# Technical Note 4 – Forecast Modelling Results from 7x Development Scenario Tests

## 6th June 2014

This technical note has been produced as an interim document to provide Epping Forest District Council (EFDC) and Essex County Council (ECC) with an early view of model outputs. It is envisaged that the contents of this note, will form part of a final report to be produced at the conclusion of the overall LDP study.

The note considers forecast-year vehicle flow outputs taken from the Epping spreadsheet model and their use with junction modelling packages to determine future-year junction performance in the Epping Forest district. Specific focus is placed on appraising junction capacities in 2026 with the inclusion of seven different Local Development Plan (LDP) housing quotas / scenarios as follows:

- Low Growth A – 2668 dwellings
- Low Growth B – 2622 dwellings
- Medium Growth A – 3541 dwellings
- Medium Growth B – 3551 dwellings
- Ambitious Growth A – 5136 dwellings
- Ambitious Growth B – 5142 dwellings
- Ambitious Growth C – 4898 dwellings

These quotas are based on an assumption that 50% of the total LDP development allocation to 2036 will be completed by 2026. Spreadsheet models have been built to test the full development scenarios/quotas in 2036. However, it was deemed unnecessary to model these at this stage, as it was clear from the earlier modelling work that the majority of the junctions under appraisal were operating over capacity with half the quota modelled. It is envisaged that the 2036 modelling work will become more relevant with subsequent consideration of mitigation measures.

A table of the housing development sites included in each scenario is included as item 2 in the appendices of this technical note. The methodology for calculating background growth and development trip generation can be found in Technical Note 2 (January 2014). Employment site quotas determined for the initial Scenario One modelling, and documented in Technical Note 3 (May 2014), were used across all seven scenario tests. This was as agreed with ECC at the start of the scenario modelling.

The junctions under appraisal match those covered in the base-year and initial forecast modelling. A location map is included as item 3 in the appendices of this technical note. Junctions in Harlow are considered to be outside the scope of the study. Outputs from the Greater Harlow modelling work should instead be considered for junctions on the M11 (i.e. J7) and A414.

## Modelling results

Results of the junction capacity modelling are presented in tables for each assessed junction in turn, and represent conditions modelled at the busiest quarter-hour period of the peak hours. Ratio of Flow to Capacity (RFC) values for roundabouts and Degree of Saturation (DoS) values for signalised junctions are used to present a comparison of outputs for each scenario. Clarification on the use of capacity ratios/values in this study is included as item 1 in the appendices of this technical note.

For direct comparison, 2026 forecast-year outputs are presented for each scenario alongside 2013 base-year outputs representing current junction capacities and maximum queue length approximations.

It should be acknowledged that, as flow outputs have been taken from a fixed assignment spreadsheet model, junction capacity results should be deemed 'worse case'. In reality, it might be expected that vehicles will attempt to avoid the worst incidences of congestion by changing route, mode of travel or time of travel. Instead, the results from this modelling exercise should be used to identify anticipated pinch-points on the road network, and prioritise focus on the most congested junctions relative to the others being assessed.

Queue lengths presented in this report are for illustrative purposes only and are not intended as an accurate representation of future conditions. Modelled queue lengths are increasingly difficult to predict accurately once a junction approaches capacity. They are however, included in this technical note to provide a further comparison between development scenarios. In the output tables that follow, changes in queue lengths can help to illustrate a specific / nuanced impact that differing housing allocations across scenarios might have on conditions experienced at junctions. Values are presented as Passenger Car Units (PCUs).

*Housing quotas per settlement for each modelled scenario*

It is apparent from the modelling results that the location of development sites in proximity to the junctions under assessment, and the quantity of housing proposed for each, has a strong influence on junction capacity performance. Table 1 below, summarises the quotas of housing development per major settlement in Epping Forest for each scenario. Numbers highlighted in red draw attention to scenarios where housing is loaded in one particular area. Modelling results demonstrate that junctions in and around settlements containing comparatively high levels of housing development, are more likely to have higher RFC values and queue lengths on link approaches.

**Table 1: Quotas of housing development per settlement for each scenario**

| | Low A | Low B | Med A | Med B | Amb A | Amb B | Amb C |
|---|---|---|---|---|---|---|---|
| **Epping** | 104 | 104 | 204 | 204 | 204 | 373 | **2873** |
| **Ongar** | 593 | 407 | 593 | 553 | **739** | 593 | 139 |
| **North Weald** | 227 | 227 | 674 | 227 | **1199** | 674 | 227 |
| **Waltham Abbey** | 469 | 143 | **729** | **729** | 479 | 479 | 198 |
| **Harlow** | 1138 | 889 | 889 | 889 | **2027** | **2027** | 1027 |
| **Other** | 139 | 853 | 453 | 949 | 489 | 998 | 436 |
| **Total:** | 2668 | 2622 | 3541 | 3551 | 5136 | 5142 | 4898 |

## *Junction 1 – Wake Arms Roundabout, Epping Forest*

| Junction 1 (Wake Arms PH) - Epping | | | | | | | | | *Roundabout Maximum RFC Values* | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Arm** | **AM PEAK** | | | | | | | | **PM PEAK** | | | | | | | |
| | Base | Low A | Low B | Med A | Med B | Amb A | Amb B | Amb C | Base | Low A | Low B | Med A | Med B | Amb A | Amb B | Amb C |
| B1393 Epping Road | 0.59 | 0.82 | 0.85 | 0.91 | 0.88 | 1.01 | 1.00 | 1.29 | 0.73 | 0.85 | 0.85 | 0.87 | 0.86 | 0.87 | 0.88 | 0.99 |
| B172 | 0.89 | 1.15 | 1.17 | 1.22 | 1.20 | 1.28 | 1.28 | 1.33 | 0.96 | 1.16 | 1.17 | 1.18 | 1.18 | 1.20 | 1.20 | 1.29 |
| A121 Golding's Hill | 1.33 | 1.68 | 1.68 | 1.75 | 1.73 | 1.80 | 1.79 | 1.91 | 1.02 | 1.25 | 1.27 | 1.30 | 1.29 | 1.34 | 1.33 | 1.42 |
| A104 Epping New Road | 0.94 | 1.05 | 1.03 | 1.03 | 1.03 | 1.01 | 1.02 | 1.07 | 1.14 | 1.45 | 1.50 | 1.55 | 1.52 | 1.63 | 1.63 | 1.80 |
| A121 Woodridden Hill | 0.86 | 1.08 | 1.04 | 1.12 | 1.12 | 1.09 | 1.09 | 1.12 | 1.21 | 1.46 | 1.48 | 1.51 | 1.49 | 1.53 | 1.54 | 1.74 |

| Junction 1 (Wake Arms PH) - Epping | | | | | | | | | *Roundabout Maximum Queue Lengths* | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Arm** | **AM PEAK** | | | | | | | | **PM PEAK** | | | | | | | |
| | Base | Low A | Low B | Med A | Med B | Amb A | Amb B | Amb C | Base | Low A | Low B | Med A | Med B | Amb A | Amb B | Amb C |
| B1393 Epping Road | 1 | 4 | 5 | 8 | 7 | 25 | 21 | 184 | 3 | 5 | 5 | 6 | 6 | 6 | 7 | 21 |
| B172 | 7 | 83 | 94 | 113 | 104 | 142 | 143 | 192 | 14 | 86 | 90 | 96 | 94 | 102 | 103 | 138 |
| A121 Golding's Hill | 160 | 437 | 452 | 506 | 493 | 542 | 535 | 629 | 26 | 125 | 135 | 157 | 150 | 186 | 179 | 234 |
| A104 Epping New Road | 11 | 29 | 26 | 25 | 26 | 22 | 22 | 38 | 55 | 234 | 269 | 316 | 293 | 389 | 384 | 529 |
| A121 Woodridden Hill | 6 | 39 | 27 | 51 | 52 | 41 | 41 | 52 | 79 | 239 | 251 | 277 | 266 | 294 | 300 | 493 |

- Given existing congestion difficulties at the Wake Arms Roundabout, the addition of background traffic to 2026 and development traffic associated with the 'Low Growth' scenarios will be expected to leave most arms of the junction operating with long queues – particularly in the PM peak.
- With a significantly higher quota of housing in Epping under the 'Ambitious Growth C' scenario, modelling demonstrates that congestion at the Wake Arms Roundabout is notably worsened, particularly along the B1393 Epping Road in the morning peak and along the A104 Epping New Road and A121 Woodridden Hill in the evening peak.

## *Junction 2 – Talbot PH Roundabout, North Weald*

| Junction 2 (Talbot PH) - North Weald | | | | | | | | | *Roundabout Maximum RFC Values* | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Arm** | **AM PEAK** | | | | | | | | **PM PEAK** | | | | | | | |
| | Base | Low A | Low B | Med A | Med B | Amb A | Amb B | Amb C | Base | Low A | Low B | Med A | Med B | Amb A | Amb B | Amb C |
| B181 Weald Bridge Road | 0.19 | 0.30 | 0.29 | 0.38 | 0.30 | 0.51 | 0.40 | 0.31 | 0.18 | 0.28 | 0.28 | 0.33 | 0.28 | 0.40 | 0.35 | 0.28 |
| A414 High Road | 0.81 | 1.03 | 1.01 | 1.07 | 1.03 | 1.15 | 1.09 | 1.02 | 0.53 | 0.75 | 0.74 | 0.77 | 0.75 | 0.83 | 0.80 | 0.74 |
| B181 High Road | 0.43 | 0.60 | 0.59 | 0.63 | 0.60 | 0.66 | 0.63 | 0.63 | 0.47 | 0.70 | 0.69 | 0.78 | 0.71 | 0.90 | 0.81 | 0.74 |
| A414 | 0.45 | 0.59 | 0.58 | 0.59 | 0.59 | 0.64 | 0.63 | 0.57 | 0.70 | 0.93 | 0.90 | 0.97 | 0.92 | 1.09 | 1.02 | 0.90 |

| Junction 2 (Talbot PH) - North Weald | | | | | | | | | Roundabout Maximum Queue Lengths | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Arm** | **AM PEAK** | | | | | | | | **PM PEAK** | | | | | | | |
| | Base | Low A | Low B | Med A | Med B | Amb A | Amb B | Amb C | Base | Low A | Low B | Med A | Med B | Amb A | Amb B | Amb C |
| B181 Weald Bridge Road | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 |
| A414 High Road | 4 | 43 | 32 | 60 | 41 | 109 | 75 | 34 | 1 | 3 | 3 | 3 | 3 | 5 | 4 | 3 |
| B181 High Road | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 2 | 2 | 3 | 2 | 7 | 4 | 3 |
| A414 | 1 | 2 | 1 | 2 | 2 | 2 | 2 | 1 | 2 | 10 | 8 | 16 | 9 | 55 | 28 | 8 |

- At the Talbot Roundabout in North Weald, forecast year congestion is modelled along the A414 High Road in the morning peak and to a lesser extent along the A414 western approach (from the direction of the M11) in the evening peak. It is anticipated that the additional housing modelled in North Weald for the 'Ambitious Growth A' scenario will lead to noticeably higher queue lengths along the two A414 approaches. With a lower housing quota as modelled in the other scenarios, morning peak hour queue lengths along the A414 are shown to be moderate in length, whilst evening peak hour queue lengths are comparatively short.

*Junction 3 – B194 Crooked Mile / Abbeyview Roundabout, Waltham Abbey*

| Junction 3 (Crooked Mile) - Waltham Abbey | | | | | | | | | Roundabout Maximum RFC Values | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Arm | AM PEAK | | | | | | | | PM PEAK | | | | | | | |
| | Base | Low A | Low B | Med A | Med B | Amb A | Amb B | Amb C | Base | Low A | Low B | Med A | Med B | Amb A | Amb B | Amb C |
| B194 Crooked Mile | 0.52 | 0.61 | 0.66 | 0.64 | 0.67 | 0.67 | 0.68 | 0.59 | 0.44 | 0.51 | 0.53 | 0.53 | 0.54 | 0.54 | 0.54 | 0.50 |
| Parklands | 0.48 | 0.59 | 0.59 | 0.60 | 0.62 | 0.61 | 0.62 | 0.56 | 0.39 | 0.47 | 0.48 | 0.48 | 0.48 | 0.48 | 0.48 | 0.46 |
| Crooked Mile | 0.32 | 0.37 | 0.38 | 0.38 | 0.39 | 0.39 | 0.39 | 0.37 | 0.46 | 0.52 | 0.53 | 0.53 | 0.53 | 0.53 | 0.53 | 0.52 |
| Car park | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 |
| B194 Abbeyview | 0.23 | 0.26 | 0.27 | 0.27 | 0.28 | 0.28 | 0.28 | 0.26 | 0.53 | 0.63 | 0.68 | 0.67 | 0.69 | 0.69 | 0.71 | 0.61 |

| Junction 3 (Crooked Mile) - Waltham Abbey | | | | | | | | | *Roundabout Maximum Queue Lengths* | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Arm | AM PEAK | | | | | | | | PM PEAK | | | | | | | |
| | Base | Low A | Low B | Med A | Med B | Amb A | Amb B | Amb C | Base | Low A | Low B | Med A | Med B | Amb A | Amb B | Amb C |
| B194 Crooked Mile | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Parklands | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Crooked Mile | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Car park | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| B194 Abbeyview | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |

- Under all modelled scenarios, the B194 Crooked Mile / Abbeyview Roundabout in Waltham Abbey is expected to remain operating well within capacity in 2026.

## *Junction 4 – B194 Highbridge Street / Abbeyview Roundabout, Waltham Abbey*

| Junction 4 (Highbridge St) - Waltham Abbey | | | | | | | | | *Roundabout Maximum RFC Values* | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Arm** | **AM PEAK** | | | | | | | | **PM PEAK** | | | | | | | |
| | Base | Low A | Low B | Med A | Med B | Amb A | Amb B | Amb C | Base | Low A | Low B | Med A | Med B | Amb A | Amb B | Amb C |
| B194 Abbeyview | 0.34 | 0.41 | 0.44 | 0.44 | 0.46 | 0.46 | 0.48 | 0.39 | 0.27 | 0.31 | 0.32 | 0.32 | 0.33 | 0.33 | 0.33 | 0.30 |
| Highbridge Street | 0.33 | 0.39 | 0.40 | 0.40 | 0.41 | 0.41 | 0.41 | 0.38 | 0.25 | 0.29 | 0.29 | 0.29 | 0.30 | 0.30 | 0.30 | 0.29 |
| B194 Highbridge Street | 0.46 | 0.52 | 0.53 | 0.53 | 0.54 | 0.54 | 0.54 | 0.51 | 0.85 | 0.99 | 1.06 | 1.04 | 1.07 | 1.07 | 1.09 | 0.96 |
| Powdermill Lane | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.15 | 0.18 | 0.17 | 0.18 | 0.17 | 0.17 | 0.17 | 0.18 |

| Junction 4 (Highbridge St) - Waltham Abbey | | | | | | | | | *Roundabout Maximum Queue Lengths* | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Arm** | **AM PEAK** | | | | | | | | **PM PEAK** | | | | | | | |
| | Base | Low A | Low B | Med A | Med B | Amb A | Amb B | Amb C | Base | Low A | Low B | Med A | Med B | Amb A | Amb B | Amb C |
| B194 Abbeyview | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 |
| Highbridge Street | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| B194 Highbridge Street | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 6 | 22 | 52 | 39 | 57 | 56 | 69 | 14 |
| Powdermill Lane | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

- Under all modelled scenarios, the B194 Highbridge Street / Abbeyview Roundabout in Waltham Abbey will likely operate within capacity, save for the B194 Highbridge Street approach from the west. Here, the nearby developments in Waltham Abbey have less of an impact on the performance of the junction, whilst high housing numbers in Roydon associated with the 'Low, Medium and Ambitious Growth B' scenarios have more of an impact.

## *Junction 5 – A112 Sewardstone Road / Dowding Way Roundabout, Waltham Abbey*

| Junction 5 (Sewardstone Rd) - Waltham Abbey | | | | | | | | | *Roundabout Maximum RFC Values* | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Arm** | **AM PEAK** | | | | | | | | **PM PEAK** | | | | | | | |
| | Base | Low A | Low B | Med A | Med B | Amb A | Amb B | Amb C | Base | Low A | Low B | Med A | Med B | Amb A | Amb B | Amb C |
| Sewardstone Road | 0.36 | 0.43 | 0.42 | 0.43 | 0.43 | 0.43 | 0.43 | 0.42 | 0.36 | 0.44 | 0.44 | 0.45 | 0.45 | 0.45 | 0.45 | 0.45 |
| A121 Dowding Way | 0.52 | 0.63 | 0.63 | 0.67 | 0.66 | 0.66 | 0.66 | 0.69 | 0.37 | 0.44 | 0.44 | 0.45 | 0.45 | 0.44 | 0.44 | 0.46 |
| A112 Sewardstone Road | 0.42 | 0.49 | 0.49 | 0.50 | 0.50 | 0.50 | 0.50 | 0.51 | 0.65 | 0.76 | 0.76 | 0.78 | 0.78 | 0.77 | 0.77 | 0.76 |
| A121 Meridian Way | 0.34 | 0.39 | 0.39 | 0.40 | 0.40 | 0.40 | 0.40 | 0.41 | 0.46 | 0.58 | 0.58 | 0.61 | 0.60 | 0.62 | 0.61 | 0.64 |

| Junction 5 (Sewardstone Rd) - Waltham Abbey | | | | | | | | | *Roundabout Maximum Queue Lengths* | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Arm** | **AM PEAK** | | | | | | | | **PM PEAK** | | | | | | | |
| | Base | Low A | Low B | Med A | Med B | Amb A | Amb B | Amb C | Base | Low A | Low B | Med A | Med B | Amb A | Amb B | Amb C |
| Sewardstone Road | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| A121 Dowding Way | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| A112 Sewardstone Road | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| A121 Meridian Way | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 |

- Under all modelled scenarios, the A112 Sewardstone Road / Dowding Way Roundabout in Waltham Abbey is expected to remain operating well within capacity in 2026.

## *Junction 6 – A112 Sewardstone Road / Sun Street Signalised Junction, Waltham Abbey*

**Junction 6 (Sun St) - Waltham Abbey** — ***Signals Maximum DoS Values***

| Arm | AM PEAK | | | | | | | | PM PEAK | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Base | Low A | Low B | Med A | Med B | Amb A | Amb B | Amb C | Base | Low A | Low B | Med A | Med B | Amb A | Amb B | Amb C |
| A121 Crooked Mile | 62 | 74 | 68 | 90 | 69 | 67 | 69 | 69 | 81 | 88 | 81 | 83 | 84 | 87 | 82 | 78 |
| Monkswood Avenue | 76 | 76 | 84 | 80 | 72 | 84 | 84 | 87 | 59 | 66 | 70 | 72 | 70 | 69 | 69 | 70 |
| Sun Street - *Left/Ahead* | 35 | 37 | 33 | 42 | 35 | 36 | 36 | 37 | 29 | 43 | 40 | 40 | 44 | 42 | 41 | 42 |
| Sun Street - *Right* | 71 | 78 | 70 | 89 | 73 | 75 | 75 | 77 | 88 | 133 | 124 | 127 | 139 | 131 | 126 | 131 |
| Sewardstone Rd NB - *L/A* | 71 | 76 | 77 | 73 | 83 | 79 | 79 | 78 | 66 | 76 | 70 | 70 | 73 | 72 | 72 | 65 |
| Sewardstone Rd NB - *R/A* | 54 | 72 | 58 | 29 | 57 | 48 | 48 | 47 | 65 | 63 | 63 | 62 | 62 | 65 | 66 | 59 |
| Sewardstone Rd SB - *L/A* | 59 | 65 | 66 | 68 | 68 | 70 | 67 | 67 | 82 | 82 | 83 | 82 | 82 | 81 | 82 | 78 |
| Sewardstone Rd SB - *Ahead* | 31 | 37 | 33 | 35 | 30 | 30 | 34 | 35 | 42 | 48 | 48 | 47 | 48 | 48 | 47 | 44 |
| Farm Hill Road | 116 | 142 | 142 | 134 | 155 | 152 | 147 | 144 | 107 | 136 | 130 | 131 | 125 | 127 | 130 | 117 |
| Sewardstone Rd NB | 69 | 73 | 79 | 91 | 74 | 78 | 79 | 74 | 105 | 114 | 120 | 121 | 121 | 120 | 120 | 130 |

**Junction 6 (Sun St) - Waltham Abbey** — ***Signals Maximum Queue Lengths***

| Arm | AM PEAK | | | | | | | | PM PEAK | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Base | Low A | Low B | Med A | Med B | Amb A | Amb B | Amb C | Base | Low A | Low B | Med A | Med B | Amb A | Amb B | Amb C |
| A121 Crooked Mile | 10 | 13 | 10 | 24 | 12 | 12 | 10 | 12 | 10 | 13 | 12 | 12 | 12 | 13 | 14 | 10 |
| Monkswood Avenue | 6 | 7 | 7 | 8 | 6 | 8 | 8 | 8 | 4 | 4 | 4 | 5 | 4 | 4 | 4 | 4 |
| Sun Street - *Left/Ahead* | 4 | 4 | 4 | 5 | 4 | 4 | 4 | 4 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| Sun Street - *Right* | 9 | 12 | 11 | 14 | 11 | 10 | 12 | 10 | 13 | 71 | 59 | 67 | 82 | 69 | 62 | 70 |
| Sewardstone Rd NB - *L/A* | 7 | 7 | 7 | 9 | 7 | 7 | 7 | 7 | 7 | 6 | 7 | 7 | 7 | 7 | 7 | 7 |
| Sewardstone Rd NB - *R/A* | 4 | 5 | 3 | 2 | 2 | 2 | 2 | 2 | 7 | 7 | 7 | 7 | 6 | 5 | 6 | 7 |
| Sewardstone Rd SB - *L/A* | 7 | 7 | 7 | 8 | 7 | 7 | 7 | 7 | 7 | 7 | 8 | 8 | 7 | 7 | 7 | 7 |
| Sewardstone Rd SB - *Ahead* | 3 | 5 | 3 | 7 | 6 | 4 | 4 | 3 | 5 | 6 | 6 | 6 | 6 | 7 | 6 | 7 |
| Farm Hill Road | 76 | 158 | 160 | 138 | 192 | 185 | 170 | 164 | 45 | 135 | 120 | 124 | 110 | 115 | 119 | 84 |
| Sewardstone Rd NB | 6 | 7 | 7 | 15 | 7 | 8 | 8 | 7 | 68 | 133 | 165 | 174 | 174 | 170 | 164 | 212 |

- At the junction of the A112 Sewardstone Road with Sun Street in Waltham Abbey, long queue lengths may be expected in the evening peak hour along Sun Street for right-turning movements.
- Although modelled queue lengths are fairly similar across scenarios, the 'Medium Growth B' scenario, with comparatively higher housing levels in Waltham Abbey and Roydon, is shown to generate the longest queue lengths along Sun Street in the evening peak.
- In both peak hours and across all scenarios, heavy queuing is modelled along Farm Hill Road at the southern half of the signalised arrangement. The northbound approach along Sewardstone Road is also shown to have significant queue extents. There is a similar correlation between the quantity of development proposed in Waltham Abbey / Roydon, and the extent of congestion modelled, albeit one that seems diluted by the signal optimisation process.

## *Junction 7 – Honey Lane / Broomstick Hall Road Roundabout, Waltham Abbey*

| Junction 7 (Honey Ln) - Waltham Abbey | | | | | | | | | *Roundabout Maximum RFC Values* | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Arm** | **AM PEAK** | | | | | | | | **PM PEAK** | | | | | | | |
| | Base | Low A | Low B | Med A | Med B | Amb A | Amb B | Amb C | Base | Low A | Low B | Med A | Med B | Amb A | Amb B | Amb C |
| Broomstick Hall Road | 0.32 | 0.48 | 0.41 | 0.49 | 0.49 | 0.49 | 0.49 | 0.43 | 0.32 | 0.45 | 0.45 | 0.46 | 0.46 | 0.45 | 0.45 | 0.42 |
| Honey Lane | 0.92 | 1.12 | 1.07 | 1.13 | 1.14 | 1.13 | 1.13 | 1.09 | 0.85 | 1.15 | 1.16 | 1.18 | 1.18 | 1.16 | 1.16 | 1.07 |
| Farm Hill Road | 0.46 | 0.54 | 0.53 | 0.54 | 0.55 | 0.54 | 0.54 | 0.53 | 0.74 | 0.89 | 0.89 | 0.91 | 0.91 | 0.90 | 0.89 | 0.88 |

| Junction 7 (Honey Ln) - Waltham Abbey | | | | | | | | | *Roundabout Maximum Queue Lengths* | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Arm** | **AM PEAK** | | | | | | | | **PM PEAK** | | | | | | | |
| | Base | Low A | Low B | Med A | Med B | Amb A | Amb B | Amb C | Base | Low A | Low B | Med A | Med B | Amb A | Amb B | Amb C |
| Broomstick Hall Road | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Honey Lane | 9 | 51 | 34 | 54 | 55 | 54 | 53 | 39 | 5 | 61 | 63 | 70 | 73 | 66 | 65 | 34 |
| Farm Hill Road | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 3 | 7 | 7 | 8 | 8 | 7 | 7 | 6 |

- The Honey Lane approach to the junction with Broomstick Hall Road in Waltham Abbey operates over capacity in both peak hours and in all 2026 development scenarios. Modelled queue lengths are shown to be moderate in length with little variability across scenarios. An exception is the 'Ambitious Growth C' quota containing lower housing numbers in Waltham Abbey and Roydon, which results in lower queue lengths and RFC values at the junction.

*Junction 8 – B1393 Thornwood Road Signalised Junction, Epping*

| Junction 8 (Thornwood Road) - Epping | | | | | | | | | *Signals Maximum DoS Values* | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Arm** | **AM PEAK** | | | | | | | | **PM PEAK** | | | | | | | |
| | Base | Low A | Low B | Med A | Med B | Amb A | Amb B | Amb C | Base | Low A | Low B | Med A | Med B | Amb A | Amb B | Amb C |
| B1393 Thornwood Rd - *L/A* | 90 | 107 | 108 | 116 | 112 | 128 | 119 | 143 | 111 | 112 | 111 | 111 | 111 | 111 | 110 | 137 |
| B181 The Plain - *L/A* | 77 | 95 | 95 | 99 | 96 | 103 | 98 | 93 | 101 | 118 | 118 | 119 | 118 | 119 | 115 | 116 |
| B1393 Palmers Hill - *R/A* | 89 | 102 | 103 | 101 | 103 | 97 | 101 | 111 | 119 | 161 | 161 | 176 | 165 | 191 | 179 | 194 |

| Junction 8 (Thornwood Road) - Epping | | | | | | | | | *Signals Maximum Queue Lengths* | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Arm** | **AM PEAK** | | | | | | | | **PM PEAK** | | | | | | | |
| | Base | Low A | Low B | Med A | Med B | Amb A | Amb B | Amb C | Base | Low A | Low B | Med A | Med B | Amb A | Amb B | Amb C |
| B1393 Thornwood Rd - *L/A* | 24 | 143 | 172 | 190 | 183 | 220 | 206 | 290 | 113 | 135 | 134 | 117 | 136 | 115 | 119 | 270 |
| B181 The Plain - *L/A* | 22 | 42 | 37 | 47 | 37 | 69 | 45 | 39 | 22 | 80 | 80 | 84 | 81 | 89 | 73 | 80 |
| B1393 Palmers Hill - *R/A* | 20 | 64 | 58 | 47 | 61 | 40 | 52 | 141 | 161 | 413 | 418 | 494 | 437 | 573 | 507 | 614 |

- As documented in the first technical note, Thornwood Road signalised junction is shown to be operating over-capacity in the base model assessment. Using the fixed assignment model with no consideration of route diversion or congestion-sensitive demand variability, significant congestion is modelled at the junction in all scenarios by 2026. Patterns of congestion are tidal in nature, with the Thornwood Road approach towards Epping town centre experiencing the longest queue lengths in the morning peak, and the Palmers Hill link experiencing very long queues in the PM peak.
- Perhaps unsurprisingly, the 'Ambitious Growth C' scenario with high levels of housing planned in Epping, leaves the signalised junction performing significantly worse when compared with the other scenarios.

## *Junction 9a – B1393 High Street / Station Road Roundabout, Epping*

| Junction 9a (Station Rd) - Epping | | | | | | | | | *Roundabout Maximum RFC Values* | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Arm** | **AM PEAK** | | | | | | | | **PM PEAK** | | | | | | | |
| | Base | Low A | Low B | Med A | Med B | Amb A | Amb B | Amb C | Base | Low A | Low B | Med A | Med B | Amb A | Amb B | Amb C |
| B1393 High Street RAB Link | 0.80 | 1.01 | 1.02 | 1.08 | 1.04 | 1.17 | 1.14 | 1.04 | 0.92 | 1.10 | 1.10 | 1.12 | 1.12 | 1.13 | 1.13 | 1.16 |
| Station Road | 0.77 | 0.99 | 0.99 | 1.04 | 1.02 | 1.05 | 1.02 | 1.01 | 0.69 | 0.85 | 0.85 | 0.87 | 0.87 | 0.88 | 0.88 | 0.86 |
| B1393 High Street | 0.92 | 1.11 | 1.11 | 1.13 | 1.13 | 1.14 | 1.14 | 1.16 | 0.87 | 1.12 | 1.13 | 1.20 | 1.15 | 1.29 | 1.26 | 1.15 |

| Junction 9a (Station Rd) - Epping | | | | | | | | | *Roundabout Maximum Queue Lengths* | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Arm** | **AM PEAK** | | | | | | | | **PM PEAK** | | | | | | | |
| | Base | Low A | Low B | Med A | Med B | Amb A | Amb B | Amb C | Base | Low A | Low B | Med A | Med B | Amb A | Amb B | Amb C |
| B1393 High Street RAB Link | 4 | 26 | 29 | 56 | 36 | 99 | 87 | 35 | 9 | 59 | 63 | 70 | 70 | 76 | 77 | 91 |
| Station Road | 3 | 14 | 14 | 20 | 18 | 22 | 18 | 15 | 2 | 5 | 5 | 6 | 6 | 6 | 6 | 5 |
| B1393 High Street | 9 | 64 | 63 | 73 | 72 | 78 | 80 | 92 | 6 | 72 | 79 | 115 | 89 | 175 | 155 | 87 |

## *Junction 9b – B1393 High Street / St. John's Road Roundabout, Epping*

| Junction 9b (St. John's Rd) - Epping | | | | | | | | | *Roundabout Maximum RFC Values* | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Arm** | **AM PEAK** | | | | | | | | **PM PEAK** | | | | | | | |
| | Base | Low A | Low B | Med A | Med B | Amb A | Amb B | Amb C | Base | Low A | Low B | Med A | Med B | Amb A | Amb B | Amb C |
| St. John's Road | 0.37 | 1.01 | 1.01 | 1.03 | 1.02 | 1.07 | 1.06 | 1.01 | 0.82 | 1.20 | 1.21 | 1.24 | 1.23 | 1.28 | 1.27 | 1.30 |
| B1393 High Street | 0.69 | 1.19 | 1.20 | 1.29 | 1.23 | 1.41 | 1.38 | 1.23 | 0.93 | 1.22 | 1.23 | 1.26 | 1.25 | 1.28 | 1.28 | 1.30 |
| B1393 High Street RAB Link | 0.89 | 1.05 | 1.05 | 1.07 | 1.07 | 1.08 | 1.08 | 1.10 | 0.72 | 0.92 | 0.93 | 1.00 | 0.95 | 1.07 | 1.05 | 0.95 |

| Junction 9b (St. John's Rd) - Epping | | | | | | | | | *Roundabout Maximum Queue Lengths* | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Arm** | **AM PEAK** | | | | | | | | **PM PEAK** | | | | | | | |
| | Base | Low A | Low B | Med A | Med B | Amb A | Amb B | Amb C | Base | Low A | Low B | Med A | Med B | Amb A | Amb B | Amb C |
| St. John's Road | 1 | 10 | 10 | 11 | 10 | 13 | 13 | 10 | 4 | 31 | 32 | 38 | 35 | 45 | 42 | 50 |
| B1393 High Street | 2 | 82 | 86 | 140 | 99 | 230 | 206 | 100 | 9 | 85 | 90 | 106 | 103 | 119 | 121 | 126 |
| B1393 High Street RAB Link | 7 | 43 | 42 | 54 | 53 | 58 | 56 | 67 | 3 | 10 | 11 | 23 | 14 | 54 | 44 | 13 |

- The double-mini roundabout junction along the B1393 High Street at Station Road and St. John's Road, is modelled as operating over capacity in both peak hours and across all scenarios by 2026.
- Fixed modelled trip routing patterns from proposed developments in Epping leave only a minor impact on the double-mini roundabout, with most Epping-based development trips accessing the B1393 to the north or south of the town centre for onward journeys. Instead, the longest queue extents are modelled under 'Ambitious Growth A/B' scenarios. These two scenarios contain more development in Harlow, North Weald and Ongar, suggesting that future growth in congestion at the mini-roundabout is more likely to be caused by development traffic originating further afield and routing through Epping.

## *Junction 10 – B1393 Epping Road / Theydon Road Signalised Junction, Epping*

| Junction 10 (Theydon Road) - Epping | | | | | | | | | | *Signals Maximum DoS Values* | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Arm** | **AM PEAK** | | | | | | | | | **PM PEAK** | | | | | | | |
| | Base | Low A | Low B | Med A | Med B | Amb A | Amb B | Amb C | | Base | Low A | Low B | Med A | Med B | Amb A | Amb B | Amb C |
| B1393 Epping Rd (E) *L/A* | 82 | 115 | 116 | 120 | 119 | 126 | 105 | 149 | | 65 | 74 | 74 | 115 | 113 | 127 | 121 | 126 |
| Theydon Road | 92 | 340 | 343 | 347 | 346 | 348 | 163 | 344 | | 84 | 120 | 126 | 337 | 335 | 341 | 351 | 551 |
| B1393 Epping Rd (W) *R/A* | 87 | 115 | 115 | 120 | 117 | 126 | 203 | 120 | | 75 | 98 | 98 | 111 | 111 | 111 | 110 | 112 |

| Junction 10 (Theydon Road) - Epping | | | | | | | | | | *Signals Maximum Queue Lengths* | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Arm** | **AM PEAK** | | | | | | | | | **PM PEAK** | | | | | | | |
| | Base | Low A | Low B | Med A | Med B | Amb A | Amb B | Amb C | | Base | Low A | Low B | Med A | Med B | Amb A | Amb B | Amb C |
| B1393 Epping Rd (East) *L/A* | 28 | 140 | 151 | 174 | 168 | 216 | 95 | 358 | | 17 | 21 | 21 | 108 | 97 | 154 | 135 | 162 |
| Theydon Road | 15 | 160 | 162 | 165 | 164 | 165 | 96 | 163 | | 12 | 48 | 57 | 160 | 158 | 162 | 169 | 302 |
| B1393 Epping Rd (West) *R/A* | 17 | 98 | 96 | 115 | 105 | 137 | 290 | 126 | | 22 | 47 | 47 | 106 | 105 | 113 | 108 | 117 |

- The signalised junction of the B1393 Epping Road and Theydon Road might be expected to heavily exceed capacity in the morning peak by 2026 across all development quota scenarios. This is despite optimisation of signal timings to reduce overall delays through the junction (by targeting delay reduction on arm(s) with greater traffic flows – i.e. the B1393). The apparent variation in modelled DoS values and queue lengths in the 'Ambitious Growth B' scenario, is likely down to the signal optimisation process.
- As with most junctions assessed in Epping, the scale of development proposed in and around the town in the 'Ambitious Growth C' scenario, will likely result in a significant increase in traffic flows through the junction, which will further add to congestion experienced.
- It is noticeable that in the PM peak, signal optimisation accommodates B1393 traffic flows in the two 'Low Growth' scenarios. However, the increase in housing quotas associated with Medium and High (Ambitious) Growth scenarios, results in all arms of the junction exceeding capacity in the evening peak hour.

*Junction 11 – B1393 High Road / Bury Lane Roundabout, Epping*

| Junction 11 (Bury Ln) - Epping | | | | | | | | | *Roundabout Maximum RFC Values* | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Arm** | **AM PEAK** | | | | | | | | **PM PEAK** | | | | | | | |
| | Base | Low A | Low B | Med A | Med B | Amb A | Amb B | Amb C | Base | Low A | Low B | Med A | Med B | Amb A | Amb B | Amb C |
| B182 Bury Lane | 0.68 | 0.91 | 0.93 | 0.91 | 0.95 | 0.98 | 1.02 | 1.59 | 0.43 | 0.57 | 0.56 | 0.57 | 0.56 | 0.59 | 0.58 | 0.65 |
| B1393 High Road (East) | 1.02 | 1.35 | 1.36 | 1.44 | 1.38 | 1.55 | 1.51 | 1.48 | 1.00 | 1.21 | 1.21 | 1.23 | 1.22 | 1.25 | 1.26 | 1.43 |
| B1393 High Road (West) | 0.82 | 0.95 | 0.95 | 0.96 | 0.96 | 0.97 | 0.98 | 1.02 | 0.86 | 1.10 | 1.13 | 1.16 | 1.14 | 1.26 | 1.26 | 1.46 |

| Junction 11 (Bury Ln) - Epping | | | | | | | | | *Roundabout Maximum Queue Lengths* | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Arm** | **AM PEAK** | | | | | | | | **PM PEAK** | | | | | | | |
| | Base | Low A | Low B | Med A | Med B | Amb A | Amb B | Amb C | Base | Low A | Low B | Med A | Med B | Amb A | Amb B | Amb C |
| B182 Bury Lane | 2 | 8 | 9 | 8 | 10 | 14 | 19 | 259 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 |
| B1393 High Road (East) | 26 | 170 | 177 | 234 | 193 | 314 | 291 | 295 | 21 | 102 | 105 | 114 | 111 | 127 | 132 | 227 |
| B1393 High Road (West) | 4 | 14 | 13 | 16 | 15 | 18 | 20 | 34 | 6 | 77 | 91 | 115 | 100 | 196 | 194 | 425 |

- At the B1393 High Road junction with Bury Lane, both B1393 approach arms are modelled to be significantly over capacity in the evening peak hour in all scenarios. The B1393 approach from the east is also over capacity in the morning peak. Congestion at the junction is seen to increase as housing growth in the district increases. Again, the large increase in housing in Epping attributed to the 'Ambitious Growth C' scenario, is shown to lengthen queues at the junction considerably.

## *Junction 12 – Four Wantz Roundabout, Ongar*

| Junction 12 (Wantz Service Stn) - Ongar | *Roundabout Maximum RFC Values* | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Arm** | **AM PEAK** | | | | | | | | **PM PEAK** | | | | | | | |
| | Base | Low A | Low B | Med A | Med B | Amb A | Amb B | Amb C | Base | Low A | Low B | Med A | Med B | Amb A | Amb B | Amb C |
| B184 Fyfield Road | 0.67 | 0.95 | 0.93 | 0.96 | 0.95 | 0.99 | 0.99 | 0.94 | 0.57 | 1.02 | 0.99 | 1.02 | 1.00 | 1.06 | 1.05 | 0.98 |
| A414 Chelmsford Road | 0.86 | 1.14 | 1.13 | 1.15 | 1.15 | 1.18 | 1.17 | 1.15 | 0.52 | 0.69 | 0.68 | 0.69 | 0.69 | 0.71 | 0.70 | 0.68 |
| B184 High Street | 0.71 | 1.00 | 0.97 | 1.00 | 0.99 | 1.03 | 1.01 | 0.95 | 0.75 | 1.08 | 1.06 | 1.08 | 1.07 | 1.13 | 1.11 | 1.03 |
| A414 Epping Road | 0.54 | 0.91 | 0.90 | 0.91 | 0.91 | 0.96 | 0.94 | 0.89 | 0.76 | 1.07 | 1.04 | 1.07 | 1.08 | 1.12 | 1.10 | 1.04 |

| Junction 12 (Wantz Service Stn) - Ongar | *Roundabout Maximum Queue Lengths* | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Arm** | **AM PEAK** | | | | | | | | **PM PEAK** | | | | | | | |
| | Base | Low A | Low B | Med A | Med B | Amb A | Amb B | Amb C | Base | Low A | Low B | Med A | Med B | Amb A | Amb B | Amb C |
| B184 Fyfield Road | 2 | 12 | 10 | 13 | 12 | 18 | 17 | 11 | 1 | 22 | 17 | 23 | 19 | 34 | 29 | 15 |
| A414 Chelmsford Road | 6 | 81 | 77 | 84 | 85 | 98 | 95 | 86 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| B184 High Street | 3 | 23 | 16 | 23 | 20 | 33 | 26 | 13 | 3 | 57 | 47 | 60 | 56 | 84 | 74 | 35 |
| A414 Epping Road | 1 | 9 | 8 | 10 | 10 | 15 | 13 | 8 | 3 | 53 | 41 | 55 | 56 | 85 | 72 | 40 |

- The roundabout junction at the Wantz Service Station is modelled as operating over capacity in the PM peak in all 2026 development scenarios with moderate queue lengths calculated. In the AM peak hour, the A414 Chelmsford Road approach is shown to exceed capacity with moderate queue lengths modelled.

*Junction 13 – A113 Coopers Hill / Brentwood Road Roundabout, Marden Ash / Ongar*

| Junction 13 (Coopers Hill) - Marden Ash (Ongar) | | | | | | | | | *Roundabout Maximum RFC Values* | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Arm** | **AM PEAK** | | | | | | | | **PM PEAK** | | | | | | | |
| | Base | Low A | Low B | Med A | Med B | Amb A | Amb B | Amb C | Base | Low A | Low B | Med A | Med B | Amb A | Amb B | Amb C |
| A113 Coopers Hill | 0.96 | 1.40 | 1.37 | 1.41 | 1.39 | 1.45 | 1.43 | 1.34 | 0.73 | 1.09 | 1.08 | 1.10 | 1.13 | 1.17 | 1.11 | 0.98 |
| A128 Brentwood Road | 0.66 | 0.83 | 0.83 | 0.83 | 0.89 | 0.90 | 0.84 | 0.84 | 0.53 | 0.72 | 0.73 | 0.73 | 0.74 | 0.75 | 0.74 | 0.71 |
| A113 Stanford Rivers Road | 0.37 | 0.68 | 0.68 | 0.68 | 0.69 | 0.71 | 0.69 | 0.55 | 0.77 | 1.14 | 1.12 | 1.15 | 1.16 | 1.20 | 1.16 | 1.03 |
| St. James Avenue | 0.04 | 0.10 | 0.10 | 0.10 | 0.10 | 0.11 | 0.10 | 0.08 | 0.09 | 0.34 | 0.35 | 0.35 | 0.39 | 0.42 | 0.38 | 0.35 |

| Junction 13 (Coopers Hill) - Marden Ash (Ongar) | | | | | | | | | *Roundabout Maximum Queue Lengths* | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Arm** | **AM PEAK** | | | | | | | | **PM PEAK** | | | | | | | |
| | Base | Low A | Low B | Med A | Med B | Amb A | Amb B | Amb C | Base | Low A | Low B | Med A | Med B | Amb A | Amb B | Amb C |
| A113 Coopers Hill | 14 | 231 | 203 | 240 | 224 | 269 | 252 | 187 | 3 | 49 | 44 | 52 | 64 | 78 | 57 | 17 |
| A128 Brentwood Road | 2 | 5 | 5 | 5 | 7 | 8 | 5 | 5 | 1 | 3 | 3 | 3 | 3 | 3 | 3 | 2 |
| A113 Stanford Rivers Road | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 3 | 62 | 54 | 64 | 69 | 83 | 68 | 25 |
| St. James Avenue | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 |

- South of Ongar at the junction of the A113 Coopers Hill with Brentwood Road, modelled queues are apparent along the A113 Coopers Hill approach in both peak periods (although more severe in the AM peak) and in all scenarios. In the evening peak, the A113 approach from the south is also shown to experience moderate queuing which is worsened by greater volumes of development traffic in Ongar associated with the 'Ambitious Growth A' scenario.

## *Junction 19 – B172 Coppice Road / Piercing Hill Priority Junction, Theydon Bois*

| Junction 19 (Piercing Hill) - Theydon Bois | | | | | | | | | *Priority Junction Maximum RFC Values* | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Arm** | **AM PEAK** | | | | | | | | **PM PEAK** | | | | | | | |
| | Base | Low A | Low B | Med A | Med B | Amb A | Amb B | Amb C | Base | Low A | Low B | Med A | Med B | Amb A | Amb B | Amb C |
| Piercing Hill | 0.76 | 0.96 | 0.98 | 0.97 | 0.97 | 0.98 | 0.99 | 0.98 | 0.80 | 1.00 | 1.02 | 1.01 | 1.00 | 1.01 | 1.03 | 1.02 |
| B172 Coppice Road (E) R-T | 0.32 | 0.36 | 0.37 | 0.37 | 0.36 | 0.37 | 0.37 | 0.38 | 0.40 | 0.47 | 0.48 | 0.48 | 0.47 | 0.49 | 0.49 | 0.51 |
| The Green | 0.89 | 1.11 | 1.13 | 1.12 | 1.12 | 1.13 | 1.15 | 1.17 | 0.66 | 0.82 | 0.85 | 0.83 | 0.82 | 0.84 | 0.86 | 0.87 |
| B172 Coppice Road (W) R-T | 0.05 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 |

| Junction 19 (Piercing Hill) - Theydon Bois | | | | | | | | | *Priority Junction Maximum Queue Lengths* | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Arm** | **AM PEAK** | | | | | | | | **PM PEAK** | | | | | | | |
| | Base | Low A | Low B | Med A | Med B | Amb A | Amb B | Amb C | Base | Low A | Low B | Med A | Med B | Amb A | Amb B | Amb C |
| Piercing Hill | 3 | 9 | 10 | 10 | 9 | 10 | 11 | 10 | 4 | 12 | 14 | 13 | 13 | 14 | 14 | 14 |
| B172 Coppice Road (E) R-T | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| The Green | 6 | 27 | 30 | 29 | 28 | 30 | 33 | 37 | 2 | 4 | 5 | 4 | 4 | 5 | 5 | 6 |
| B172 Coppice Road (W) R-T | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

- The priority junction of Piercing Hill and the B172 Coppice Road is shown to exceed capacity on its minor arms in the peak periods. Queue lengths are shown to be low-to-moderate in all future assessments, with little variation across scenarios.

*Junction 21 – M25 J26 Northern Roundabout, Waltham Abbey*

| Junction 21 (M25 J26 Northern RAB) - Waltham Abbey | | | | | | | | | *Roundabout Maximum RFC Values* | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Arm** | **AM PEAK** | | | | | | | | **PM PEAK** | | | | | | | |
| | Base | Low A | Low B | Med A | Med B | Amb A | Amb B | Amb C | Base | Low A | Low B | Med A | Med B | Amb A | Amb B | Amb C |
| Old Shire Lane | 0.17 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.13 | 0.16 | 0.16 | 0.16 | 0.16 | 0.16 | 0.16 | 0.16 |
| Honey Lane RAB Link | 0.38 | 0.43 | 0.41 | 0.44 | 0.44 | 0.43 | 0.43 | 0.43 | 0.52 | 0.62 | 0.63 | 0.64 | 0.64 | 0.63 | 0.63 | 0.61 |
| M25 Off Slip | 0.24 | 0.27 | 0.27 | 0.27 | 0.28 | 0.27 | 0.27 | 0.27 | 0.40 | 0.47 | 0.48 | 0.49 | 0.49 | 0.48 | 0.48 | 0.46 |
| Honey Lane | 0.33 | 0.46 | 0.41 | 0.47 | 0.47 | 0.47 | 0.46 | 0.42 | 0.20 | 0.28 | 0.28 | 0.31 | 0.31 | 0.29 | 0.29 | 0.26 |

| Junction 21 (M25 J26 Northern RAB) - Waltham Abbey | | | | | | | | | *Roundabout Maximum Queue Lengths* | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Arm** | **AM PEAK** | | | | | | | | **PM PEAK** | | | | | | | |
| | Base | Low A | Low B | Med A | Med B | Amb A | Amb B | Amb C | Base | Low A | Low B | Med A | Med B | Amb A | Amb B | Amb C |
| Old Shire Lane | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Honey Lane RAB Link | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| M25 Off Slip | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Honey Lane | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

- Under all modelled scenarios, the M25 J26 northern roundabout in Waltham Abbey is expected to remain operating well within capacity in 2026.

## *Junction 22 – M25 J26 Southern Roundabout, Waltham Abbey*

| Junction 22 (M25 J26 Southern RAB) - Waltham Abbey | | | | | | | | | *Roundabout Maximum RFC Values* | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Arm** | **AM PEAK** | | | | | | | | **PM PEAK** | | | | | | | |
| | Base | Low A | Low B | Med A | Med B | Amb A | Amb B | Amb C | Base | Low A | Low B | Med A | Med B | Amb A | Amb B | Amb C |
| M25 Off Slip | 0.34 | 0.42 | 0.41 | 0.44 | 0.44 | 0.42 | 0.42 | 0.42 | 0.26 | 0.33 | 0.33 | 0.34 | 0.34 | 0.34 | 0.33 | 0.33 |
| A121 Honey Lane | 0.97 | 1.24 | 1.20 | 1.33 | 1.32 | 1.30 | 1.29 | 1.37 | 0.75 | 0.94 | 0.94 | 0.98 | 0.97 | 0.96 | 0.96 | 1.00 |
| A121 Dowding Way | 0.38 | 0.46 | 0.46 | 0.47 | 0.47 | 0.47 | 0.47 | 0.47 | 0.49 | 0.67 | 0.68 | 0.73 | 0.72 | 0.72 | 0.71 | 0.77 |
| Honey Lane RAB Link | 0.46 | 0.56 | 0.53 | 0.60 | 0.61 | 0.57 | 0.57 | 0.55 | 0.48 | 0.55 | 0.55 | 0.57 | 0.57 | 0.56 | 0.56 | 0.57 |

| Junction 22 (M25 J26 Southern RAB) - Waltham Abbey | | | | | | | | | *Roundabout Maximum Queue Lengths* | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Arm** | **AM PEAK** | | | | | | | | **PM PEAK** | | | | | | | |
| | Base | Low A | Low B | Med A | Med B | Amb A | Amb B | Amb C | Base | Low A | Low B | Med A | Med B | Amb A | Amb B | Amb C |
| M25 Off Slip | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 |
| A121 Honey Lane | 17 | 151 | 129 | 205 | 195 | 192 | 186 | 268 | 3 | 12 | 12 | 18 | 18 | 15 | 15 | 26 |
| A121 Dowding Way | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 3 | 3 | 3 | 2 | 3 |
| Honey Lane RAB Link | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

- All but the A121 Honey Lane approach to the M25 J26 southern roundabout in Waltham Abbey are modelled to operate within capacity in 2026. Long queue extents are modelled along the A121 approach in the morning peak, although it operates largely within capacity in the evening peak. Changes in traffic volumes across low, medium and high (ambitious) growth scenarios, have little impact on RFCs and queue lengths on junction approaches that are well within capacity. Along the congested A121 approach, the increase in housing in Waltham Abbey attributed to the 'Medium Growth A/B' scenarios and the increase in housing in Epping contained in the 'Ambitious Growth C' scenario all result in increases in modelled RFCs and queue lengths.

## *Junction 24 – B194 Highbridge Street / Meridian Way Signalised Junction, Waltham Abbey*

| Junction 24 (Station Road) - Waltham Abbey | | | | | | | | | | | | | | | | | *Signals Maximum DoS Values* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Arm** | **AM PEAK** | | | | | | | | **PM PEAK** | | | | | | | | |
| | Base | Low A | Low B | Med A | Med B | Amb A | Amb B | Amb C | Base | Low A | Low B | Med A | Med B | Amb A | Amb B | Amb C | |
| Beaulieu Drive | 22 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 34 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | |
| B194 Highbridge St (E) | 111 | 143 | 150 | 153 | 154 | 157 | 161 | 143 | 89 | 105 | 109 | 113 | 110 | 115 | 111 | 112 | |
| Meridian Way | 95 | 103 | 104 | 107 | 107 | 108 | 107 | 113 | 61 | 68 | 69 | 68 | 70 | 67 | 70 | 67 | |
| B194 Highbridge St (W) | 98 | 93 | 93 | 91 | 94 | 92 | 91 | 92 | 89 | 103 | 106 | 106 | 107 | 110 | 111 | 113 | |

| Junction 24 (Station Road) - Waltham Abbey | | | | | | | | | | | | | | | | | *Signals Maximum Queue Lengths* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Arm** | **AM PEAK** | | | | | | | | **PM PEAK** | | | | | | | | |
| | Base | Low A | Low B | Med A | Med B | Amb A | Amb B | Amb C | Base | Low A | Low B | Med A | Med B | Amb A | Amb B | Amb C | |
| Beaulieu Drive | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | |
| B194 Highbridge St (E) | 73 | 195 | 226 | 230 | 243 | 249 | 264 | 185 | 19 | 49 | 65 | 78 | 70 | 89 | 73 | 71 | |
| Meridian Way | 24 | 41 | 44 | 54 | 54 | 60 | 54 | 78 | 12 | 16 | 16 | 16 | 16 | 15 | 16 | 16 | |
| B194 Highbridge St (W) | 23 | 20 | 21 | 19 | 21 | 20 | 20 | 20 | 35 | 88 | 108 | 113 | 121 | 144 | 154 | 165 | |

- The three main arms of the signalised junction of Highbridge Street and Meridian Way in Waltham Abbey are modelled as over-capacity in the 2026 peak hours in all scenarios. Highbridge Street East and, to a lesser extent, Meridian Way exceed capacity in the morning peak hour. In the evening peak hour, both Highbridge Street approach arms exceed capacity, with the greatest constraint likely along the western approach.
- Outputs from the spreadsheet model suggests that the differing volumes of proposed housing in Waltham Abbey, and other settlements, appear to have a comparatively small impact on the capacity of the signalised junction.

## Summary of main findings

- Only three of the seventeen modelled junctions operate fully within capacity in both peak periods under the 2026 low-growth development scenarios tested.
- Those that remain within capacity are located in Waltham Abbey. Here, the location and scale of housing development proposed, appears to have less of an impact on the demand at junctions located on the periphery of the urban area.
- There are few instances of junction arms being pushed over capacity from one development scenario to the next. Instead, approach arms operating over capacity under low growth scenarios, are typically modelled as having increasingly higher RFC/DoS values and queue lengths in the Medium and High (Ambitious) Growth scenarios.
- The high level of housing growth in Epping attributed to the 'Ambitious Growth C' scenario is reflected in a significant escalation in queue lengths and RFC values at junctions in Epping – mainly along approach arms that exceed capacity in the other development scenarios.
- Junctions along the B1393 in Epping are shown to have high RFC/DoS values and queue lengths, particularly under 'ambitious growth' scenarios. This is reflective of the through-route accommodating traffic flows from across the district. Consequently, the capacity of the junctions along the B1393 are likely to be the most sensitive to overall changes in LDP housing allocation.

# *Appendices*

## 1) Junction Capacity Descriptions & Application

*RFC = Ratio of Flow to Capacity*

The ratio of flow to capacity provides a measure of the utilised capacity of a junction approach arm. Arms exceeding a ratio of 0.85 (i.e. 85% capacity utilised) are considered to be approaching capacity and characteristically have light-to-moderate levels of queued traffic flow. Arms exceeding a ratio of 1.00 (i.e. 100% capacity utilised) are considered to be over capacity and are characterised as having heavy volumes of queued traffic.

ARCADY results that exceed RFCs of 1.00 generate queue lengths that are subject to exponential growth. However, the instability of flows through over-capacity approach arms, results in an inherent difficulty in calibrating modelled outputs to observed conditions. For this reason, queue lengths attributed to over capacity approach arms should be seen as indicative rather than representative.

The capacity assessment tables at the end of this technical note use a colour-coding system to assist in appraisal:

- Arms with an RFC of less than 0.85 are coloured green
- Arms with an RFC between 0.85 and 0.99 are coloured amber
- Arms with an RFC of 1.00 or more are coloured red

*DOS = Degree of Saturation*

The degree of saturation is an output from LINSIG which provides a measure of the utilised capacity of a signalised junction approach lane. It is directly comparable to the RFC outputs obtained from ARCADY assessments (see above).

The colour-coding system used to categorise DOS in the model results tables is as follows:

- Lanes with a DOS of less than 85% are coloured green
- Lanes with a DOS between 85% and 99% are coloured amber
- Lanes with a DOS of 100% or more are coloured red

*2) Epping Forest Local Plan – reasonable alternatives for housing provision*

# Epping Forest Local Plan Highway Impact Assessment

| Settlement | Study Site Ref. | Low Growth A Site Options | Low Growth A 7,500 to 8,000 dwellings (4850 to 5350) | SA Score: | Study Site Ref. | Low Growth B Site Options | Low Growth B 7,500 to 8,000 dwellings (4850 to 5350) | SA Score | Study Site Ref. | Medium Growth A Site Options | Medium Growth A 8,000 to 10,000 dwellings (5350 to 7350) | SA Score | Study Site Ref. | Medium Growth B Site Options | Medium Growth B 8,000 to 10,000 dwellings (5350 to 7350) | SA Score | Study Site Ref. | Ambitious Growth A Site Options | Ambitious Growth A 11,000 to 13,000 dwellings (8350 to 10350) | SA Score | Study Site Ref. | Ambitious Growth B Site Options | Ambitious Growth B 11,000 to 13,000 dwellings (8350 to 10350) | SA Score | Study Site Ref. | Ambitious Growth C Site Options | Ambitious Growth C 11,000 to 13,000 dwellings (8350 to 10350) | SA Score |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Harlow | HAR-C | SR-0006 | 70 | 70 | | ~~SR-0006~~ | ~~70~~ | ~~70~~ | HAR-A | SR-0091 | 1778 | 65 | HAR-A | SR-0091 | 1778 | 65 | HAR-C | SR-0006 | 70 | 70 | HAR-C | SR-0006 | 70 | 70 | HAR-C | SR-0006 | 70 | 70 |
| | HAR-C | SR-0046 | 2000 | 50 | | ~~SR-0046~~ | ~~2000~~ | ~~50~~ | | | | | | | | | HAR-C | SR-0046 | 2000 | 50 | HAR-C | SR-0046 | 2000 | 50 | | ~~SR-0046~~ | ~~2000~~ | ~~50~~ |
| | HAR-C | SR-0074 | 155 | 80 | | ~~SR-0074~~ | ~~155~~ | ~~80~~ | | | | | | | | | HAR-C | SR-0074 | 155 | 80 | HAR-C | SR-0074 | 155 | 80 | HAR-C | SR-0074 | 155 | 80 |
| | HAR-C | SR-0092 | 0 | 50 | | ~~SR-0092~~ | ~~0~~ | ~~50~~ | | | | | | | | | HAR-C | SR-0092 | 0 | 50 | HAR-C | SR-0092 | 0 | 50 | HAR-C | SR-0092 | 0 | 50 |
| | HAR-C | SR-0139 | 50 | 90 | | ~~SR-0139~~ | ~~50~~ | ~~90~~ | | | | | | | | | HAR-C | SR-0139 | 50 | 90 | HAR-C | SR-0139 | 50 | 90 | HAR-C | SR-0139 | 50 | 90 |
| | | | | | HAR-A | SR-0091 | 1778 | 65 | | | | | | | | | HAR-A | SR-0091 | 1778 | 65 | HAR-A | SR-0091 | 1778 | 65 | | ~~SR-0091~~ | ~~1778~~ | ~~65~~ |
| **Harlow Subtotal** | | | **2275** | | | | **1778** | | | | **1778** | | | | **1778** | | | | **4053** | | | | **4053** | | | | **2053** | |
| Existing Dwellings | | | 35719 | | | | 35719 | | | | 35719 | | | | 35719 | | | | 35719 | | | | 35719 | | | | 35719 | |
| **Buckhurst Hill** | | | **0** | | BKH-1 | SR-0176 | 60 | 130 | BKH-1 | SR-0176 | 60 | 130 | BKH-1 | SR-0176 | 60 | 130 | BKH-1 | SR-0176 | 60 | 130 | BKH-1 | SR-0176 | 60 | 130 | BKH-1 | SR-0176 | 60 | 130 |
| | | | | | BKH-2 | SR-0230 | 12 | 140 | | | | | BKH-2 | SR-0230 | 12 | 140 | BKH-2 | SR-0230 | 12 | 140 | BKH-2 | SR-0230 | 12 | 140 | BKH-2 | SR-0230 | 12 | 140 |
| **Buckhurst Hill Subtotal** | | | **0** | | | | **72** | | | | **60** | | | | **72** | | | | **72** | | | | **72** | | | | **72** | |
| Existing Dwellings | | | 4742 | | | | 4742 | | | | 4742 | | | | 4742 | | | | | | | | 4742 | | | | 4742 | |
| **Chigwell** | | | **0** | | CHG-1 | SR-0014 | 10 | 110 | CHG-1 | SR-0014 | 10 | 110 | CHG-1 | SR-0014 | 10 | 110 | CHG-1 | SR-0014 | 10 | 110 | CHG-1 | SR-0014 | 10 | 110 | CHG-1 | SR-0014 | 10 | 110 |
| | | | | | | ~~SR-0318~~ | ~~448~~ | ~~75~~ | CHG-B | SR-0318 | 448 | 75 | | ~~SR-0318~~ | ~~448~~ | ~~75~~ | CHG-B | SR-0318 | 448 | 75 | | ~~SR-0318~~ | ~~448~~ | ~~75~~ | | ~~SR-0318~~ | ~~448~~ | ~~75~~ |
| | | | | | CHG-B | SR-0433 | 75 | 90 | | | | | CHG-B | SR-0433 | 75 | 90 | | | | | CHG-B | SR-0433 | 75 | 90 | CHG-B | SR-0433 | 75 | 90 |
| | | | | | CHG-D | SR-0478(b) | 50 | 90 | | | | | CHG-D | SR-0478(b) | 50 | 90 | | | | | CHG-D | SR-0478(b) | 50 | 85 | | ~~SR-0478(b)~~ | ~~50~~ | ~~85~~ |
| | | | | | | | | | | | | | | | | | | | | | CHG-D | SR-0478(a) | 175 | 90 | CHG-D | SR-0478(a) | 175 | 90 |
| **Chigwell Subtotal** | | | **0** | | | | **135** | | | | **458** | | | | **135** | | | | **458** | | | | **310** | | | | **260** | |
| Existing Dwellings | | | 2653 | | | | 2653 | | | | 2653 | | | | 2653 | | | | 2653 | | | | 2653 | | | | 2653 | |
| **Chipping Ongar** | ONG-1 | SR-0022 | 5 | 130 | ONG-1 | SR-0022 | 5 | 130 | ONG-1 | SR-0022 | 5 | 130 | ONG-1 | SR-0022 | 5 | 130 | ONG-1 | SR-0022 | 5 | 130 | ONG-1 | SR-0022 | 5 | 130 | ONG-1 | SR-0022 | 5 | 130 |
| | ONG-E | SR-0112 | 765 | 85 | ONG-E | SR-0112 | 765 | 85 | ONG-E | SR-0112 | 765 | 85 | ONG-E | SR-0112 | 765 | 85 | ONG-E | SR-0112 | 765 | 85 | ONG-E | SR-0112 | 765 | 85 | | ~~SR-0112~~ | ~~765~~ | ~~85~~ |
| | ONG-E | SR-0268 | 43 | 95 | ONG-E | SR-0268 | 43 | 95 | ONG-E | SR-0268 | 43 | 95 | ONG-E | SR-0268 | 43 | 95 | ONG-E | SR-0268 | 43 | 95 | ONG-E | SR-0268 | 43 | 95 | | ~~SR-0268~~ | ~~43~~ | ~~95~~ |
| | | ~~SR-0067~~ | ~~1620~~ | ~~80~~ | | | | | | ~~SR-0067~~ | ~~1620~~ | ~~80~~ | ONG-D | SR-0053 | 7 | 100 | | ~~SR-0067~~ | ~~1620~~ | ~~80~~ | | ~~SR-0067~~ | ~~1620~~ | ~~80~~ | | ~~SR-0067~~ | ~~1620~~ | ~~80~~ |
| | ONG-F | SR-0120 | 100 | 95 | | | | | ONG-F | SR-0120 | 100 | 95 | ONG-D | SR-0090 | 114 | 95 | ONG-F | SR-0120 | 100 | 95 | ONG-F | SR-0120 | 100 | 95 | ONG-F | SR-0120 | ~~100~~ | ~~95~~ |
| | ONG-F | SR-0390 | 272 | 105 | | | | | ONG-F | SR-0390 | 272 | 105 | | ~~SR-0267~~ | ~~1325~~ | ~~75~~ | ONG-F | SR-0390 | 272 | 105 | ONG-F | SR-0390 | 272 | 105 | ONG-F | SR-0390 | 272 | 105 |
| | | | | | | | | | | | | | ONG-D | SR-0391 | 172 | 95 | ONG-D | SR-0053 | 7 | 100 | | | | | | | | |
| | | | | | | | | | | | | | | | | | | ~~SR-0267~~ | ~~1325~~ | ~~75~~ | | | | | | | | |
| | | | | | | | | | | | | | | | | | ONG-D | SR-0391 | 172 | 95 | | | | | | | | |
| **Chipping Ongar Subtotal** | | | **1185** | | | | **813** | | | | **1185** | | | | **1106** | | | | **1478** | | | | **1185** | | | | **277** | |
| Existing Dwellings | | | 1686 | | | | 1686 | | | | 1686 | | | | 1686 | | | | 1686 | | | | 1686 | | | | 1686 | |
| **Epping** | EPP-1 | SR-0281 | 50 | 135 | EPP-1 | SR-0281 | 50 | 135 | EPP-1 | SR-0281 | 50 | 135 | EPP-1 | SR-0281 | 50 | 135 | EPP-1 | SR-0281 | 50 | 135 | EPP-1 | SR-0281 | 50 | 135 | EPP-1 | SR-0281 | 50 | 135 |
| | EPP-2 | SR-0347 | 35 | 145 | EPP-2 | SR-0347 | 35 | 145 | EPP-2 | SR-0347 | 35 | 145 | EPP-2 | SR-0347 | 35 | 145 | EPP-2 | SR-0347 | 35 | 145 | EPP-2 | SR-0347 | 35 | 145 | EPP-2 | SR-0347 | 35 | 145 |
| | EPP-3 | SR-0005 | 12 | 140 | EPP-3 | SR-0005 | 12 | 140 | EPP-3 | SR-0005 | 12 | 140 | EPP-3 | SR-0005 | 12 | 140 | EPP-3 | SR-0005 | 12 | 140 | EPP-3 | SR-0005 | 12 | 140 | EPP-3 | SR-0005 | 12 | 140 |
| | EPP-4 | SR-0278 | 0 | 135 | EPP-4 | SR-0278 | 0 | 135 | EPP-4 | SR-0278 | 0 | 135 | EPP-4 | SR-0278 | 0 | 135 | EPP-4 | SR-0278 | 0 | 135 | EPP-4 | SR-0278 | 0 | 135 | EPP-4 | SR-0278 | 0 | 135 |
| | EPP-E | SR-0208 | 0 | 130 | EPP-E | SR-0208 | 0 | 130 | EPP-E | SR-0208 | 0 | 130 | EPP-E | SR-0208 | 0 | 130 | EPP-E | SR-0208 | 0 | 130 | EPP-E | SR-0208 | 0 | 130 | EPP-E | SR-0208 | 0 | 130 |
| | EPP-F | SR-0466 | 44 | 105 | EPP-F | SR-0466 | 44 | 105 | EPP-F | SR-0466 | 44 | 105 | EPP-F | SR-0466 | 44 | 105 | EPP-F | SR-0466 | 44 | 105 | EPP-F | SR-0466 | 44 | 105 | EPP-F | SR-0466 | 44 | 105 |
| | Z-E8 | SR-0506 | 67 | 100 | Z-E8 | SR-0506 | 67 | 100 | Z-E8 | SR-0506 | 67 | 100 | Z-E8 | SR-0506 | 67 | 100 | Z-E8 | SR-0506 | 67 | 100 | | ~~SR-0506~~ | ~~67~~ | ~~100~~ | | ~~SR-0506~~ | ~~67~~ | ~~100~~ |
| | | | | | | ~~SR-0113b~~ | ~~200~~ | ~~95~~ | EPP-G | SR-0113b | 200 | 95 | EPP-G | SR-0113b | 200 | 95 | EPP-G | SR-0113b | 200 | 95 | | ~~SR-0113b~~ | ~~200~~ | ~~95~~ | | ~~SR-0113b~~ | ~~200~~ | ~~95~~ |
| | | | | | | | | | | | | | | ~~SR-0132a~~ | ~~5000~~ | ~~105~~ | | ~~SR-0132a~~ | ~~5000~~ | ~~105~~ | | ~~SR-0132a~~ | ~~5000~~ | ~~105~~ | EPP-D | SR-0132a | 5000 | 105 |
| | | | | | | | | | | | | | | | | | | | | | EPP-B | SR-0406 | 604 | 105 | EPP-B | SR-0406 | 604 | 105 |
| **Epping Subtotal** | | | **208** | | | | **208** | | | | **408** | | | | **408** | | | | **408** | | | | **745** | | | | **5745** | |
| Existing Dwellings | | | 5180 | | | | 5180 | | | | 5180 | | | | 5180 | | | | 5180 | | | | 5180 | | | | 5180 | |
| **Loughton / Debden** | LOU-1 | SR-0058 | 78 | 100 | LOU-1 | SR-0058 | 78 | 100 | LOU-1 | SR-0058 | 78 | 100 | LOU-1 | SR-0058 | 78 | 100 | LOU-1 | SR-0058 | 78 | 100 | LOU-1 | SR-0058 | 78 | 100 | LOU-1 | SR-0058 | 78 | 100 |
| | LOU-6 | SR-0289 | 41 | 155 | LOU-6 | SR-0289 | 41 | 155 | LOU-6 | SR-0289 | 41 | 155 | LOU-6 | SR-0289 | 41 | 155 | LOU-6 | SR-0289 | 41 | 155 | LOU-6 | SR-0289 | 41 | 155 | LOU-6 | SR-0289 | 41 | 155 |
| | LOU-9 | SR-0286 | 80 | 155 | LOU-9 | SR-0286 | 80 | 155 | LOU-9 | SR-0286 | 80 | 155 | LOU-9 | SR-0286 | 80 | 155 | LOU-9 | SR-0286 | 80 | 155 | LOU-9 | SR-0286 | 80 | 155 | LOU-9 | SR-0286 | 80 | 155 |
| | LOU-11 | SR-0059 | 10 | 140 | LOU-11 | SR-0059 | 10 | 140 | LOU-11 | SR-0059 | 10 | 140 | LOU-11 | SR-0059 | 10 | 140 | LOU-11 | SR-0059 | 10 | 140 | LOU-11 | SR-0059 | 10 | 140 | LOU-11 | SR-0059 | 10 | 140 |
| | | | | | LOU-7 | SR-0285 | 19 | 155 | | | | | LOU-7 | SR-0285 | 19 | 155 | LOU-7 | SR-0285 | 19 | 155 | LOU-7 | SR-0285 | 19 | 155 | LOU-7 | SR-0285 | 19 | 155 |
| | | | | | LOU-8 | SR-0284 | 41 | 150 | | | | | LOU-8 | SR-0284 | 41 | 150 | LOU-8 | SR-0284 | 41 | 150 | LOU-8 | SR-0284 | 41 | 150 | LOU-8 | SR-0284 | 41 | 150 |
| | | | | | | ~~SR-0446~~ | ~~80~~ | ~~90~~ | | | | | LOU-1 | SR-0446 | 80 | 90 | | | | | LOU-1 | SR-0446 | 80 | 90 | LOU-1 | SR-0446 | 80 | 90 |
| | | | | | LOU-1 | SR-0436 | 4 | 120 | | | | | LOU-1 | SR-0436 | 4 | 120 | | | | | LOU-1 | SR-0436 | 4 | 120 | LOU-1 | SR-0436 | 4 | 120 |
| **Loughton / Debden Subtotal** | | | **209** | | | | **273** | | | | **209** | | | | **353** | | | | **269** | | | | **353** | | | | **353** | |
| Existing Dwellings | | | 12961 | | | | 12961 | | | | 12961 | | | | 12961 | | | | 12961 | | | | 12961 | | | | 12961 | |
| **Nazeing/ Lower Nazeing** | | | **0** | | | ~~SR-0434~~ | ~~150~~ | ~~70~~ | NAZ-B | SR-0507 | 55 | 80 | NAZ-A | SR-0434 | 150 | 70 | NAZ-B | SR-0507 | 55 | | | ~~SR-0011~~ | ~~262~~ | ~~95~~ | | ~~SR-0011~~ | ~~262~~ | ~~95~~ |
| | | | | | NAZ-B | SR-0507 | 55 | 80 | | | | | NAZ-B | SR-0507 | 55 | 80 | | | | | | ~~SR-0101~~ | ~~7~~ | ~~65~~ | | ~~SR-0101~~ | ~~7~~ | ~~65~~ |
| | | | | | | | | | | | | | | | | | | | | | | ~~SR-0300~~ | ~~447~~ | ~~85~~ | | ~~SR-0300~~ | ~~447~~ | ~~85~~ |
| | | | | | | | | | | | | | | | | | | | | | | ~~SR-0507~~ | ~~55~~ | ~~80~~ | | ~~SR-0507~~ | ~~55~~ | ~~80~~ |
| **Nazeing/ Lower Nazeing Subtotal** | | | **0** | | | | **55** | | | | **55** | | | | **205** | | | | **55** | | | | **0** | | | | **0** | |
| Existing Dwellings | | | 1614 | | | | 1614 | | | | 1614 | | | | 1614 | | | | 1614 | | | | 1614 | | | | 1614 | |
| **Lower Sheering** | | | **0** | | LSH-B | SR-0121 | 14 | 95 | LSH-B | SR-0121 | 14 | 95 | LSH-B | SR-0121 | 14 | 95 | LSH-B | SR-0121 | 14 | 95 | LSH-B | SR-0121 | 14 | 95 | | ~~SR-0121~~ | ~~14~~ | ~~95~~ |
| **Lower Sheering Subtotal** | | | **0** | | | | **14** | | | | **14** | | | | **14** | | | | **14** | | | | **14** | | | | **0** | |
| Existing Dwellings | | | 839 | | | | 839 | | | | 839 | | | | 839 | | | | 839 | | | | 839 | | | | 839 | |
| **Sheering** | | | **0** | | LSH-B | SR-0472 | 34 | 65 | | | 0 | | SHE-A | SR-0073 | 71 | 75 | | | 0 | | LSH-B | SR-0472 | 34 | 65 | | ~~SR-0472~~ | ~~34~~ | ~~65~~ |
| | | | | | | | | | | | | | | | | | | | | | SHE-A | SR-0073 | 71 | 75 | | ~~SR-0073~~ | ~~71~~ | ~~75~~ |
| | | | | | | | | | | | | | | | | | | | | | SHE-C | SR-0449 | 6 | 60 | | ~~SR-0449~~ | ~~6~~ | ~~60~~ |
| | | | | | | | | | | | | | | | | | | | | | SHE-C | SR-0450 | 3 | 55 | | ~~SR-0450~~ | ~~3~~ | ~~55~~ |
| **Sheering Subtotal** | | | **0** | | | | **34** | | | | **0** | | | | **71** | | | | **0** | | | | **114** | | | | **0** | |
| Existing Dwellings | | | 839 | | | | 839 | | | | 839 | | | | 839 | | | | 839 | | | | 839 | | | | 839 | |
| **North Weald Bassett including North Weald Airfield** | | Low Growth | 454 | | | Low Growth | 454 | | | Medium Growth | 1347 | | | Low Growth | 454 | | | High Growth | 2397 | | | Medium Growth | 1347 | | | Low Growth | 454 | |
| North Weald Bassett Subtotal | | | 454 | | | | 454 | | | | 1347 | | | | 454 | | | | 2397 | | | | 1347 | | | | 454 | |
| Existing Dwellings | | | 1865 | | | | 1865 | | | | 1865 | | | | 1865 | | | | 1865 | | | | 1865 | | | | 1865 | |
| **Roydon** | | | **0** | | ROY-B | SR-0197 | 5 | 55 | | | 0 | | ROY-B | SR-0197 | 5 | 55 | | | 0 | | ROY-B | SR-0197 | 5 | 55 | ROY-B | SR-0197 | 5 | 55 |
| | | | | | ROY-B | SR-0306 | 703 | 45 | | | | | ROY-B | SR-0306 | 703 | 45 | | | | | ROY-B | SR-0306 | 703 | 45 | | ~~SR-0306~~ | ~~703~~ | ~~45~~ |
| **Roydon Subtotal** | | | **0** | | | | **708** | | | | **0** | | | | **708** | | | | **0** | | | | **708** | | | | **5** | |
| Existing Dwellings | | | 914 | | | | 914 | | | | 914 | | | | 914 | | | | 914 | | | | 914 | | | | 914 | |
| **Theydon Bois** | THB-B | SR-0080 | 68 | 95 | THB-B | SR-0080 | 68 | 95 | THB-B | SR-0080 | 68 | 95 | THB-B | SR-0080 | 68 | 95 | THB-B | SR-0080 | 68 | 95 | THB-B | SR-0080 | 68 | 95 | | ~~SR-0080~~ | ~~68~~ | ~~95~~ |
| | | ~~SR-0497~~ | ~~31~~ | ~~80~~ | | ~~SR-0497~~ | ~~31~~ | ~~80~~ | THB-A | SR-0497 | 31 | 80 | | ~~SR-0497~~ | ~~31~~ | ~~80~~ | THB-A | SR-0497 | 31 | 80 | | ~~SR-0497~~ | ~~31~~ | ~~80~~ | | ~~SR-0497~~ | ~~31~~ | ~~80~~ |
| | | | | | THB-A | SR-0070 | 0 | 0 | | | | | | ~~SR-0026c~~ | ~~306~~ | ~~90~~ | | | | | THB-A | SR-0070 | 0 | 0 | THB-A | SR-0070 | 0 | 0 |
| | | | | | THB-A | SR-0327b | 171 | 105 | | | | | | | | | | | | | THB-A | SR-0327b | 171 | 105 | THB-A | SR-0327b | 171 | 105 |
| | | | | | | | | | | | | | | | | | | | | | | ~~SR-0026c~~ | ~~306~~ | ~~90~~ | | ~~SR-0026c~~ | ~~306~~ | ~~90~~ |
| **Theydon Bois Subtotal Revised** | | | **68** | | | | **239** | | | | **99** | | | | **68** | | | | **99** | | | | **239** | | | | **171** | |
| Existing Dwellings | | | 1693 | | | | 1693 | | | | 1693 | | | | 1693 | | | | 1693 | | | | | | | | | |
| **Thornwood** | | | **0** | | | ~~SR-0043~~ | ~~86~~ | ~~65~~ | THO-1 | SR-0271 | 10 | 80 | THO-1 | SR-0271 | 10 | 80 | THO-1 | SR-0271 | 10 | 80 | THO-1 | SR-0271 | 10 | 80 | THO-1 | SR-0271 | 10 | 80 |
| | | | | | THO-A | SR-0149 | 175 | 70 | | | | | THO-A | SR-0043 | 86 | 65 | | | | | | ~~SR-0043~~ | ~~86~~ | ~~65~~ | | ~~SR-0043~~ | ~~86~~ | ~~65~~ |
| | | | | | | | | | | | | | THO-A | SR-0149 | 175 | 70 | | | | | THO-A | SR-0149 | 175 | 70 | | ~~SR-0149~~ | ~~175~~ | ~~70~~ |
| **Thornwood Subtotal** | | | **0** | | | | **175** | | | | **10** | | | | **271** | | | | **10** | | | | **185** | | | | **10** | |
| Existing Dwellings | | | 2599 | | | | 2599 | | | | 2599 | | | | 2599 | | | | 2599 | | | | 2599 | | | | 2599 | |
| **Waltham Abbey** | WAL-1 | SR-0283 | 0 | 0 | WAL-1 | SR-0283 | 0 | 0 | WAL-1 | SR-0283 | 0 | 0 | WAL-1 | SR-0283 | 0 | 0 | WAL-1 | SR-0283 | 0 | 0 | WAL-1 | SR-0283 | 0 | 0 | WAL-1 | SR-0283 | 0 | 0 |
| | WAL-1 | SR-0380 | 41 | 110 | WAL-1 | SR-0380 | 41 | 110 | WAL-1 | SR-0380 | 41 | 110 | WAL-1 | SR-0380 | 41 | 110 | WAL-1 | SR-0380 | 41 | 110 | WAL-1 | SR-0380 | 41 | 110 | | ~~SR-0380~~ | ~~41~~ | ~~110~~ |
| | WAL-1 | SR-0381 | 15 | 120 | WAL-1 | SR-0381 | 15 | 120 | WAL-1 | SR-0381 | 15 | 120 | WAL-1 | SR-0381 | 15 | 120 | WAL-1 | SR-0381 | 15 | 120 | WAL-1 | SR-0381 | 15 | 120 | WAL-1 | SR-0381 | 15 | 120 |
| | WAL-1 | SR-0382 | 0 | 0 | WAL-1 | SR-0382 | 0 | 0 | WAL-1 | SR-0382 | 0 | 0 | WAL-1 | SR-0382 | 0 | 0 | WAL-1 | SR-0382 | 0 | 0 | WAL-1 | SR-0382 | 0 | 0 | WAL-1 | SR-0382 | 0 | 0 |
| | WAL-3 | SR-0021 | 10 | 140 | WAL-3 | SR-0021 | 10 | 140 | WAL-3 | SR-0021 | 10 | 140 | WAL-3 | SR-0021 | 10 | 140 | WAL-3 | SR-0021 | 10 | 140 | WAL-3 | SR-0021 | 10 | 140 | WAL-3 | SR-0021 | 10 | 140 |
| | WAL-4 | SR-0384 | 199 | 135 | WAL-4 | SR-0384 | 199 | 135 | WAL-4 | SR-0384 | 199 | 135 | WAL-4 | SR-0384 | 199 | 135 | WAL-4 | SR-0384 | 199 | 135 | WAL-4 | SR-0384 | 199 | 135 | WAL-4 | SR-0384 | 199 | 135 |
| | WAL-F | SR-0089a | 341 | 105 | WAL-4 | SR-0482 | 21 | 120 | WAL-F | SR-0089a | 341 | 105 | WAL-4 | SR-0482 | 21 | 120 | WAL-F | SR-0089a | 341 | 105 | WAL-F | SR-0089a | 341 | 105 | | ~~SR-0089a~~ | ~~341~~ | ~~105~~ |
| | WAL-F | SR-0089b | 0 | 100 | | ~~SR-0034~~ | ~~500~~ | ~~90~~ | WAL-F | SR-0089b | 0 | 100 | WAL-B | SR-0034 | 500 | 90 | WAL-F | SR-0089b | 0 | 100 | WAL-F | SR-0089b | 0 | 100 | WAL-F | SR-0089b | 0 | 100 |
| | WAL-F | SR-0099 | 100 | 110 | | | | | WAL-F | SR-0099 | 100 | 110 | WAL-F | SR-0089a | 341 | 105 | WAL-F | SR-0099 | 100 | 110 | WAL-F | SR-0099 | 100 | 110 | | ~~SR-0099~~ | ~~100~~ | ~~110~~ |
| | WAL-F | SR-0104 | 150 | 115 | | | | | WAL-F | SR-0104 | 150 | 115 | WAL-F | SR-0089b | 0 | 100 | WAL-F | SR-0104 | 150 | 115 | WAL-F | SR-0104 | 150 | 115 | WAL-F | SR-0104 | 150 | 115 |
| | WAL-F | SR-0376 | 81 | 110 | | | | | WAL-F | SR-0376 | 81 | 110 | WAL-F | SR-0099 | 100 | 110 | WAL-F | SR-0376 | 81 | 110 | WAL-F | SR-0376 | 81 | 110 | | ~~SR-0376~~ | ~~81~~ | ~~110~~ |
| | | ~~SR-0034~~ | ~~500~~ | ~~90~~ | | | | | WAL-4 | SR-0482 | 21 | 120 | WAL-F | SR-0104 | 150 | 115 | WAL-4 | SR-0482 | 21 | 120 | | ~~SR-0034~~ | ~~500~~ | ~~90~~ | | ~~SR-0034~~ | ~~500~~ | ~~90~~ |
| | | | | | | | | | WAL-B | SR-0034 | 500 | 90 | WAL-F | SR-0376 | 81 | 110 | | ~~SR-0034~~ | ~~500~~ | ~~90~~ | WAL-4 | SR-0482 | 21 | 120 | WAL-4 | SR-0482 | 21 | 120 |
| **Waltham Abbey Subtotal** | | | **937** | | | | **286** | | | | **1458** | | | | **1458** | | | | **958** | | | | **958** | | | | **395** | |
| Existing Dwellings | | | 8812 | | | | 8812 | | | | 8812 | | | | 8812 | | | | 8812 | | | | 8812 | | | | 8812 | |
| **TOTAL** | | | **5336** | | | | **5244** | | | | **7081** | | | | **7101** | | | | **10271** | | | | **10283** | | | | **9795** | |

## 3) Location Map of Assessed Junctions, LDP Sites and Committed Developments in Epping Forest District