Maldon Local Development Plan

Technical Note – Impact of Proposed Development Sites in Heybridge and South Maldon at Eves Corner and Well Lane Junctions on A414, Danbury

November 2014

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1 Introduction

1.1 Background to Study

Essex County Council (ECC) and Maldon District Council (MDC) have been working together to progress MDC’s Local Development Plan (LDP). As part of this process, Essex Highways (EH) have provided a series of technical reports that assess the potential impact on the highway network of various development proposals both within and beyond the Maldon district area. The reports included a wider impacts document (issued in December 2013) which considered the potential effects on the Eves Corner double-mini roundabout arrangement in Danbury within Chelmsford City Council’s (CCC) administrative area. This study provides a further examination of the junction, as well as an analysis of the A414 / Well Lane junction at the western end of Danbury. The report follows concerns raised by CCC about the performance of the highway network in Danbury post-development in Maldon district in 2026. Figure 1-1 shows the study focus areas.

![Figure 1-1: Danbury Study Area](image)

1.2 Report Structure

Following this introductory section, Section 2 considers predicted traffic growth before Section 3 details EH’s approach to modelling the development impact. Section 4 continues with a more in-depth assessment of the Eves Corner junction in Danbury before Section 5 considers the A414 / Well Lane junction. Section 6 then summarises the findings of the study.
2 Traffic Flows used in Junction Assessments

2.1 Traffic Surveys

Traffic flows used in the junction assessments that appear in the following sections are based on manual classified turn counts by EH using video cameras as follows:

- Eves Corner – Wednesday 23rd October, 2013; and
- A414 / Well Lane – Wednesday 10th September, 2014.

The counts were supported by queue length surveys completed on the same days and these have contributed to the junctions’ model calibration for the base case scenario.

2.2 Future Year Traffic Flows used in Junction Assessments

In the interests of expediency, EH’s assessment of the Eves Corner junction in the December 2013 report adopted the same background traffic growth factor for the year 2026 as that used in the rest of the Maldon Local Plan modelling. This has been questioned by CCC’s consultants who suggest that a higher factor should have been used as per their referral to the Trip End Model Presentation Programme (TEMPro).

Notwithstanding CCC’s consultants do not appear to have considered the National Trip End Model (NTEM) in conjunction with TEMPro as the Department for Transport guidelines advise, EH’s view is that a higher factor would not be appropriate for a number of reasons. They can be summarised as follows:

- The use of the same background growth factor as the Maldon area provides a level of consistency throughout all the modelling of Maldon’s proposed developments;
- EH holds manually classified turn count data from November 2004 and, compared to the same data collected in October 2013, there has been no material increase in vehicles accessing the Eves Corner junction in peak hours. Furthermore, data from ECC’s Annual Average Daily Traffic (AADT) monitoring sites shows that there has been no growth on the A414 between Danbury and the Oak Corner roundabout between 2000 and 2013;
- The 2013 assessment of Eves Corner assumed that all Maldon development traffic that comes from Oak Corner would route through Eves Corner. In reality, a number of drivers are likely to be lost from the A414 in between the junctions;
- If demand increases at Eves Corner, recent trends show that network demand will change. This will entail re-routing and, as is increasingly common, drivers elect to travel at different times.

In light of the above, the traffic flows used in the 2013 Eves Corner junction assessments should be considered robust. In total, an increase of 28% in the AM peak and 29% and PM peak has been
added to existing traffic flows at the junction; adding further traffic to the assessments is regarded as unrealistic as there is only a finite capacity on the highway network.
3 Modelling Approach

3.1 Junction Modelling Software

As with EH’s previous Maldon LDP studies, Transport Research Laboratory’s (TRL) Junctions 8 software has been used in the assessment of existing junctions. This is the standard transport planning industry tool to assess both roundabouts and priority junctions. In this study, the proposed pre-signals layout for Eves Corner has been modelled using the established LinSig 3 software for traffic signals (developed by JCT Consultancy). It is important to recognise that, whilst both pieces of software are accepted industry modelling tools, they have differing mechanisms, which means direct comparison of results should be treated with a degree of caution.

As in previous studies, it should again be reiterated that both Junctions 8 and its predecessor Arcady 6 have a propensity to exaggerate the level of delay for mini-roundabouts. This is particularly the case where there is a straight-on movement (such as the A414 through movements considered in this study). In reality, there is often less delay on these approaches than calculated by Junctions 8 as drivers perceive that they are staying on the main route and therefore hesitate less. This should therefore be taken into account in viewing some of the results.

Using the same presentation format as earlier studies, the tabulated results are colour-coded so that, for Junctions 8, any junction arm with a ratio of flow to capacity (RFC) of more than 1.0 is shown in red (exceeds capacity), RFCs of 0.90 to 1.00 are shown in amber (approaching capacity), whilst green represents anything less than 0.90 (satisfactory performance). LinSig outputs are in the form of Degrees of Saturation and are in the form of percentages. 100% is considered to be at capacity and is the relative equivalent of an RFC of 1.0. N.B. It is important that any RFCs or Degrees of Saturation of more than 1.0 / 100% are viewed with caution in both Junctions 8 and LinSig as models become unstable once capacity is exceeded.

As well as RFCs and Degrees of Saturation, the tables also provide an indication of the level of queuing likely to take place on each arm. These are shown in passenger car units (PCUs).

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1 PCU is a general term used to quantify all vehicles on the road; a car or van = 1.0 PCUs, a medium goods vehicle = 1.5 PCUs and a heavy goods vehicle = 2.0 PCUs.
4 Eves Corner Junction Assessments

4.1 Existing Junction Performance

Table 4-1 assesses the current layout at Eves Corner. It includes the results from EH’s December 2013 study for Base 2013 and 2026 post Maldon development scenarios and, in addition for comparison purposes, the 2026 Background Traffic scenario, i.e. without development. This aspect of the modelling has been completed using the Junctions 8 software.

<table>
<thead>
<tr>
<th></th>
<th>Base 2013</th>
<th>2026 Background Traffic</th>
<th>2026 with Heybridge / Maldon Development</th>
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<tbody>
<tr>
<td></td>
<td>RFC</td>
<td>Queue Length</td>
<td>RFC</td>
</tr>
<tr>
<td>AM Peak</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Little Baddow Road</td>
<td>0.77</td>
<td>3.1</td>
<td>0.88</td>
</tr>
<tr>
<td>A414 East</td>
<td>1.47</td>
<td>150+</td>
<td>1.65</td>
</tr>
<tr>
<td>Mayes Lane</td>
<td>0.48</td>
<td>0.9</td>
<td>0.53</td>
</tr>
<tr>
<td>A414 West</td>
<td>0.91</td>
<td>7.8</td>
<td>1.01</td>
</tr>
<tr>
<td>PM Peak</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Little Baddow Road</td>
<td>0.73</td>
<td>2.5</td>
<td>0.81</td>
</tr>
<tr>
<td>A414 East</td>
<td>0.97</td>
<td>14.3</td>
<td>1.09</td>
</tr>
<tr>
<td>Mayes Lane</td>
<td>0.68</td>
<td>2.0</td>
<td>0.77</td>
</tr>
<tr>
<td>A414 West</td>
<td>1.38</td>
<td>150+</td>
<td>1.56</td>
</tr>
</tbody>
</table>

Table 4-1: A414 Eves Corner, Danbury Junction Performance

The findings confirm that, in the 2013 Base case, the A414 East arm operates over capacity in the AM peak and, similarly, the A414 West arm exceeds capacity in the PM peak. The addition of background traffic to 2026 leads to both A414 arms exceeding capacity in each peak hour. Lastly, the proposed development in 2026 leads to further deterioration in the performance of the A414 arms, but the minor arms of the junction continue to operate adequately. Therefore, if the current junction layout remains unchanged in 2026, it would be reasonable to conclude that rat-running on minor roads in Danbury is likely to increase significantly as drivers seek to avoid queues.

4.2 Proposed Pre-signals Layout Background

The December 2013 study considered both a priority junction and a signalised layout for Eves Corner. The former option was discarded as access would become almost impossible from the minor roads and therefore local residents would be adversely affected. The latter was a better option, but raised engineering issues such as below-standard right turn lanes, the necessity to move bus stops and the repositioning of stop lines further back from existing points in order to
accommodate HGV movements. The head of Essex ITS, who are responsible for the management of traffic signals in Essex, has also raised a series of technical concerns why full signalisation is unlikely to provide any improvement over the current layout. Furthermore, the proposals were previously not favoured by CCC as they would create an unnecessarily urban feel to what is a predominantly rural village. Consequently, a pre-signals option (see Appendix A for draft design drawing) was put forward as a potential alternative.

4.3 Pre-signals Junction Performance

Table 4-2 shows the results of the proposed pre-signals arrangement as an alternative to the existing double mini-roundabout arrangement. It is important to consider that this phase of the modelling has been completed using the LinSig software. Like Junctions 8, it has a tendency to exaggerate queue lengths when the Degree of Saturation exceeds 100%. For reference purposes though, the current layout has also been modelled with LinSig and is included in the left hand column. This provides a useful comparison with the Junctions 8 equivalent in Table 4-1 and indicates that the LinSig modelling shows reduced (and therefore slightly more realistic) queuing at the junction in the Base case. It should, however, be pointed out that LinSig is designed to assess signalised junctions and its effectiveness at modelling mini-roundabouts is not well established. It has, nevertheless, been used by CCC’s consultants and EH’s use of the software remains consistent with that approach.

<table>
<thead>
<tr>
<th></th>
<th>Base Layout 2013</th>
<th>Pre-signals Layout 2013</th>
<th>Pre-signals Layout – 2026 Background Traffic</th>
<th>Pre-signals Layout – 2026 with Heybridge / Maldon Development</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Deg of Sat %</td>
<td>Mean Max Queue</td>
<td>Deg of Sat %</td>
<td>Deg of Sat %</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Mean Max Queue</td>
<td>Mean Max Queue</td>
</tr>
<tr>
<td>AM Peak</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Little Baddow Road</td>
<td>60.6%</td>
<td>0.8</td>
<td>89.0%</td>
<td>8.6</td>
</tr>
<tr>
<td>A414 East</td>
<td>110.7%</td>
<td>126.4</td>
<td>110.7%</td>
<td>106.4</td>
</tr>
<tr>
<td>A414 West</td>
<td>46.6%</td>
<td>46.6%</td>
<td>2.8</td>
<td>57.3%</td>
</tr>
<tr>
<td>Mayes Lane</td>
<td>67.7%</td>
<td>67.7%</td>
<td>1.0</td>
<td>1.5</td>
</tr>
<tr>
<td>PM Peak</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Little Baddow Road</td>
<td>58.1%</td>
<td>0.7</td>
<td>71.0%</td>
<td>83.5%</td>
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<tr>
<td>A414 East</td>
<td>76.0%</td>
<td>1.6</td>
<td>76.0%</td>
<td>116.9</td>
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<tr>
<td>A414 West</td>
<td>63.9%</td>
<td>82.4%</td>
<td>84.7%</td>
<td>35.3</td>
</tr>
<tr>
<td>Mayes Lane</td>
<td>100.8%</td>
<td>25.7</td>
<td>100.8%</td>
<td>116.9</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
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</table>
| Table 4-2: Eves Corner Pre-signals Junction Performance

The LinSig results indicate that the pre-signals will not provide a major improvement on the A414 in the short term in terms of capacity. However, it should be stressed that the models have been
calibrated to existing conditions and the mechanism for achieving this within LinSig (amending the saturation flow) must also be applied to the proposed layout in the interests of a consistent approach. Whilst the Degrees of Saturation do not therefore indicate any benefit, the predicted queue lengths are marginally shorter than the current junction layout. Consequently, the pre-signals should provide a minor improvement to the operation of the junction in the short term.

However, given that pre-signals are a mechanism for delaying the minor roads in favour of the A414, EH has also considered a scenario where they are only operational on Little Baddow Road in the AM peak and Mayes Lane in the PM peak. Mayes Lane in the AM peak and Little Baddow Road in the PM peak have little effect on the tidal flow of the main road. In fact, right turners from Mayes Lane in the AM peak and Little Baddow Road in the PM peak, if left unimpeded, will marginally increase the delay of the opposite minor road which would be of benefit to the A414’s main flow.

The alternative has also been modelled, but given that there are not many of the aforementioned right turners (approximately one vehicle every minute in the AM peak and less than two every minute in the PM peak), the results of the additional test remain virtually unchanged from Table 4-2. However, from a capacity perspective, it may be worth considering this approach to the pre-signals being operational on both minor arms in both peak hours as it would maximise the improvement to A414 tidal flows.

EH have estimated that an indicative cost of installing pre-signals would be approximately £280,000 (August 2014).

4.4 Summary and Comment

A modelling exercise has been undertaken based on conceptual designs to determine whether, in capacity terms, a pre-signal arrangement could provide a benefit to the operation of the junction at Eves Corner. The conceptual proposals have not yet been reviewed in detail in terms of engineering feasibility and wider issues which may be picked up at a road safety audit (such as provision of suitable pedestrian crossing points on Little Baddow Road and Mayes Lane and access to the Heathcote and St John’s primary schools on Little Baddow Road). Only when the scheme has satisfied such an assessment and a full road safety audit could it be taken forward for possible implementation.

The modelling has indicated that a pre-signals arrangement may provide a minor improvement to the operation of the current double mini-roundabout layout in the short term. However, it will not completely solve the issues at Eves Corner. With the addition of Maldon Local Plan development traffic in 2026, the junction’s performance will deteriorate significantly if demand reaches the forecast levels in the peak hour and the current layout remains in place. Pre-signals could moderate the development’s impact, but queues will still be prevalent at the junction.
It is acknowledged that pre-signals are relatively unconventional as a method of traffic control. There are a few examples around Essex where they have been successfully implemented, but the Eves Corner road layout is different to these. Consequently, EH would recommend that, if the option is pursued, a pre-signals test is carried out ahead of any full implementation. This approach has been used by Essex ITS ahead of signal installation in the past and a temporary test over a few days would allow a greater confidence in their likely success.
5  A414 / Well Lane Junction

5.1  Introduction

This junction was not considered in previous EH studies linked to MDC’s emerging Local Plan as it was not considered to be as significant an issue as Eves Corner. It is, however, included in this study as CCC’s consultants have raised it as an area of concern. EH thus undertook the traffic count detailed in Section 2.1 so that it can be formally modelled.

5.2  Review of Traffic Behaviour on A414 around Well Lane

Principal traffic flows on the A414 in Danbury are westbound in the AM peak as drivers migrate towards the A12 and Chelmsford, and eastbound in the PM peak as they return home. However, there are number of minor roads both north and south of the A414 that can be seen as a viable alternative route if the main thoroughfare becomes congested. One of these options is Well Lane (which is subject to a 7.5 tonne vehicle weight limit). It links the A414 with Woodhall Road to the south and is an attractive route towards the village of Bicknacre (despite the signposted route being via Eves Corner) and beyond towards South Woodham Ferrers. It also offers an alternative route towards the Oak Corner junction east of Danbury via various back roads and lanes.

Observation of the videos which provided the traffic data has indicated that, whilst traffic flows are quite heavy on the A414, the Well Lane mini-roundabout junction seems to perform well in isolation. Traffic can, however, be quite slow-moving and any obstruction can lead to delays extending back some distance. For example, a bus waiting at the stop to the west of Well Lane, or vehicles stopped at the zebra crossing, can lead to westbound queues extending back and across Well Lane in the AM peak. This can give the impression that the junction is causing delays when not actually the case. In the PM peak, as has been indicated by CCC’s consultants, eastbound traffic can also be slow-moving, but the videos suggest that there is, in fact, little delay caused by the Well Lane mini-roundabout. Instead, delays can probably be attributable to a rippling effect back from Eves Corner, the sharp bends that precede it and the uphill section of road towards the Griffin pub.

Nevertheless, the Well Lane junction has been modelled and the results considered.

5.3  A414 / Well Lane Modelling Results

Table 5-1 contains the results of the modelling of the existing junction. As indicated in Section 2.1, these have been calibrated to observed conditions, but they should be considered in conjunction with the comments in the second paragraph of Section 3.1 regarding A414 through movements, i.e. arms where RFCs are 1.0 or above should be viewed with caution as the model becomes unstable at that point and tends to exaggerate queue lengths.
The Base 2014 results bear out what has been observed on site, namely the AM peak sees delays for westbound traffic and the PM peak experiences delay eastbound. However, the modelling does not accurately reflect the level of delay at the junction. As detailed above, in reality, A414 through movements tend to be slow but traffic rarely comes to a complete standstill. Consequently, it is EH’s view that the junction performance itself is not currently a major factor in delays in Danbury.

With the addition of the future year traffic flows, the junction will naturally come under greater pressure. However, the modelling indicates that this will remain tidal in 2026 post-development, i.e. westbound in the AM peak and eastbound in the PM peak, with the junction’s other arms continuing to perform satisfactorily.

### 5.4 Potential for A414 / Well Lane Junction

EH has, nevertheless, examined the possibility of improving the performance of the current mini-roundabout layout. As alluded to in Section 5.2, Well Lane can be an attractive alternative route to the A414 for drivers in the peak periods. Consequently, it makes sense to downgrade its attractiveness in favour of the main thoroughfare. EH has thus drafted a conceptual priority (give way) junction to allow unrestricted flow on the A414. This is contained within Appendix B and incorporates a right turn lane on the A414 West arm. Table 5-2 shows the results of the capacity assessment.

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<th>RFC</th>
<th>Queue Length</th>
<th>RFC</th>
<th>Queue Length</th>
<th>RFC</th>
<th>Queue Length</th>
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<tr>
<td><strong>AM Peak</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A414 West</td>
<td>0.76</td>
<td>3.0</td>
<td>0.83</td>
<td>4.7</td>
<td>0.92</td>
<td>9.5</td>
</tr>
<tr>
<td>A414 East</td>
<td>1.00</td>
<td>25</td>
<td>1.11</td>
<td>73.5</td>
<td>1.35</td>
<td>150+</td>
</tr>
<tr>
<td>Well Lane</td>
<td>0.75</td>
<td>2.7</td>
<td>0.84</td>
<td>4.4</td>
<td>0.86</td>
<td>4.9</td>
</tr>
<tr>
<td><strong>PM Peak</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A414 West</td>
<td>1.22</td>
<td>127</td>
<td>1.34</td>
<td>150+</td>
<td>1.55</td>
<td>150+</td>
</tr>
<tr>
<td>A414 East</td>
<td>0.66</td>
<td>1.9</td>
<td>0.72</td>
<td>2.5</td>
<td>0.82</td>
<td>4.3</td>
</tr>
<tr>
<td>Well Lane</td>
<td>0.30</td>
<td>0.4</td>
<td>0.35</td>
<td>0.5</td>
<td>0.40</td>
<td>0.6</td>
</tr>
</tbody>
</table>

**Table 5-1: A414 / Well Lane Junction - Existing Layout Performance**
The modelling indicates that a priority junction would provide improved performance over the current layout if traffic flows remain unchanged. However, in the longer term, Well Lane will begin to experience some congestion in 2026 with the addition of background traffic and this will increase further with Maldon / Heybridge development traffic. The priority junction represents an upgrade for A414 movements though, and even with the addition of the development traffic in 2026, the A414 is modelled to experience less delay than the current situation.

EH have estimated an indicative cost of installing a priority junction to be approximately £235,000 (November 2014).

5.5 Summary and Comment

A modelling exercise based on a conceptual design has been undertaken to establish the likely effect on capacity of reverting the Well Lane mini-roundabout to a priority junction. Given the importance of the A414 as a strategic route, it is considered appropriate that it should receive priority over minor roads such as Well Lane. However, factors such as the existing zebra crossing and bus stop to the west of the junction would need to be considered in more detail, particularly given the potential for speeds to increase on the main thoroughfare with the priority junction in place.

Modelling has shown that a priority junction would re-establish the A414’s precedence and, in the short term, ensure that all arms could operate satisfactorily. Post-development in 2026 however, Well Lane is likely to encounter increased delay, but the A414, whilst continuing to be subjected to heavy traffic flows, can be expected to perform better than currently with the mini-roundabout layout.
It is, however, important to stress that the above junction assessments have been based on existing traffic flows with background growth and development traffic added according to current turning proportions. Whilst this is reasonable in the short term, the advent of increased queues on Well Lane in 2026 post-development is likely to alter the dynamics of the junction. The delay incurred on the minor arm can be expected to lead to reduced numbers of vehicles using it as an A414 alternative. It is therefore considered that the forecast queues on Well Lane in 2026 post-development are unlikely to materialise as more drivers will be inclined to remain on the A414 with its improved throughput. Modelling therefore suggests that a priority junction represents a capacity upgrade on the current layout and, subject to a full road safety audit being carried out, should be taken forward as a potential mitigation measure for the Maldon LDP development.
Conclusion

6.1 Summary comments

This technical note is the latest in a series of technical notes and reports that assess the potential impact of Maldon’s emerging Local Plan on the highway network in terms of capacity. Following concerns raised by Chelmsford City Council, the note considers the performance of the A414 Eves Corner and A414 / Well Lane junctions in Danbury in detail. The findings can be summarised as follows:

- In reviewing Essex Highways’ previous wider impacts study of December 2013, CCC’s transport consultants were of the view that EH had underestimated the background growth. With evidence of negligible growth over the last 10 years on the A414 in the vicinity, plus the finite capacity of the network, EH do not consider this criticism to be valid and, consequently, the same traffic flows as the December 2013 study have been used in the Eves Corner junction assessments in this work;

- Modelling of the proposed pre-signals arrangement at Eves Corner has indicated that, in capacity terms, they should provide a minor, short term improvement in queuing over the existing double mini-roundabout layout. However, the proposals tested are in concept only and have not been reviewed in detail for engineering feasibility or road safety. Subject to the scheme passing a road safety audit, it would be considered prudent to carry out a temporary test before any full installation;

- Video observation of the A414 / Well Lane mini-roundabout shows that, although traffic flows are reasonably heavy, the junction generally operates well with minimal delay for straight-on movements on the A414. Eastbound delays in the PM peak are, instead, probably attributable to a rippling effect of slow-moving traffic through Danbury caused by the uphill section, sharp bends and Eves Corner;

- However, the modelling assessment of the A414 / Well Lane intersection has indicated that a priority junction could be beneficial in terms of capacity on the A414 in place of the existing mini-roundabout arrangement. This will assist in prioritising A414 movements over the minor road. Further consideration will need to be given to safety aspects such as the existing zebra crossing to the west of the junction (which provides access to Danbury Park Primary School and a bus stop) before implementation though;

- The advantage of both the pre-signals layout at Eves Corner and the priority junction at the A414 / Well Lane is that the proposals favour through movements on the main A414. This ensures that the minor roads in and around Danbury will become less attractive to drivers.
Appendices

Appendix A: Eves Corner Pre signals Proposals

Appendix B: A414 / Well Lane Priority Junction Proposals
Appendix A: Eves Corner Pre-signals Proposals
Appendix B: A414 / Well Lane Priority Junction Proposals
Proposed Carriageway Edge

3.7m

3.4m

25.0m

Proposed Footway

1.5m

3.4m

3.0m

2.5m

3.0m

1.5m

6.8m

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Tel: 0845 6037631

Essex County Council, 100019602, 2014

PROPOSED WELL HILL JUNCTION LAYOUT

A414 MALDON TO CHELMSFORD ROUTE BASED STRATEGY

FOR INFORMATION

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Tel: 0845 6037631

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Maldon Local Development Plan

Technical Note Addendum – Impact of Proposed Development Sites in Heybridge and South Maldon at Eves Corner and Well Lane Junctions on A414, Danbury

January 2015

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1 Introduction

1.1 Background to Study

Essex County Council (ECC) and Maldon District Council (MDC) have been working together to progress MDC’s Local Development Plan (LDP). As part of this process, Essex Highways (EH) have been commissioned to provide a series of technical reports that assess the potential impact on the highway network of various development proposals both within and beyond the Maldon district area. The reports included a wider impacts document (issued in December 2013) which considered the potential effects on the Eves Corner double-mini roundabout arrangement in Danbury within Chelmsford City Council’s (CCC) administrative area. In November 2014, a further study examined the junction, as well as the A414 / Well Lane junction at the western end of Danbury. This note forms an addendum to the November 2014 study and considers in more detail the potential for a fully signalised junction to replace the existing double-mini roundabout at Eves Corner. Figure 1-1 shows the study area.

Figure 1-1: Danbury Study Area
2 Eves Corner Signalisation Proposals and Assessment

2.1 Proposed Layout

EH have drawn up an indicative proposed layout for the full signalisation of Eves Corner. This is contained within Appendix A of this technical note. It should be stressed that the options for expanding the junction are limited. The design has, nevertheless, included widening of the south-west corner of the junction where some of the existing grass verge has been utilised. This allows a two-lane approach with a central island to be provided on the A414 West arm of the junction.

The design also incorporates a right turn lane on the A414 East arm which can be accommodated within the existing highway boundary. However, the design does not include a widening of the Mayes Lane approach to the junction. This could be incorporated within the existing highway boundary, but in reality, this would only serve to improve capacity on Mayes Lane itself. The priority is to improve throughput on the A414 and the widening of Mayes Lane could have a counter-productive effect of encouraging more rat-running on the minor route.

2.2 Junction Capacity Assessment

Table 2-1 shows the results obtained for the proposed signalised layout. They have been obtained using the LinSig software where a Degree of Saturation of 100% is considered to be at capacity. Also included in the left hand column is an assessment of the existing junction layout using LinSig for comparison purposes.

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<tr>
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<th>Existing Double-mini Roundabout Layout –2013</th>
<th>Signalisation Layout 2013</th>
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<td>Mean Max Queue</td>
<td>Deg of Sat %</td>
<td>Mean Max Queue</td>
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<td>A414 West</td>
<td>100.8%</td>
<td>25.7</td>
<td>93.6%</td>
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Table 2-1: A414 Eves Corner, Danbury Signalised Junction Performance
N.B. Clearly it is possible to favour specific movements with traffic signals. The modelling has sought to, where possible, favour A414 movements. The figures shown in Table 2-1 are a representation of this, but it should be acknowledged that delays on Little Baddow Road and Mayes Lane could be reduced at the expense of the A414 if required.

Irrespective of this, the results indicate that the proposed signalised junction would not perform as well as the existing layout under current traffic conditions. Furthermore, the addition of background growth and development traffic to the network would lead to significant delay on all arms of the junction in both peak periods. Consequently, EH would recommend that proposals for the junction’s full signalisation are not pursued.

2.3 Consideration of Assessment Results

There are a number of technical and practical reasons why the full signalisation of Eves Corner does not provide a solution to traffic issues in the area. These can be summarised as follows:

- The junction is an offset four arm arrangement. Therefore, in order to manage traffic, Little Baddow Road & Mayes Lane have to run in separate stages of the signal cycle to avoid conflict. The offset nature of the junction also necessitates comparatively high intergreen periods, which similarly causes inefficiency in the signals’ operation.

- As indicated in Section 2.1, the space available to widen the scope of the junction is limited. This means that only one ahead lane can be provided on the A414 approaches. A widened exit has been suggested as a possibility on the A414 West exit arm. This would, however, be sub-standard and therefore not offer any real improvement over a single lane discharge. Experience has shown that drivers will not use two lanes where an exit is sub-standard.

- The A414 East arm of the junction is on a gradient which reduces the discharge rate (particularly for goods vehicles). This also compromises junction capacity.

- The design of the proposed signalised junction incorporates pedestrian crossings on all four approaches as a safety requirement. Therefore the junction must have an all-round pedestrian stage. In total, this takes nearly 30 seconds out of the signal cycle (i.e. pedestrian stage plus intergreen periods). This further impacts on the overall junction capacity.

---

1 This section has been completed with input from John Silvester, Head of Essex ITS who manage traffic signals within Essex.
3 Conclusion

3.1 Summary comments

This note forms an addendum to Essex Highways’ Maldon Local Development, Technical Note – Impact of Proposed Development Sites in Heybridge and South Maldon at Eves Corner and Well Lane Junctions on A414, Danbury, November 2014. It considers the potential for a fully signalised junction at Eves Corner to replace the existing double-mini roundabout. The findings are as follows:

- EH have designed and drawn up an indicative signalised arrangement at Eves Corner which includes widening of the south-west corner of the junction to enable a two-lane approach with a central island to be provided on the A414 West arm. The design also incorporates a right turn lane on the A414 East approach arm.

- Capacity assessments using the LinSig software have indicated that the proposed layout does not offer an upgrade in terms of capacity from the existing layout.

- The reasons behind the poor performance of a signalised junction include the need to include a pedestrian stage within the signal cycle, having to run the minor arms of the junction on separate signal stages and the necessity for longer than average intergreen times.

- In light of the above points, EH would not recommend that such an arrangement is carried forward as an option to improve network performance in the future.
Appendix A: Eves Corner Signalisation Proposal