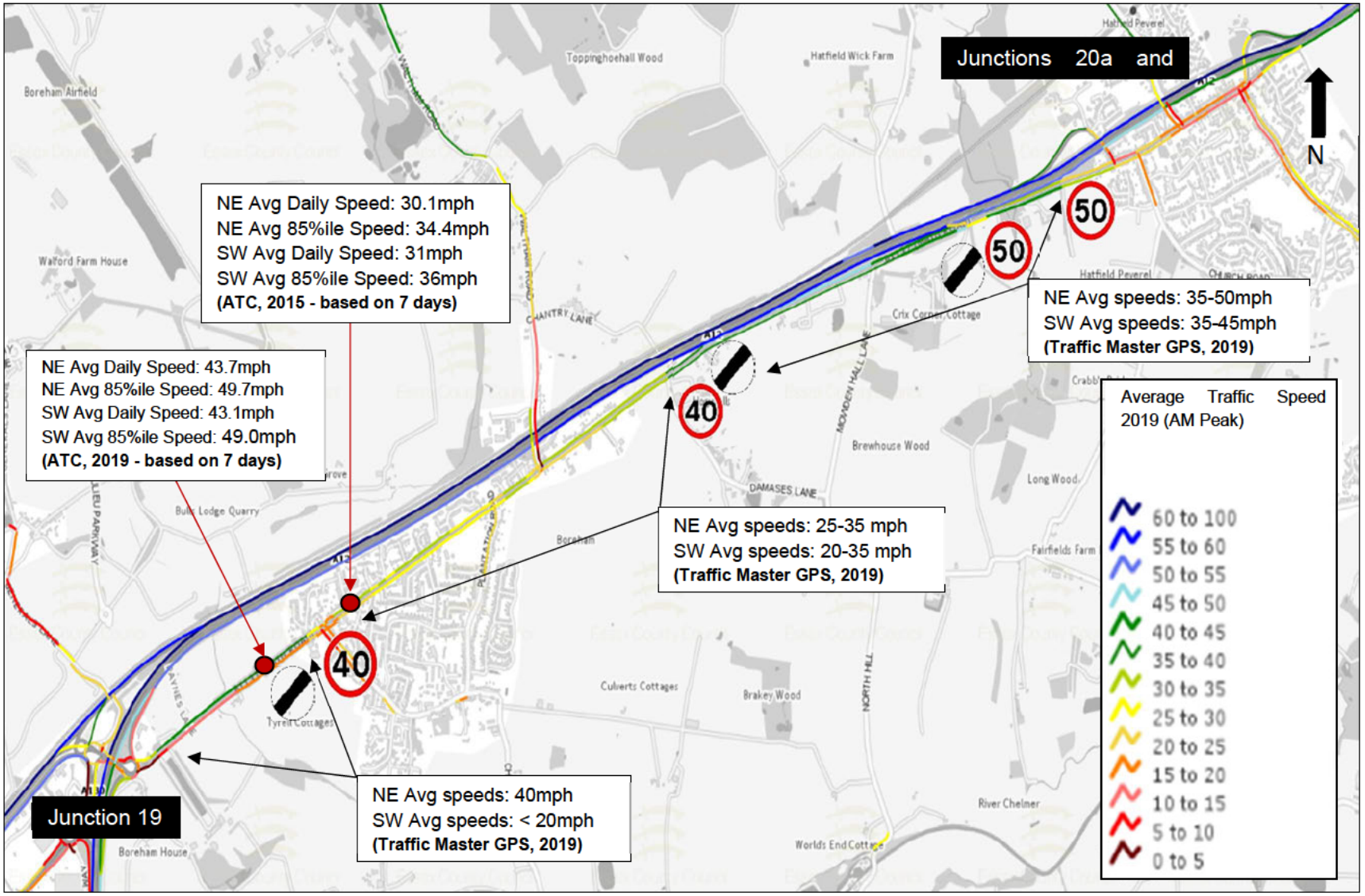

Figure 3: Average and 85th percentile speeds along the B1137 through Boreham for the AM peak

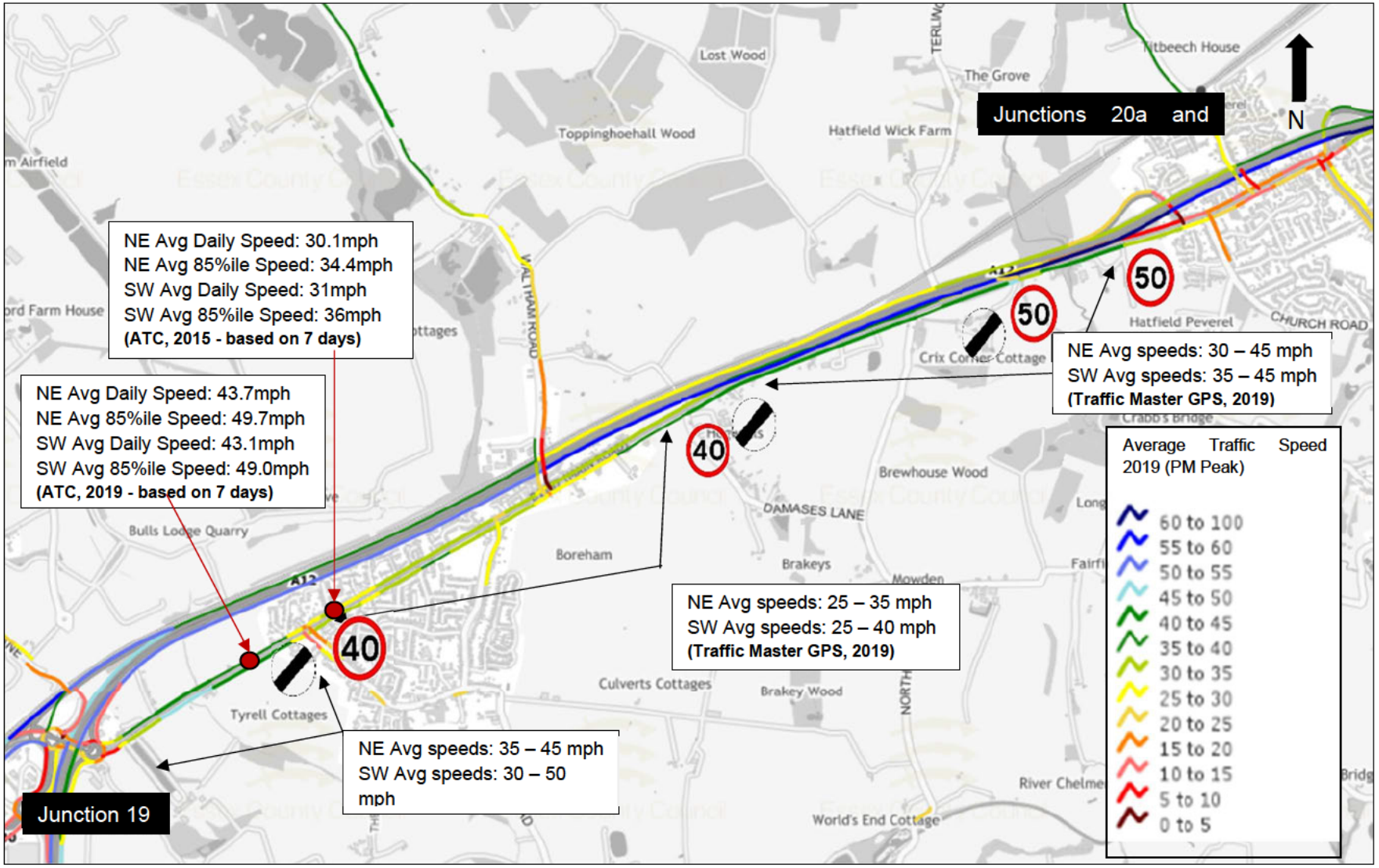

Figure 4: Average and 85th percentile speeds along the B1137 through Boreham for the PM peak

Observed speed data for the three main sections of the route is summarised below:

- **Section 1: B1137 south of Boreham (southwest of Church Road junction):**
  - *Existing speed limit* – Currently the speed limit along this stretch is the National Speed Limit (60mph for the B1137).
  - 2019 AM peak Average Speed (Traffic Master GPS data) – The AM average varies between 0-20mph in the southwest direction (due to queueing related to Junction 19) and ie around 40mph in the northeast direction. Traffic is therefore travelling faster towards Boreham village in the morning peak.
  - 2019 PM peak Average Speed (Traffic Master GPS data) – The PM average varies between 35-45mph in the northeast direction and 30–50mph in the southwest direction. Traffic is therefore travelling faster away from Boreham village in the evening peak
  - *2019 ATC recorded speeds* - The counter southwest of Boreham Village recorded a daily average speed of 43.7mph and an 85th percentile speed of 49.7mph in the northeast direction. In the southwest direction, it recorded a daily average speed of 43.1mph and an 85th percentile speed of 49mph. Across the day, therefore, the speeds are fairly similar in each direction.
- **Section 2: B1137 through Boreham village**
  - *Existing speed limit* – Currently the speed limit through the village is 40mph.
  - *2019 AM peak Average Speed (Traffic Master GPS data)* – The AM average varies between 25-35mph in the northeast direction and varies between 20-35mph in the southwest direction.
  - *2019 PM peak Average Speed (Traffic Master GPS data)* – The PM average varies between 25-35mph in the northeast direction and 25-40mph in the southwest direction. Traffic is therefore travelling slightly faster in the southwest direction in the evening.
  - *2015 ATC recorded speeds* - The counter in Boreham village, located northeast of Church Road junction recorded a daily average speed of 30.1mph and an 85th percentile speed of 34.4mph in the northeast direction. In the southwest direction it recorded a daily average speed of 31mph and an 85th percentile speed of 36mph. Across the day, traffic appears to travel slightly faster in the southwest direction.
- **Section 3: B1137 between Boreham and Hatfield Peverel**
  - *Existing speed limit* – Currently the speed limit along this section is a combination of the National Speed Limit (60mph) and 50mph.
  - *2019 AM peak Average Speed (Traffic Master GPS data)* – The AM average varies between 35-50mph in the northeast direction and between 35-45mph in the southwest direction. Traffic is therefore travelling slightly faster as it moves away from Boreham village in the morning.
  - *2019 PM peak Average Speed (Traffic Master GPS data)* – The PM average varies between 30-45mph in the northeast direction and between 35-45mph

in the southwest direction.

- *ATC speeds* – There is no ATC data for this section of the route.

Of particular note, when considering the speed limit changes proposed as part of the A12 scheme are the following points:

1. The daily average speeds recorded by the ATC counter south of Boreham village lie between 43-44mph in both directions, with 85th percentile speeds of 49-50mph. These are lower than the designated speed limit of 60mph, but the counter is close to the point at which the speed limit changes from 60mph to 40mph.
2. The daily average speeds recorded by the ATC counter in Boreham village lie between 30-31mph in both directions, with 85th percentile speeds of 34-36mph. The counter was located near to the Church Road junction, however, and it can be seen from ECC's Traffic Master GPS data that speeds can be higher away from the key junctions of Church Road/Main Road and Plantation Road/Main Road. It is by no means certain that a reduction in the speed limit will ensure that average speeds are reduced to 30mph along the whole length of Main Road in Boreham.
3. Peak period average speeds on the B1137 between Boreham and Hatfield Peverel range between 30-50mph, with the majority of the section experiencing average speeds of around 35-45mph. It is likely that average speeds are higher outside of peak times and, based on the two ATC surveys further south, 85th percentile speeds are likely to be around 5mph higher still. In order to ensure an average of 40mph for the whole length of this section of road, vehicle speeds will have to be brought down in those areas where the average speed is currently closer to 50mph.

2.3 Collision Data

Collision data from the Essex Highways road safety team shows that between 2017 and 2022 there were 14 collisions along the B1137 from Junction 19 to where Main Road transitions into The Street (Hatfield Peverel). There were 5 severe collisions and 9 slight collisions with no fatal collisions recorded in this time period.

Figure 5 shows the locations of the collisions recorded along Main Road in the past five years.

Three of the collisions involved a cyclist, all in daylight. Two of the collisions occurred in the vicinity of the southbound A12 on-slip, with right-turning cars colliding with cyclists travelling in the northbound direction. The other collision occurred in the vicinity of the Church Road junction in Boreham, when a cyclist and a van approached a section of the road with a central island and the van collided with the rear of the cyclist.

Whilst the majority of accidents occurred where the speed limit is 50-60mph, five slight collisions were recorded where the speed limit is 40mph. Two of these collisions involved a central traffic island and most occurred at or near a junction with Main Road. Only one collision in this area was due to a vehicle speeding into a junction.

The number of vehicles using the B1137 is predicted to increase with the A12 scheme in place. There is, therefore, a risk that the number of collisions could increase in Boreham village, even though collisions in the vicinity of the existing southbound A12 on-slip are likely to reduce.

Figure 5: Collisions recorded on the B1137 (2017 to 2022)

3 Potential Traffic Calming Measures

This section explores potential traffic calming measures that could help to reduce traffic speeds and flows along Main Road. For some of the measures, a 'traffic-light' colour coding has been provided to indicate its likely impact on speed and flows. This indication of performance is informed by Table 1.1 in DfT's 2007 Local Technical Note on Traffic Calming[2] LTN 1/07 (see Appendix 1). Some measures are not given a colour coding, as they do not appear in LTN 1/17.

3.1 Average speed cameras

Essex Police has expressed support for the installation of average speed cameras on the B1137, in order to help ensure that drivers comply with the lower speed limits. It is likely that one bi-directional camera would be required at either end of the section stretching from The Lion Inn pub to at least Damases Lane (Figure 6). Further investigation would be required to establish the exact details of any provision.

[2] DfT, 2007. LTN 01/07 Local Transport Note on Traffic Calming

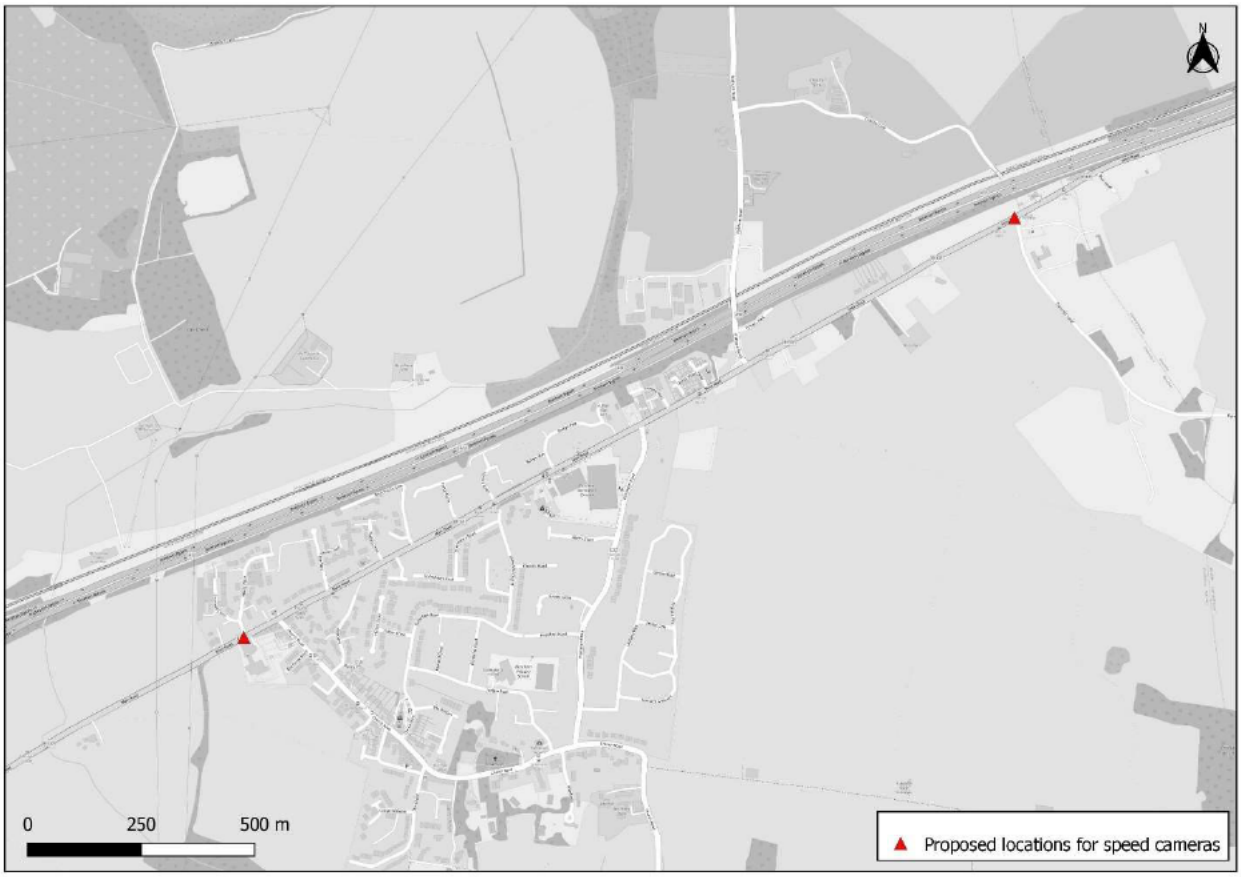

Figure 6: Proposed speed camera locations on the B1137

Average speed camera systems cannot be installed on the side roads branching off Main Road, due to the too short distance between the minor roads, so there will not be enforcement for drivers who turn off Main Road between the two camera locations. This provides further justification for additional measures that can help to slow drivers irrespective of where they join the road.

3.2 Vehicle Activated Speed Signs (VAS)

Medium Impact on Speeds	Low Impact on Flows

Vehicle activated signs (VAS) are another measure that could be considered for the B1137. VAS are electric traffic signs which display a message triggered by the speed at which a vehicle is going. The signs may display the vehicle's speed and an associated message such as 'Thank you' if they are driving within the limit and 'Slow down' if the vehicle is travelling too fast. They are used to increase a driver's awareness of their speed and the speed limits in place within an area.

They have been effective at the entry to 30mph limit areas and at village gateways in Essex. In some locations VAS have also been used in the run-up to a speed camera location as a

warning to drivers to slow down. Speed reductions of about 2 to 6mph have been obtained in the 85th percentile speeds at VAS locations (DfT, 2007)[3].

A more recent study in Scotland verifies these findings. VAS, including LED signs were reported to be very effective at reducing speeds at the community entrance to Eddleston village, located on the A703 in Scotland (Figure 7). A decrease of 6mph resulted for mean and 85th percentile speeds at this location, at a 12 month review[4]. Whilst effective, the use of VAS in one area should be limited as too many signs on one route can dilute their impact.

Figure 7: Example VAS location - Entrance to Eddleston village on the A703, Scotland

Potential locations on the B1137 where VAS could be used include:

- **Potential VAS location 1 (Figure 8)-** The entrance to Boreham village for traffic moving in a southwest direction, located between Damases lane and Waltham Road. This site marks a change in the speed limit and would be where the 30mph limit is first introduced.
- **Potential VAS location 2 (Figure 9)** - Outside of Orchard Cottages for traffic moving in a southwest direction, located between Damases Lane and Waltham Road. This marks the point where the road naturally narrows and the sense of place increases.
- **Potential VAS location 3 (Figure 10)** – This site is the entrance to Boreham village for traffic moving in a northeast direction and marks where the speed limit changes. A VAS in this location would also supplement the existing kerb-build outs which narrow the road slightly to help reduce speeds.

[3] DfT, 2007. Local Transport Note on Traffic Calming.
[4] Scottish Borders Council, 2020. Balance between 20mph speed limits and Street Architecture

Figure 8: Potential VAS Location 1 - Entrance to Boreham Village for traffic moving southwest.

Figure 9: Potential VAS Location 2 - Outside of Orchard Cottages for traffic moving in a southwest direction, where on-street parking ends.

Figure 10: Potential VAS Location 2 - Entrance to Boreham Village for traffic moving northeast.

It would probably not be appropriate to use VAS in association with average speed cameras. The combination of the two would create a feeling of being over-policed and drivers could react in a negative way to their presence.

3.3 Signalised pedestrian crossings (with minor road narrowing)

Signalised pedestrian crossings in areas of relatively low usage are unlikely to reduce average car speeds significantly. When presented with a green light, drivers might actually travel faster than they would without the signals in place and, if the signals are only called occasionally, they will not reduce the speed of a sufficient number of vehicles to reduce the average speed. Figures 3 and 4 of this report would appear to bear this out, as average peak hour traffic speeds are actually higher in the vicinity of the existing signalised crossing than elsewhere in Boreham.

When combined with a road narrowing of some form, signalised crossings are much more likely to reduce average speeds.

According to LTN 1/20 guidance, signal crossings provide suitable provision for most people on both 30 and 40mph routes. Potential locations on the B1137 for signalised crossings include:

- **Potential Crossing Location 1 (Figure 11) –** Outside of the co-operative food store. A crossing at this location would help pedestrians safely access the food store. The crossing could also connect to the footpath which leads to Boons Close and Church Road.
- **Potential Crossing Location 2 (Figure 12) –** Outside of The Lion Inn Pub. A crossing could be installed where there are currently pedestrian islands. However, collision data doesn't suggest a safety need for a crossing in this location and other than the pub, there would probably not be much demand for a crossing at this location.
- **Potential Crossing Location 3 (Figure 13) -** Located next to Elm Way bus stop and just before Main Road's junction with Church Road. There is an existing zebra crossing in place at this location and an upgrade to a signalised crossing may improve safety further.

All three of the locations listed above are located in the southwest portion of the village. This is because a signalised crossing already exists in the northeast part of the village, at the junction between Main Road and Boleyn way.

Figure 11: Potential Signalised Crossing Location 1 - Outside of the co-operative food store

Figure 11: Potential Signalised Crossing Location 2 - Outside of the Lions Inn Pub.

Figure 12: Potential Signalised Crossing Location 3 - Main Rd junction with Church Road, outside of Elm Way bus stop.

It should be noted that, when combined with road narrowing, both signalised crossings and zebra crossings are likely to result in reduced traffic speeds. As such, the decision as to which form of crossing should be installed should take into account local factors at each location.

3.4 Signalised crossings within raised junctions

High Impact on Speeds	High Impact on Flows

Signalised crossings within raised junctions have been known to reduce speeds by up to 17-18% (TfL, 2019)[5]. However, they are not considered appropriate for Boreham, due to their likely impact on large vehicles such as buses and emergency vehicles and the complications they can cause for some vulnerable users, particularly those with a visual impairment.

3.5 Mini-roundabouts

Medium Impact on Speeds	Low Impact on Flows

Mini-roundabouts could potentially be used as traffic calming measures at key side road junctions with Main Road. The most likely locations would be:

- Main Road / Church Road
- Main Road / Plantation Road
- Main Road / Waltham Road

Whilst there would probably be space to create mini roundabouts within the highway boundary and they are likely to lead to a reduction in average speeds on Main Road, there would be a significant downside to their implementation – this being a potential increase in traffic on the B1137 itself.

The A12 scheme is already predicted to lead to an increase in traffic on Main Road in the AM peak period. It would not, therefore, be appropriate to encourage even more traffic on Main Road by making it easier to join it from the side roads.

Waltham Road, Church Road, and to a lesser extent Plantation Road, all have the potential to be used as 'rat-run' routes for traffic trying to avoid delays in other locations. Making it easier to join Main Road from these roads would, in all likelihood, result in increased traffic on the side roads themselves and also on Main Road, which would be counter-productive.

In addition, the businesses accesses on the northern side of the Church Road and Plantation Road junctions would result in them effectively becoming fourth arms, without the status of actually being arms of the junction. This is likely to result in uncertainty regarding right of way and could lead to more collisions.

[5] TfL, 2019. Achieving Lower Speeds: The Too kit

3.6 Road and priority narrowing

Roads can be narrowed with the use of kerb build-outs, chicanes, traffic islands, pinch points, vertical structures, sheltered parking and priority narrowing. Using vertical structures such as trees to reduce the carriageway and psychologically narrow the route has been discounted as an option for the B1137 as they pose as hazards to the road users in the event of collisions.

Traffic islands and pedestrian refuges have been found to reduce speeds by 1-3mph, in general (TfL, 2019)[6]. However, accident data has shown that a few collisions have occurred where traffic islands are currently installed on the B1137 so this may not be the most appropriate solution.

Sheltered parking has also been found to reduce speeds on links and junctions by 2-5mph (TRL, 2007)[7]. However, on-street parking may be a less desirable option as it may encourage people in the village to use their car more to make shorter trips.

Other road narrowing measures such as kerb-build outs and chicanes have been successful in calming traffic in other locations, particularly at village gateways (see examples below) and could be considered for use on the B1137.

Slight Narrowing of road

Medium Impact on Speeds	Low Impact on Flows

Figure 13: An example where a kerb build out has been used to cause a slight reduction in carriageway width

[6] ibid.
[7] TRL, 2007. The Manual for Streets: Evidence and Research

Significant narrowing of road

High Impact on Speeds	Medium Impact on Flows

Figure 14: An example of where a kerb build out has been used to cause a significant reduction in carriageway width - On the A20 in Rayne, Essex

The greater the reduction in carriageway width, the greater the impact on traffic speeds and flows. A significant reduction in carriageway width may not be feasible along the B1137 due to the route being used by large and wide vehicles including HGVs, buses, emergency vehicles and farm traffic. However, a slight narrowing as shown in Figure 14 could be considered. Emergency vehicles should still be able to pass through without the need to slow down.

Potential locations where similar measures, such as a small kerb build-out, could be implemented on the B1137 include:

- **Potential road narrowing location 1 (Figure 16)** – Entrance to Boreham village for traffic moving southwest. This location, also noted as a potential VAS site could be reduced in width to help reduce speeds further. Kerb build outs have already been used at the other village entrance lower down on the B1137 to help slow traffic approaching the village from junction 19.
- **Potential road narrowing location 2 (Figure 17)** – In the vicinity of Orchard Cottages for traffic moving southwest. Another location that has also been noted as a potential VAS site. The road naturally narrows at this location as drivers enter the urban area. However, a more noticeable deflection in the road would help to reinforce slower speeds. This point on the route also marks the end of the on-street parking. Sheltered parking can help to reduce speeds. Therefore, as the parking ends a kerb-build out could help to remind drivers to remain slow and cautious.

- **Potential road narrowing location 3 (Figure 18)** – Located near the pedestrian entrance to the recreation ground for traffic moving southwest. The road is currently quite wide at this point where there is a need for drivers to be more cautious of pedestrians using the path and accessing nearby facilities such as the recreation ground, the bus stops, and the village hall. A reduced width at this location may help to protect pedestrians and slow vehicles before they reach the signalised crossing which lies 100m ahead at the junction with Boleyn Way.

Figure 15: Potential Road narrowing location 1 - Entrance to Boreham Village for traffic moving southwest

Figure 16: Potential Road narrowing location 2 - Vicinity of Orchard Cottages for traffic moving southwest.

Figure 17: Potential Road narrowing location 3 - Pedestrian entrance to the recreation ground, for traffic moving southwest.

Additional Locations

Average speeds on the section of the B1137 between Boreham and Hatfield Peverel generally sit between 35 to 50mph, suggesting that, on average, vehicles are already travelling under the current 60mph speed limit. The A12 scheme is proposing to reduce the speed limit to 40mph, however, and additional measures to encourage drivers to stick to a lower speed limit may be required. Road narrowing could be considered in appropriate locations, for example, in the vicinity of the Plantation Road / Waltham Road and Mowden Hall Lane / Terling Hall Road junctions, which are key routes for cyclists making north-south journeys across the A12.

3.7 Softer measures

Low Impact on Speeds	Low Impact on Flows

Softer measures such as place-making signs and safety signs could also help to reduce speeds and increase awareness of the speed limit changes on the B1137. They are typically used in conjunction with other measures. An example of where softer measures have previously been successful is in Selby in North Yorkshire. The district council worked with the local tenants and residents' association and Selby's Community Primary School to create a competition for school children to design a road safety poster for their local area as part of an effort to reduce local speeds. The winning designs were approved by North Yorkshire County Council highways team and installed in the local area (Figure 19).

Other areas have used similar initiatives. A 'drive safely' sign on Valley Drive in Gravesend, Kent uses a child's handwriting to remind drivers entering the town from the A2 to watch their speed.

Figure 18: Examples of road safety posters. One of the winning designs from Selby in North Yorkshire (left) and a road safety sign at the entrance to Gravesend, Kent (right)

Other areas have used place-making signs to alert drivers that they are driving through a village/community area and remind them to slow down and be cautious of other users such as pedestrians. In Clifton village in Penrith planters with specially designed plaques were installed on build-outs outside key community sites within the village such as the church.

Name signs may also be used to reinforce a sense of place and are typically used at a village gateways alongside other measures such as road narrowing.

Figure 19: Examples of place-making interventions. Planters with a specially designed plaque used on build-outs in Clifton (left). Name sign at entrance of village in Startston, Norfolk (right)

Potential locations for softer measures on the B1137 include:

- **Potential Softer Measures Location 1 (Figure 21)** – Vicinity of Orchard Cottages. This location has been noted as a potential location for road narrowing and a VAS. In addition, or as an alternative to a VAS, a road safety sign could help highlight the shift in the road's width, function and users as drivers enter the urban area. It could also help to reinforce any measures used at the entrance to Boreham village.
- **Potential Softer Measures Location 2 (Figure 22)** – Just before the recreation ground for traffic travelling southwest. This location has also been noted as a potential location for road narrowing. A road safety poster could alert drivers to be cautious of pedestrians who are likely to use this section of the route to access nearby facilities.
- **Potential Softer Measures Location 3 (Figure 23)** - Vicinity of Little Hedgehogs Day Nursery. A road safety poster in this location could help to reduce speeds and improve road safety around the nursery where there may be more vulnerable road users such as parents with their young children.

Figure 21: Potential Softer Measures Location 1 - Vicinity of Orchard Cottages

Figure 22: Potential Softer Measures Location 2 - Just before the recreation ground for traffic travelling SW

Figure 20: Potential Softer Measures Location 3 - Vicinity of Little Hedgehogs Day Nursery

4 Summary and Conclusions

Within the Development Consent Order (DCO) proposals for the A12 Chelmsford to A120 widening scheme, National Highways is proposing to reduce the speed limit on the B1137 from 40mph to 30mph through Boreham village and from 60mph to 40mph between Boreham and Hatfield Peverel. This technical note has reviewed the existing conditions on the B1137 and assessed a number of measures that could help to ensure that National Highways' proposed speed limit reductions are adhered to, once the A12 DCO scheme in place.

Having reviewed a variety of potential traffic calming measures for the B1137 (Main Road), Essex Highways considers the following options to be the most appropriate for implementation as part of the A12 DCO Scheme:

- Average speed cameras covering the section of Main Road from the southern end of Boreham village to the existing A12 J20a on-slip
- A new signalised pedestrian crossing with road narrowing in the vicinity of Boreham Co-op
- Road narrowing at:
    - Location 1 (Boreham village entrance for SW traffic)
    - Location 2 (outside Orchard cottages) and
    - Location 3 (pedestrian entrance to recreation ground)
- Softer measures at:
    - Location 1 (outside of Orchard Cottages),
    - location 2 (just before the recreation ground) and
    - location 3 (outside of the Little Hedgehogs Day nursery)

Further feasibility work and engagement should be undertaken including with local stakeholders to consider these measures in more detail and confirm the package of measures to be taken forward. These measures should then be included within the A120 DCO scheme proposals; firstly, as mitigation for the predicted increases in traffic in Boreham and, secondly, to help ensure that the reduced speed limits proposed by National Highways are adhered to - thus preventing even greater traffic increases from occurring.

Appendices

Appendix 1: Table 1.1 from DfT, 2007. LTN 1/07 on Traffic Calming

Table 1.1 Summary of measures and their relative performance

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