TRAFFIC + TRANSPORTATION

THE DATA COLLECTION SPECIALISTS

52690 – Ellerbeck Manor

Traffic and Speed Survey Analysis

January 2023

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Contents

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2. Introduction

Ellerbeck Manor appointed CTS Traffic and Transportation Ltd to undertake a speed survey and calculation of survey-based visibility splays for their proposed development of glamping pods using a current field access (improved) to the west of the main site on the B5345.

When either a new access is to be provided onto an established road, or if a new usage or revised usage of the land on an existing access implies increased traffic levels, planning and in particular highway authorities usually require a review of the safety aspects of the access point with regards to its use.

The industry standard method to identify and provide information regarding potential safety and operational issues for such development is to undertake a speed survey to identify the 85th percentile average traffic speed in each direction on the established road, and then to calculate the required safe stopping distances and hence distances drivers from the access need to be able to see approaching traffic from both directions.

This Report provides an outline of national and local guidance and methodology and reviews the required and available visibility splays for the proposed development.

In some cases, the results need to be seen in a wider context and this report may be one of several aspects reviewed which may then be drawn together into a comprehensive Transport Statement for a proposed development.

The proposal seeks to provide glamping pods using what is currently a field access improved for public usage.

In a letter, the local highway authority (LHA), Cumbria County Council confirmed that they "Your client either needs to be able to provide the required visibility splays (which I don't think they can) or justify the reduced splays via a speed survey as requested by Cumbria Highways".

3. Methodology Background:

The formal Department for Transport overarching advice on collection and understanding of speed information was formerly based on the Design Manual for Roads and Bridges, Volume 5, Section 1, TA 22/81. This covered measures of instantaneous speed either collected by inductive loops or radar speed meters.

This was superceded in November 2019 by CA 185 Revision 0 – Vehicle Speed Measurement. This is confirmed in the Highways England DMRB Briefing Note dated 29th July 2020. The principal change was removal of the concept of wet weather journey speeds mainly as that concept was not included in any other DMRB document.

When design parameters for anything other than speed limits and traffic signal installations are to be determined based on speed measurement, journey speeds of all motor vehicle types shall be used. Speed measurements shall be taken on the approaches to the scheme extents. They shall also be in free flow conditions unless they are taken in connection with changes to an existing feature that naturally impacts the free flow of traffic. They should not be used for alignment revisions. Where there is persistent parking this can be taken as a feature that naturally impacts the free flow of traffic. Measurements should be taken in dry weather conditions.

The 85th percentile dry weather spot speed value is the speed only exceeded by 15% of the vehicles within the sample. If the sample is partially or entirely in wet weather conditions, 8kph should be added for dual carriageways and 4kph for single carriageways. (CA 185 para 3.1.1). This is because people tend to drive more slowly to account for reduced adhesion in wet weather, a fact confirmed by research.

Manual for Streets was published in 2007. It applies formally in England and Wales and superceded Design Bulletin 32 and its companion guide Places, Streets and Movement. It does not apply to the Trunk Road Network whose guidance remains in DMRB and focusses on lightly-trafficked residential streets. Chapter 7 covers street geometry and sections 7.5 to 7.7 stopping sight distances (SSD) and visibility splays (VS).

Figure 7.18 provides the classic diagram defining visibility splay identification and marking. The point in the minor road from which both left and right splays begin is the centre-line of the minor approach. The point of start for visibility is 2.4m back from the edge of main carriageway, or formally the 'give-way' line (or an imaginary one if there are no road markings, or the main road channel line (MFS2 10.5.1)). Where there is a splitter island, the start position might better be the actual spot at which the drivers' eye would be. In some cases 2m can be considered but only if the resulting protrusion of some vehicles into the running carriageway is not a problem to drivers and cyclists on that main carriageway having to manouvre around this.

Both left and right visibility is normally measured along the nearside kerb in both directions. However, if there is a feature that prevents any traffic from the left crossing the centre-line, the left splay can be taken to the centre-line of the main carriageway. If the minor arm joins on the outside of a bend it is necessary to check an approaching vehicle is visible over the whole of the y distance, done by an additional sight line meeting the kerb line at a tangent.

The 'y' distance is measured along the kerb and based on SSD. Table 7.1 of MfS provides calculated SSD in metres for speeds up to and including 60kph (37mph). The suggestion is made that 2.4m be added to SSD to allow for bonnet length.

Manual for Streets 2 (published in 2010) takes the principles of MFS and applies them more widely. Its Chapter 10 discusses calculation of stopping sight distances (SSD's) based on MFS 7.5. The formula to calculate SSD is:

$Vt + v^2/2\ (d+0.1a)$

Where
V= speed m/s
t= driver perception reaction time (seconds)
d=deceleration m/s^2
a=longitudinal gradient (+ for upgrades and – for downgrades)

MFS values are t=1.5 and d=0.45g (4.41 m/s^2) (0.375g for hgv and bus)

Prior to MFS, t was 2.0 and d 0.25g (2.45 m/s^2), with a further value representing absolute minimum distances using d of 0.375g (3.68 m/s^2)

Para 10.1.8 guides that bus/hgv SSD should not need to be assessed when the combined proportion of bus and hgv is less than 5% of traffic flow but subject to consideration of local circumstances.

MFS2 suggests that for design speeds 60kph and below t should be 1.5s but above it should be 2s; with absolute minimum SSD using d=0.375g and desirable minimums using d=0.25g.

MFS2 para 10.5.9 states that 'based on the research above (High risk collision site and y distance visibility), unless there is local evidence to the contrary, a reduction in visibility below recommended levels will not necessarily lead to a significant problem.

This provides two key questions to be answered to define the parameters used in estimating 'y' values. Firstly, is the 85^{th} percentile speed for either direction greater than 37mph. If so, t must be 2 and d 0.25 or 0.375. For locations with 85^{th} percentile speeds less than 37mph ogv parameters should be used if the bus/ogv proportion is 5% or more of the traffic flow.

There are some cases we are aware of where without a footway, the splay can be measured to a point 0.5m in from the carriageway edge. Others allow 2m x distances for where vehicles leave in forward gear at all times.

Further, some authorities have produced their own guides to visibility splays which may need to be considered if in place. For Cumbria the "Cumbria Development Design Guide" is available although no date is provided for its adoption or currency. Chapter B gives an extensive discussion regarding visibility. It confirms that, for Cumbria, the preference is for use of the actual 85^{th} percentile recorded traffic speeds, given that data will best generate an accurate design. A table is provided which adds 2.4m to the visibility distance to allow for average vehicle bonnet lengths. There does not appear to be any guidance given in this document with reference to the x distantances.

4. Survey Details:

Classified volume and speed data was collected via an ATC unit positioned on the B5345, adjacent to the proposed access point for the development. The practical location identified for the counter was about at the site of the proposed access but slightly to the east of the current gate.

This location was considered to be the most appropriate and secure place for undertaking the speed survey. Data was collected from Friday 9th December 2022 to the end of Thursday 15th December 2022. Data is shown in hourly intervals and by direction.

The Vehicle Classifications used in this survey numbered in the data are as follows:

1. Pedal Cycles
2. Motorcycles
3. Passenger cars with or without trailers
4. LGVs with or without trailers
5. 2 axles rigid HGV
6. 3 axles rigid HGV
7. 4 axles rigid HGV
8. 3 axles articulated HGV
9. 4 axles articulated HGV
10. 5 or more axles articulated HGV
11. Buses and coaches

Vehicle speeds were gathered in 5mph bins for each hour, with a mean average, a standard deviation and the 85th percentile speeds calculated for each hour and for various agglomerations of hours.

5. Incidents Encountered During Surveys:
There were no out of course traffic or other incidents that were not weather related.

6. Weather Conditions:

There were no weather conditions affecting the survey that we were aware of.

7. Map of Survey Location:

Appendix 1 provides a record of the location of the ATC tube.

Appendix 2 provides a record of the vehicle types counted in pictogram format.

Appendix 3 provides the detailed traffic and speed results by day and hour.

The road is a 60mph limited road. At the access point it has wide grass verges either side of the road, but no kerb or formal pavement provision. The road has a marked centre line and low hedges at the rear of the verges. The verge on the side of the proposed access falls slightly away from the road although the current gated farm access is tarmacked and rises slightly away from the road into the field. The road rises slightly from east to west.

8. ATC Speed Survey Results:

The table below provides a summary of the observed and estimated 85th percentile speed survey results providing the range of speeds identified through each day, the all-day average and an average for the full week.

Following standard advice (CA 185 para 3.1.1) the dry 85th percentile speeds have been used – there was no evidence that the surveys had been affected by wet weather apart from the snow impacted days which have been removed.

The table below presents a summary of the data received and the results of the analysis undertaken using the industry standard software evaluation package provided with the equipment. The count quotes 85th percentile values given that most hours have sufficient levels of traffic to enable this value to be calculated by hour.

Access Point Survey	Northwest bound			Southeast bound		
Day	**Min**	**Max**	**24 hr av 85th %ile**	**Min**	**Max**	**24 hr av 85th %ile**
Monday	38.3	45	40.9	35.8	44.5	39.1
Tuesday	38	45.4	42.5	36.2	42.3	40.3
Wednesday	37.4	44.5	43.4	35.3	41.6	40
Thursday	38	46.8	44.1	34.9	44.3	42.1
Friday	39.8	48.1	44.7	38	46.8	41.6
Saturday	33.8	42.5	39.1	28.4	38.3	37.1
Sunday	35.3	42.3	38.3	34	39.6	36.9
Average, 5-day	38.3	46.0	43.1	36.0	43.9	40.6
Average, 7-day	37.2	44.9	41.9	34.7	42.5	39.6
Average, two-way, 85th percentile	**40.7**					

The resulting two-way 85th percentile average speed at the point of access is 40.7 mph. This is around what might be expected given the nature of the road. The variation between directions is 2.3 to 2.5 mph, with northwest bound slightly faster at 41.9 mph and southeast bound lower at 39.6 mph (for the 7-day average). This appears to be traffic slowing as it heads towards the bend to the south east.

The five-day average speeds are very marginally faster in both cases, by 1.2 and 1.0 mph respectively, not significantly different.

Manual for Streets 2 para 10.1.18 says "as a guide, it is suggested that bus/HGV SSD should not need to be assessed when the combined proportion of HGV and bus traffic is less than 5% of traffic flow, subject to consideration of local circumstances". The local bus and hgv proportion in the traffic count related to the speed data was 4%, below the 5% requirement. The Sunday hgv / bus proportion is just 2% and Monday to Friday ranges from 3-6%. Saturday was 2-3%.

Hgv proportions do not therefore need to be taken into account in the sight stopping distance (SSD) estimates.

However, the observed 85th percentile speeds are mainly beyond 37mph, which requires use of DMRB values for deceleration and reaction times, which are more severe allowing for the higher speeds involved.

9. Implications for Visibility Splay Requirements:

For this site, the observed average speeds in any hour are always above 37mph in both directions which following guidance suggests the standards in MfS are not directly applicable. National guidance would therefore suggest use of a reaction time of 2 seconds (not 1.5) and deceleration values of 3.68 for absolute minimum and 2.45 for preferred minimum visibility distances.

The guidance from Cumbria required 215m for a 60mph road without calculated speed evidence but guided that speed evidence should be obtained.

The road has a relatively gentle gradient east to west.

As already noted, the OGV-based deceleration values do not need to be used.

Northwest bound speeds feed the right visibility splay values whilst southeast bound feed the left visibility values (respective to direction of travel and view).

The required minimum SSD at the site access are therefore values of **57m to the right** (southeast) and **56m to the left** (northwest). These are significantly less than the 215m required were the speed limit to be taken as the basis. These are the minimum visibility distances, the preferred values would be 71m and 70m respectively.

It is normal to require that the full length of the visibility splay is within either highway land or that under the control (not necessarily direct ownership) of the developer / land owner. However, some councils are aware that implying planning blight by adhering strictly to visibility splay requirements can be hard for a council to defend at Appeal.

Given there is no footway, the x distance could be set to 0.5m in from the kerb.

There is a marked centre line and it has been assumed the left splay could be taken to the centre line as it is very unlikely that vehicles would be towards the wrong side of the road given the local geometry. However, for robustness a test to the kerb channel has been undertaken.

Further detail of the application of these splays will be provided on the developing access diagrams for the proposed development. The splay diagram was reviewed and found to correctly show the two splays.

Both the visibility splay diagram and the set of associated photographs demonstrate that there is sufficient uninterrupted visibility from the preferred calculated 71m and 70m visibility splays to and from the current and proposed access.