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Braintree Local Plan – Garden Communities Update

Highways/Transport Planning

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1. Introduction

1. To date, three reports addressing the transport aspects of Braintree's Local Plan have been produced. The first report, "Braintree Local Plan – Options Assessment" in February 2016 for Braintree District Council (BDC) and Essex County Council (ECC) described the expected impact on the local transport network of six development options for Braintree Local Plan. An Interim Assessment was then produced in June 2016 to investigate the potential for mitigation of the transport impact. Thirdly, in March 2017, a Preferred Option Assessment report considered the expected impact of the preferred Local Plan option on the transport network and the demands it will place on the transport system. Alongside the Preferred Option Assessment, work was ongoing for North Essex Garden Communities (NEGC) Ltd investigating access strategies, potential sustainable transport measures, likely trip generation and distribution and mitigation measures for the three proposed North Essex Garden Communities, two of which, Colchester / Braintree Borders and West of Braintree, are located within Braintree District.

2. This latter work led to the May 2017 North Essex Garden Community Movement and Access Study, from which we have been asked to incorporate the more detailed Garden Community trip generation and distribution into the Braintree Local Plan Preferred Option Assessment, so as to further refine the likely transport implications of the preferred option. The purpose of this study is to identify whether there is significant difference between the trip generation and distribution used for the Garden Communities in the Local Plan Preferred Option Assessment modelling and that used in the NEGC Movement and Access Study. The result will then indicate whether additional assessment work is required.

3. Further, the data and assumptions used to forecast development trips in the Local Plan and Garden Community studies have then been compared so that the reasons for any differences between the forecasts can then be understood. This Technical Note outlines the process followed to incorporate the revised Garden Community trip generation and distribution into the original local plan modelling and specifically to assess whether junctions and previously proposed mitigating measures require re-evaluation.

2. Background to methods used in LP and NEGC work

4. During the previous stages of Local Plan modelling work, the Garden Communities were treated like any other development in terms of trip generation and distribution. However, as outlined in the North Essex Garden Community Movement and Access Study, these new developments are intended to be innovative as they aim to be exemplary in terms of sustainable travel and car trip reduction.

5. The objective of the Garden Community is to create a community where walking and cycling play a substantially more central role in urban transportation than they currently do in most communities and to maximise the desirability and use of public transport. However, successfully internalising trips and providing sufficient public transport to connect with the rest of North Essex remains a key issue.

6. In order to assess the worst case scenario as well as the successful implementation of the sustainable community vision, the NEGC Movement and Access Study has provided two scenarios.
   - The first is a scenario developed from the results of journey to work data from the 2010 Census, which assumes the Garden Communities, as they grow, will internalise trips at a similar rate to existing settlements. This has been based on analysis of Census data which compared the size of existing settlements to the proportion of internal and external journey to work trips. This was then used to form an internalisation factor for the Garden Communities, which increases as the size of the developments grow.
   - The second scenario is an ambitious scenario which is based on successful implementation and uptake of sustainable transport measures and the assumption that trips will be internalised at a faster rate than for existing developments and thus the desired modal split will be met by the time the Garden Communities are fully developed.

2.1 Trip generation

7. The TRICS (Trip Rate Information Computer System) database was used in both the Local Plan and NEGC Movement and Access Study to estimate the number of trips generated by the two Garden Community developments within the Braintree Local Plan.

8. The Garden Communities study has mitigated the tendency for TRICS to overestimate trip rates for larger sites by using internalisation factors from the following other suitable sources and assumptions.
   - Home to work – analysis of 2011 Census data for various settlements based on population and age of the settlement.
   - Home to education – analysis of Essex school census data. In Colchester 96% of primary school children go to a local school, whereas 70% of secondary school children go to a local school. In Braintree 92% of primary school children go to a local school, whereas only 52% of secondary school children go to a local school.
   - Home to mixed use – based on a weighted average of retail, health and other (leisure) land uses.
     - Retail (Convenience) – based on Nathaniel Lichfield & Partners Cambourne Retail and Employment Study (2013)1 for South Cambridgeshire District Council suggested an internalisation factor of 75%.
     - Health – based on analysis of NHS data on annual visits by people to GPs, Dentists and Hospitals with the assumption that only those involving hospitals should be external to a settlement – resulting in an internalisation figure of 72%.
     - Other – a broad assumption of 50% of trips would be external.

[1] https://www.scambs.gov.uk/sites/default/files/documents/Cambourne%20Retail%20and%20Employment%20Study.PDF

9. The resulting internalisation factor for home to mixed use, by time period reflecting the different journey purposes defined by the NTS, varies between 65% in the AM peak to 62% in the PM peak.

2.2 Mode choice

10. The previous Local Plan work used the TRICS database excluding Ireland, Northern Ireland, Inner London Boroughs and weekend surveys in order to obtain a trip rate for vehicles for each of the developments' land use sub-categories across residential, retail and employment sectors.

11. The NEGC Movement and Access Study used 2011 Census journey to work data specific for Colchester / Braintree Borders and West of Braintree to establish the proportion of external trips that were hinterland and which were further afield, and thus the modal split of these trips.

West of Braintree (Census)

- Hinterland trips (< 5miles): Active modes 23%, Public Transport 6%, Car 71%
- Longer distance trips: Active modes 0%, Public Transport 15.5%, Car 84.5%

Colchester / Braintree Borders (Census)

- Hinterland trips (< 5miles): Active modes 11%, Public Transport 13%, Car 75%
- Longer distance trips: Active modes 0%, Public Transport 17%, Car 83%

12. The ambitious scenario for the Garden Communities considers a modal split of 40% active modes (walking and cycling), 30% public transport and 30% car across all trips as part of the vision for the new development to be exemplary in terms of sustainable travel. It is expected that the majority of active mode trips that make up the 40% share, will be internalised or within 5 miles, and thus trip proportions vary according to the trip distance:

- Hinterland trips (< 5miles): Active modes 24%, Public Transport 38%, Car 38%
- Longer distance trips: Active modes 0%, Public Transport 50%, Car 50%

2.3 Trip distribution

13. The Preferred Option Assessment used a similar methodology to the NEGC Movement and Access Study in that 2011 Census Journey to Work data was used to create a distribution of commuting trips and Essex Schools data was used to create distribution of education trips for the AM peak. However, the 2011 Census data was refined by using Census Output areas to create zones, whereas the NEGC work only used Census Medium Super Output Areas (MSOAs), as detailed in Section 2.4. The Preferred Option Assessment used a gravity model to create a distribution for "other" trips i.e. business, personal business, leisure, and shopping trips. The gravity model used forecast trip ends from TEMPro (NTEM 6.2) and a target trip length distribution for private car and van trips, which was derived from the DfT National Travel Survey data (2002-2013), to create a distribution for "other" trips. The Preferred Option Assessment assumed trips for both Garden Communities would distribute similar to the town of Braintree.

14. The NEGC Movement and Access Study, as noted above, used 2011 Census journey to work data to create a distribution for commuting trips. However this was not as refined as for the Preferred Option Assessment, as the zones for the NEGC work were based on 2011 Census Medium Super Output Areas (MSOAs).

15. As outlined in section 2.1, a large proportion of the education trips are expected to be internalised, but for those that are not, the distribution has been estimated based on anonymised postcode data from the Essex Sustainable Mode of Travel Study for Schools. The most significant difference between the trip distribution for the NEGC Movement and Access Study and the Preferred Option Assessment, is the way in which "other" trips have been distributed. The NEGC work analysed

retail studies [2], which were commissioned in support of the Local Plan process, to determine where residents in the Garden Communities would be likely to shop for their convenience shopping if they did not shop locally.

16. As noted in section 2.1, a high degree of internalisation has been assumed based on evidence from Cambourne in Cambridgeshire. Retail comparison shopping was not considered in the latter work, as it is not typically a major journey purpose during the working week peak hours. Health trips external to the network have been considered based on the Primary Care Trust responsible for each of the areas. For the West of Braintree Garden Community, journeys are split between Braintree Community Hospital and Broomfield Hospital based on frequency of visits to the Primary Care Trust's local and regional hospitals in 2015. For the Braintree / Colchester Borders Garden Community, it has been assumed that these trips are just to Colchester Hospital. "Other" trips were given the same distribution as retail for simplicity.

2.4 Combined Trip Assignment

17. While both the NEGC Movement and Access Study and the Local Plan modelling used 2011 Census data to inform the development of zones, in order to distribute trips, the Local Plan modelling was more refined in some areas, and less refined in others. Therefore work had to be undertaken to combine the two sets of matrices into the Local Plan format, and thus allow a direct comparison with the Preferred Option Assessment modelling.

18. Where the zones from the NEGC Movement and Access Study were more detailed than the Local Plan modelling zones, the garden community trips were simply summed and allocated to the appropriate Local Plan zone.

19. In order to include the refined trip generation and distribution from the NEGC Movement and Access Study within the Local plan model, the trips previously forecast for the two Garden Communities in Braintree were removed from the local plan matrices and the trip distribution was modified accordingly. For the purposes of this work, it was assumed there would be 2,500 homes at the Colchester / Braintree Borders Garden Community along with associated employment and amenities by 2033, while it was assumed there would be 3,500 homes at the West of Braintree Garden Community along with associated employment and amenities by 2033. Therefore the Local Plan modelling from the Preferred Option Assessment, which assumed consistent growth at the Garden Communities (i.e. 1,500 homes at both, or 2,500 or 3,500), was updated to reflect this and allow a direct comparison to be made.

20. In some areas, particularly urban areas such as Braintree, the Local Plan zones were more detailed than the larger zones used in the NEGC Movement and Access Study. Therefore for each one NEGC Movement and Access Study zone that represented several Local Plan zones, the trips allocated to this zone were spread across the Local Plan zones by using the proportion of trips already travelling to those zones in the Local Plan modelling.

[2] Braintree District Council Retail Study, 2015 & Colchester Borough Council Retail and Town Centre Uses Study, Retail Update, 2013

3. Results

21. This section outlines the results of this study and identifies where there has been significant change as a result of incorporating the NEGC work. It should be noted that for the purposes of differentiating between the scenarios they have been labelled as follows;

    - Initial Local Plan Work – this is the updated local plan results using the methodology from the Preferred Option Assessment;
    - Mode Choice based on Census – the updated local plan flows incorporating the Census based internalisation factors at each of the Garden Communities;
    - Mode Choice based on ambitious targets – the updated local plan flows incorporating ambitious modal share targets for each of the Garden Communities.

22. From here on in, the report will refer to these scenarios as “Local Plan”, “Census” and “Ambitious” respectively. It should also be noted that this study will be directly comparing only the Local Plan and Census scenarios for the purposes of assessing whether further work is required. However the results of the ambitious scenario will also be acknowledged.

3.1 Key Links Comparison

23. This section provides a comparison of development traffic flows, extracted from the VISUM used in the Local Plan modelling work, along key links for the Local Plan scenario and the two scenarios flows which incorporate the NEGC work. An additional link was added to the VISUM network between the north of the West of Braintree Garden Community and Shalford Green in order to create a secondary access point as proposed by the NEGC Movement and Access Study. That study also identified that this secondary access would be used by a minimal amount of traffic (AM: c.10% in, c. 5% out; PM: c.6% in, c. 9% out) and so the amount of development traffic that could use this access was limited in VISUM.

24. Tables 3.1, 3.2 and 3.3 show the difference in forecasted trips on key links between the Local Plan scenario and the two scenarios incorporating the NEGC work.

Table 3.1: A120 development traffic flow comparison

		AM			PM		
Location	**Direction**	**Local Plan**	**Census**	**Ambitious**	**Local Plan Work**	**Census**	**Ambitious**
Dunmow - East of Dunmow West Interchange	Eastbound	472	495	408	591	631	497
	Westbound	739	864	665	449	483	385
Little Dunmow - East of Dunmow South Interchange	Eastbound	376	317	310	437	358	343
	Westbound	554	388	450	339	272	263
Braintree - West of Panners Interchange	Eastbound	1756	1157	807	1524	910	678
	Westbound	1733	1025	776	1630	828	628
Braintree - East of Panners Interchange	Eastbound	1944	1297	1200	701	386	294
	Westbound	1403	932	796	1791	1151	1100
Braintree - East of Marks Farm Roundabout	Eastbound	840	348	333	984	482	427
	Westbound	1039	469	398	990	460	428
Coggeshall - West of junction with Colne Road	Eastbound	759	173	154	875	223	165
	Westbound	1068	423	343	922	250	212
Marks Tey - West of A12 J25	Eastbound	694	403	222	374	312	265
	Westbound	1438	469	346	484	339	380

25. The revised modelling forecasts similar flows for the sections of the A120 around Great Dunmow. However, the modelling suggests that sections of A120 around Panners Interchange and going east towards the junction with the A12, may be significantly lower than originally reported with a maximum difference of 802 development trips between the Local Plan scenario and the Census scenario in the PM peak in the westbound direction on the section of A120 to the west of Panners Interchange.

Table 3.2: A12 development traffic flow comparison

		AM			PM		
Location	**Direction**	**Local Plan**	**Census**	**Ambitious**	**Local Plan**	**Census**	**Ambitious**
Colchester - West of J23	Eastbound	754	603	569	550	451	434
	Westbound	611	506	478	404	317	307
Colchester - East of J23	Eastbound	517	332	299	326	177	160
	Westbound	72	65	65	231	112	101
Colchester - East of J24	Eastbound	786	499	450	383	236	219
	Westbound	150	143	143	311	192	182
Colchester - East of J25	Eastbound	514	801	597	437	569	445
	Westbound	487	512	414	475	681	523

26. From Table 3.2, above, it can be seen that the development trip forecasts on the A12 are generally lower in the Census scenario, with the exception of the section to the east of J25. Other significant differences are eastbound to the east of J24 and eastbound to the east of J23.

Table 3.3: Development traffic flow comparison on other links

		AM			PM		
Location	**Direction**	**Local Plan**	**Census**	**Ambitious**	**Local Plan**	**Census**	**Ambitious**
B1256 - Dunmow	Eastbound	96	178	98	154	273	154
East of B1256/Chelmsford Road roundabout	Westbound	184	388	215	110	212	122
Blake End - Braintree	Eastbound	55	58	58	103	96	96
From B1256 to Great Saling	Westbound	78	68	68	57	65	65
Bardfield Road – Braintree	Eastbound	82	50	50	88	70	69
From Great Saling to Great Bardfield	Westbound	60	61	61	55	51	51
Picotts Lane / Victoria Hill	Eastbound	127	18	18	374	135	77
From Great Saling to Shalford Green	Westbound	201	70	44	247	82	54
Pods Lane - Braintree	Eastbound	0	0	0	0	0	0
From Rayne to Shalford Green	Westbound	0	0	0	2	2	2
The St - Braintree	Eastbound	23	14	8	30	7	4
East of B1256/Dunmow Road roundabout	Westbound	28	11	7	26	5	3
A131 – Braintree	Eastbound	746	705	659	478	490	411
West of A131/Avenue W roundabout	Westbound	805	826	721	866	763	683

27. From the available evidence, it appears the majority of the other key links listed in Table 3.3 have minor flow differences between the original and revised Local plan scenarios. These links in Braintree include Blake end, Bardfield Road, Pods Lane and the A131. "The St – Braintree" link is shown to have lower flows than originally predicted, especially in the Ambitious scenario. Significantly reduced flows were estimated on Picotts Lane / Victoria Hill for all new scenarios, with the biggest drop being of 297 trips from the original PM estimates to the Ambitious scenario. Out of the selected other key links, B1256 – Dunmow was the only case where the revised trips were higher than the local plan forecast. The updated flows were all higher both in the AM and the PM, but it is particularly noticeable in the AM peak where the development trip flows rose from 184 for the local plan to 388 in the census scenario.

3.2 Junction Analysis

28. "Braintree LP Preferred Option Assessment" assessed 21 key junctions using ARCADY, PICADY and LinSig to predict their performance in 2033 and suggest mitigation measures where required. The flows for these junctions were extracted from VISUM for the Local plan, Census and Ambitious scenarios.

29. This section outlines whether the revised trip generation and distribution is likely to affect the recommendations previously made for these junctions by taking into account the junction modelling results reported in the Preferred Option Assessment for Scenario 2[3] and the flows extracted from VISUM in this study. The results shown in the tables below assume no change to the existing layouts unless otherwise stated.

30. It should therefore be noted that the Local Plan flows shown in the tables in this section, refer to flows from the Local Plan scenario outlined in this study i.e. 2,500 homes at Braintree / Colchester Borders and 3,500 at West of Braintree. Therefore they will not be exactly the same as the development flows used during the Preferred Option Assessment, from which the junction modelling results shown in the tables below, were produced. However they allow for a comparison with the Census scenario and therefore enable identification of significant changes in flow and thus where these changes may impact upon the original junction modelling results.

3.2.1 Head Street, Halstead

Junction arms:

1A – A131 Head Street (link)

1B – Parsonage Street

1C – A131 Market Hill

1D – A1124 Hedingham Road

2A – A131 Head Street

2B – A1124 Colchester Road

2C - A131 Head Street (link)

Table 3.4: Head Street, Halstead traffic flow comparison

		1A	1B	1C	1D	2A	2B	2C
AM	Previous Saturation	1.12	OC	1.27	OC	1.23	0.99	0.84
	LP Flows	261	0	352	147	106	158	435
	Census Flows	222	0	272	98	100	123	323
	Ambitious Flows	219	0	273	96	99	121	322
PM	Previous Saturation	1.05	OC	1.33	1.35	1.34	OC	1.07
	LP Flows	399	0	233	162	99	302	355
	Census Flows	320	0	210	103	90	231	279
	Ambitious Flows	319	0	205	104	91	230	274

OC refers to where capacity is significantly exceeded, where RFC or Degree of Saturation has exceeded 1.40 and 140% respectively.

31. Head Street was estimated to be at or over capacity on all arms in the AM and PM in the Preferred Option Assessment. Although the forecast development flows from the Census scenario are in the region of a 20% less in both peaks, it is unlikely that this will be enough to bring the junction under capacity when combined with the base flows. No mitigation was identified for this junction and therefore it is not suggested that the previous modelling is revisited.

[3] Scenario 2 assumed 2.500 homes and associated amenities would be built at each Garden community site

3.2.2 A120 – Colne Road, Coggeshall

Junction arms:

A – A120 East

B – Colne Road South

C – A120 West

D – Colne Road North

Table 3.5: A120 – Colne Road, Coggeshall traffic flow comparison

		A	B	C	D
AM	Previous Saturation	OC	OC	OC	OC
	LP Flows	1069	25	641	336
	Census Flows	422	20	136	220
	Ambitious Flows	343	19	122	213
PM	Previous Saturation	OC	OC	OC	OC
	LP Flows	922	94	811	441
	Census Flows	250	118	307	300
	Ambitious Flows	212	118	255	292

OC refers to where capacity is significantly exceeded, where RFC or Degree of Saturation has exceeded 1.40 and 140% respectively.

32. The Preferred Option Assessment found that the forecast flows would cause the junction to be significantly over capacity. The revised flows are however significantly lower on arms A, C and D for both the AM peak and PM peak, and are therefore it is suggested that this junction is remodelled.

3.2.3 Rye Mill Lane, Kelvedon

Junction arms:

A – London Road

B – Inworth Road

C – Feering Hill

D – Rye Mill Lane

Table 3.6: Rye Mill Lane, Kelvedon

		A	B	C	D
AM	Previous Saturation	0.04	OC	0.77	OC
	LP Flows	552	134	150	0
	Census Flows	467	122	183	0
	Ambitious Flows	414	121	182	0
PM	Previous Saturation	0.07	OC	0.83	0.16
	LP Flows	361	0	282	0
	Census Flows	444	0	345	0
	Ambitious Flows	421	0	344	0

OC refers to where capacity is significantly exceeded, where RFC or Degree of Saturation has exceeded 1.40 and 140% respectively.

33. Rye Mill lane is expected to have 63 additional development trips on arm C and 83 more development trips on arm A in the PM for the census scenario compared to the local plan scenario forecast. In the AM peak, the revised development flows for arm A are lower by 85 development trips from the Local plan to the Census scenario. Therefore, the performance of the junction is unlikely to significantly change from what was previously modelled and thus does not need to be remodelled.

3.2.4. Rickstones Road, Witham

Junction arms:

1A – Rickstones Road

1B – B1018 Braintree Road (link)

1C – B1018 Cressing Road

2A – B1018 Braintree Road (link)

2B – Cypress Road

2C – B1018 Braintree Road south

Table 3.7: Rickstones Road, Witham

		1A	1B	1C	2A	2B	2C
AM	Previous Saturation	0.72	0.73	1.3	1.03	0.54	0.64
	LP Flows	105	176	192	287	13	204
	Census Flows	85	120	132	211	8	143
	Ambitious Flows	85	111	123	201	8	134
PM	Previous Saturation	0.4	0.92	1.01	0.85	0.48	0.88
	LP Flows	55	157	156	204	51	172
	Census Flows	38	107	154	187	40	118
	Ambitious Flows	38	105	154	186	40	115

34. Rickstones Road was estimated to be slightly over capacity for arm 2A in the AM peak and 1C in both peaks. Since all the flows for the junction are lower than originally forecasted, and given that the junction is not significantly over capacity, the change in forecast development trips may be enough to bring the junction nearer to or within capacity. However, it should be noted that as arm 1C was estimated to have a degree of saturation of 1.3, it is therefore possible that it will not be brought within capacity. This junction should, however, be reassessed with revised forecast flows.

3.2.5. Chipping Hill, Witham

Junction Arms:

A – Braintree Road/Chipping Hill

B – The Avenue

C – Collingwood Road

Table 3.8: Chipping Hill, Witham

		A	B	C
AM	Previous Saturation	1.33	OC	0.87
	LP Flows	319	204	33
	Census Flows	240	148	24
	Ambitious Flows	231	140	23
PM	Previous Saturation	0.97	1.34	0.6
	LP Flows	275	101	17
	Census Flows	235	76	12
	Ambitious Flows	233	74	12

OC refers to where capacity is significantly exceeded, where RFC or Degree of Saturation has exceeded 1.40 and 140% respectively.

35. The revised development flows for the Chipping Hill junction are forecast to be reduced on all arms for both the AM and PM compared to the Local plan scenario. Since arm A and B were previously assessed to have an RFC over 1.3, it is unlikely that the census or even ambitious flows would bring the junction within capacity and therefore the junction should not be remodelled.

3.2.6. Newland Street, Witham

Junction Arms:

A – Newland Street North-East

B – Maldon Road

C – Newland Street South-West

D – Collingwood Road

Table 3.9: Newland Street, Witham

		A	B	C	D
AM	Previous Saturation	OC	1.03	0.56	OC
	LP Flows	206	19	27	0
	Census Flows	148	17	21	0
	Ambitious Flows	139	17	20	0
PM	Previous Saturation	OC	1.08	0.76	OC
	LP Flows	18	0	22	0
	Census Flows	15	0	18	0
	Ambitious Flows	15	0	17	0

OC refers to where capacity is significantly exceeded, where RFC or Degree of Saturation has exceeded 1.40 and 140% respectively.

36. The junction was forecasted to be over capacity on three arms both in the AM and the PM. The Census scenario development flows are similar to the Local Plan scenario development flows with the exception of arm A in the AM. Given the lack of difference between the development flows in the Local Plan and Census scenarios, it is not recommended that this junction is remodelled.

3.2.7. Gershwin Boulevard, Witham

Junction arms:

A – Hatfield Road north-east

B – Gershwin Boulevard

C – Hatfield Road south-east

D – New arm

Table 3.9: Gershwin Boulevard, Witham

		A	B	C	D
AM	Previous Saturation	0.77	0.56	0.55	0.5
	LP Flows	243	35	183	442
	Census Flows	225	26	169	429
	Ambitious Flows	225	26	169	429
PM	Previous Saturation	0.48	0.65	0.69	0.4
	LP Flows	33	389	217	320
	Census Flows	25	345	205	301
	Ambitious Flows	24	341	204	301

37. The Census scenario development flows are shown to be similar or slightly below the Local Plan scenario forecasts. Given that the junction was forecast to be well under capacity previously, the new flows should not have a significant impact on the junction and thus the junction does not need to be remodelled.

3.2.8. Maldon Road – The Street, Hatfield Peverel

Junction arms:

A – The Street east

B – B1019 Maldon Road

C – The Street west

Table 3.10: Maldon Road – The Street, Hatfield Peverel

		A	B	C
AM	Previous Saturation	0.79	0.45	1.4
	LP Flows	125	111	100
	Census Flows	98	91	83
	Ambitious Flows	93	89	83
PM	Previous Saturation	0.83	1.06	1.07
	LP Flows	193	112	82
	Census Flows	156	83	61
	Ambitious Flows	150	78	61

38. The reduction in flows for the Census scenario compared to the Local Plan scenario are unlikely to reduce the capacity of the junction significantly. No mitigation was previously identified for this junction and so at best, the revised forecast development flows may bring the junction closer to capacity but it is still likely to be at or overcapacity. Therefore this junction does not need to be remodelled.

3.2.9. Cuckoo Way, Great Notley

Junction arms:

A – A131 north

B – Cuckoo Way

C – A131 south

D – New arm for development

39. In accordance with the Local Plan study, these results account for the addition of a new arm assuming a 4m lane width and an 8m entry to the roundabout.

Table 3.11: Cuckoo Way, Great Notley

		A	B	C	D
AM	Previous Saturation	0.81	0.6	OC	0.34
	LP Flows	805	65	776	87
	Census Flows	826	54	751	82
	Ambitious Flows	722	49	710	82
PM	Previous Saturation	0.9	0.57	1.09	0.8
	LP Flows	819	50	307	321
	Census Flows	723	41	347	301
	Ambitious Flows	643	38	271	301

OC refers to where capacity is significantly exceeded, where RFC or Degree of Saturation has exceeded 1.40 and 140% respectively.

40. The Census scenario development flows forecast for Cuckoo Way remain similar to the Local Plan scenario forecasts with the exception of arm A which reduces by 96 development trips in the PM. Some arms see a small increase in development flows and therefore overall the flows entering the junction remain similar and thus the junction modelling results are likely to also remain similar. Thus the mitigation previously proposed is also likely to still be sufficient and so should not need revisiting.

3.2.10. Panners Interchange, Braintree/Great Notley

Junction arms:

1A – Pods Brook

1B – A131 (link)

1C – A120 west

2A – A131 (link)

2B – A120 east

2C – B1256

2D – A131 south

Table 3.12: Panners Interchange, Braintree / Great Notley

		1A	1B	1C	2A	2B	2C	2D
AM	Previous Saturation	OC	0.67	1.07	0.61	1.04	OC	0.76
	LP Flows	804	111	660	826	383	115	857
	Census Flows	727	118	707	920	356	135	866
	Ambitious Flows	694	118	707	729	355	135	866
PM	Previous Saturation	1.1	0.54	OC	0.73	0.86	0.44	0.47
	LP Flows	255	0	389	904	445	116	580
	Census Flows	254	0	417	671	439	141	557
	Ambitious Flows	233	0	417	552	439	141	474

OC refers to where capacity is significantly exceeded, where RFC or Degree of Saturation has exceeded 1.40 and 140% respectively.

41. Panners Interchange is forecast to have significantly different development flows depending on the scenario investigated. For example, arm 2A in the PM peak is forecast to have 233 less development trips in the Census scenario, while it is forecast to have 94 additional development trips in the AM peak, compared to the Local Plan scenario. The previous junction modelling results are therefore likely to be affected by the revised development flows and so should be revisited.

3.2.11. Springwood Drive, Braintree

Junction arms:

A – Springwood Drive north

B – Rayne Road east

C – Pods Brook Road south

D – Rayne Road west

Table 3.13: Springwood Drive, Braintree

		A	B	C	D
AM	Previous Saturation	0.93	1.03	0.96	0.67
	LP Flows	504	133	502	49
	Census Flows	478	140	529	54
	Ambitious Flows	471	132	468	54
PM	Previous Saturation	1	0.63	0.93	0.39
	LP Flows	110	134	449	44
	Census Flows	99	161	462	45
	Ambitious Flows	84	156	441	45

42. The Preferred Option Assessment junction modelling for Springwood Drive suggests that the junction will be near to or at capacity by 2033. There is little forecast difference in development flows between the Local Plan and Census scenarios with some arms seeing a minor decrease, while others may see a minor increase. Therefore it is unlikely to affect the junction modelling results or the mitigation proposed.

3.2.12. Aetheric Road, Braintree

Junction arms:

A – Aetheric Road

B – Rayne Road E

C – Pierrefitte Way

D – Rayne Road W

Table 3.14: Aetheric Road, Braintree

		A	B	C	D
AM	Previous Saturation	0.93	0.08	0.88	0.93
	LP Flows	349	0	61	61
	Census Flows	303	0	49	75
	Ambitious Flows	290	0	49	54
PM	Previous Saturation	1.06	0.53	1.05	0.49
	LP Flows	354	0	107	34
	Census Flows	420	0	96	21
	Ambitious Flows	411	0	89	21

43. Estimated flows for Aetheric Road varies most on arm A in the PM where 66 extra trips are estimated in the Census scenario compared to the Local Plan scenario. However as forecast development flows are likely to remain similar in all scenarios it is not suggested that this junction needs to be remodelled.

3.2.13. Church Lane, Braintree

Junction arms:

A – B1053 Church Lane

B – Convent Hill

C – Bradford Street

Table 3.15: Church Lane, Braintree

		A	B	C
AM	Previous Saturation	0.69	OC	0.56
	LP Flows	85	680	89
	Census Flows	54	559	75
	Ambitious Flows	54	555	75
PM	Previous Saturation	OC	0.91	1.33
	LP Flows	322	330	69
	Census Flows	288	299	58
	Ambitious Flows	281	299	58

OC refers to where capacity is significantly exceeded, where RFC or Degree of Saturation has exceeded 1.40 and 140% respectively.

44. Table 3.15 shows that the revised development flows are generally fractionally below the Local Plan scenario forecasts and therefore are likely to have a negligible impact on the junction analysis. The only exception is for arm B in the AM peak where a reduction of 121 development trips is

forecast for the Census scenario. As this arm was forecast to be significantly over capacity in the AM peak in the Preferred Option Assessment, the decrease in flows should not affect the previous analysis of this junction.

3.2.14. Broad Road, Braintree

Junction arms:

A – A131 North

B – A131 South

C – Broad Road

Table 3.16: Broad Road, Braintree

		A	B	C
AM	Previous Saturation	0.66	OC	0.35
	LP Flows	227	1002	49
	Census Flows	225	780	40
	Ambitious Flows	225	779	40
PM	Previous Saturation	1.26	0.85	1.11
	LP Flows	706	468	266
	Census Flows	545	431	235
	Ambitious Flows	549	429	234

OC refers to where capacity is significantly exceeded, where RFC or Degree of Saturation has exceeded 1.40 and 140% respectively.

45. Broad Road is likely to see a reduced amount of development traffic flows across all arms for the Census scenario. Arm B which was estimated to be over 140% saturated has 222 less development trips for the Census scenario compared to the Local Plan scenario. Similarly, the 706 trips previously estimated by the local plan on arm A in the PM were revised to 545 for the Census scenario, which will contribute to reducing the original RFC estimate of 1.26. This is likely to affect the original junction modelling results, however is unlikely to affect the proposed mitigation, only potentially providing slightly more capacity to the junction than was previously forecast. It is therefore not suggested that this junction is looked at again.

3.2.15. Marks Farm, Braintree

Junction arms:

A – A131 north

B – A120 east

C – A120 south

D – Coggeshall Road west

Table 3.17: Marks Farm, Braintree

		A	B	C	D
AM	Previous Saturation	1.27	OC	1.36	OC
	LP Flows	241	1085	1280	1697
	Census Flows	221	548	800	1076
	Ambitious Flows	221	478	785	1050
PM	Previous Saturation	OC	0.92	1.21	OC
	LP Flows	1182	955	993	1242
	Census Flows	1007	456	684	847
	Ambitious Flows	1012	424	617	779

OC refers to where capacity is significantly exceeded, where RFC or Degree of Saturation has exceeded 1.40 and 140% respectively.

46. The Preferred Option Assessment had forecast that all arms would be over capacity in 2033. The total junction flows are forecast to be reduced by 1658 development trips in the AM peak and by 1378 development trips in the PM peak for the Census scenario. The junction analysis undertaken in the Preferred Option Assessment is therefore highly likely to be significantly different and will need revisiting.

3.2.16. Feering Hill, Kelvedon

Junction arms:

A – Feering Hill

B – Swan Street

C – B1024 High Street

D – B1024 Coggeshall Road

Table 3.18: Feering Hill, Kelvedon

		A	B	C	D
AM	Previous Saturation	OC	0.35	OC	0.1
	LP Flows	597	0	154	53
	Census Flows	486	0	187	61
	Ambitious Flows	454	0	186	61
PM	Previous Saturation	0.41	0.47	OC	0.1
	LP Flows	292	0	260	151
	Census Flows	363	0	340	150
	Ambitious Flows	362	0	339	148

OC refers to where capacity is significantly exceeded, where RFC or Degree of Saturation has exceeded 1.40 and 140% respectively.

47. Forecast development flows for Feering Hill were found to be slightly higher for the Census scenario compared to the Local Plan scenario. However, given that the junction is forecast to be over capacity and that the Preferred Option Assessment suggested that mitigation would only be successful if J24 on the A12 was upgraded to an all movements junction, it is not suggested that the junction is remodelled.

3.2.17. Cressing Road – Coggeshall Road, Braintree

Junction arms:

A – Coggeshall Road W

B – Coggeshall Road E

C – Cressing Road

D – Marlborough Road

EB Link – Eastbound Coggeshall Road Link

WB Link – Westbound Coggeshall Road Link

Table 3.19: Cressing Road – Coggeshall Road, Braintree

		A	B	C	D
AM	Previous Saturation	0.6	OC	0.54	OC
	LP Flows	53	111	4	205
	Census Flows	48	44	2	149
	Ambitious Flows	43	42	2	135
PM	Previous Saturation	0.82	OC	OC	0.73
	LP Flows	32	41	0	176
	Census Flows	30	26	0	122
	Ambitious Flows	27	26	0	114

OC refers to where capacity is significantly exceeded, where RFC or Degree of Saturation has exceeded 1.40 and 140% respectively.

48. The revised development flows for Cressing Road are lower across the junction both in the AM and the PM. Despite the slight reduction in development flows, the junction is forecast to be significantly over capacity by 2033 and no mitigation has been identified. Therefore it is not suggested that this junction is remodelled.

3.2.18. Deanery Hill, Braintree

Junction arms:

A – Deanery Hill West

B – Deanery Hill East

C – Panfield Lane

Table 3.20: Deanery Hill, Braintree

		A	B	C
AM	Previous Saturation	OC	OC	OC
	LP Flows	157	549	105
	Census Flows	146	485	107
	Ambitious Flows	146	471	103
PM	Previous Saturation	OC	OC	OC
	LP Flows	443	276	221
	Census Flows	318	280	206
	Ambitious Flows	280	270	202

OC refers to where capacity is significantly exceeded, where RFC or Degree of Saturation has exceeded 1.40 and 140% respectively.

49. Compared to the Local Plan scenario, the development flows forecast on arm B in the AM peak have reduced by 64 trips for the Census scenario. On arm A in the PM peak, there are 125 less development trips for the Census scenario than for the Local Plan scenario. The remaining arms were found to be similar for all three scenarios. Since the Preferred Option Assessment had found Deanery Hill to be significantly over capacity across all arms both in the AM and PM, the new development flows are unlikely to change the outcome of the junction assessment or the mitigation for this junction that was identified.

3.2.19. Courtauld Road - Coggeshall

Junction arms:

1A – Courtauld Road north

1B – Link road north

1C – Coggeshall Road west

2A – Link road south

2B – Coggeshall Road east

2C – Courtauld Road south

Table 3.21: Courtauld Road – Coggeshall

		1A	1B	1C	2A	2B	2C
AM	Previous Saturation	0.64	0.72	0.63	0.86	0.84	0.61
	LP Flows	232	78	12	245	41	109
	Census Flows	175	68	10	185	12	80
	Ambitious Flows	170	65	10	180	11	78
PM	Previous Saturation	0.51	0.88	OC	0.79	0.84	0.92
	LP Flows	152	76	0	151	23	106
	Census Flows	127	58	0	127	12	69
	Ambitious Flows	120	58	0	120	12	68

OC refers to where capacity is significantly exceeded, where RFC or Degree of Saturation has exceeded 1.40 and 140% respectively.

50. The flows predicted for Courtauld Road are generally similar or lower for the Census scenario when compared to the Local Plan scenario. The most noticeable difference between the Local Plan scenario and the Census scenario is arm 1A in the AM peak where the number of development trips was reduced by 57 for the revised scenario. Overall, the junction is therefore expected to operate in a similar way to the modelling undertaken during the Preferred Option Assessment.

3.2.20. A131 – London Road, Great Notley

Junction arms:

A – A131 Great Notley Bypass

B – London Road north-east

C – London Road south-east

D – A131 Great Leighs Bypass

Table 3.22: A131 – London Road, Great Notley

		A	B	C	D
AM	Previous Saturation	0.7	0.92	0.25	0.7
	LP Flows	611	311	0	922
	Census Flows	633	330	0	909
	Ambitious Flows	539	330	0	868
PM	Previous Saturation	1.06	0.52	0.36	0.82
	LP Flows	965	213	0	576
	Census Flows	888	220	0	638
	Ambitious Flows	812	220	0	561

51. The Preferred Option Assessment forecast that London Road would only be over capacity in the PM peak on arm A. This case was found to have a decrease of 77 development trips in the Census scenario compared to the Local Plan scenario. Since the other flows remain similar, it is possible that junction would be nearer capacity on that approach. It is unlikely to affect the proposed mitigation which would still be likely to be sufficient.

3.2.21. Church Hill, Earls Colne

Junction arms:

A – A1124 Church Hill

B – Upper Holt Street

C – Coggeshall Road

Table 3.23: Church Hill, Earls Colne

		A	B	C
AM	Previous Saturation	1.1	0.94	0.75
	LP Flows	300	180	215
	Census Flows	193	147	140
	Ambitious Flows	190	144	130
PM	Previous Saturation	1.27	0.91	OC
	LP Flows	360	158	336
	Census Flows	232	111	226
	Ambitious Flows	229	108	219

OC refers to where capacity is significantly exceeded, where RFC or Degree of Saturation has exceeded 1.40 and 140% respectively.

52. As shown in Table 3.23., the revised development flows for Church Hill are lower on all arms in the Census scenario than in the Local Plan scenario. Since the arms of this junction were found to be around capacity in the Preferred Option Assessment, it is possible that the revised flows may bring the junction within capacity. Given the constrained nature of the proposed mitigation and the forecast reduction in flows, it is suggested that this junction is remodelled.

4. Discussion

53. The comparison of development flows on key links between the Local Plan, Census and Ambitious scenarios have shown that the development flows forecast by the Census scenario are generally below what was previously forecast in the Local Plan scenario. Worst case congestion related issues have therefore already been considered on the vast majority of key links.

54. Flows were forecast to be significantly lower on the stretches of the A120 either side of Panners Interchange and also on all sections east towards the A12 J25. This is of particular relevance for the A120 as mitigation measures for Panners Interchange and also for increasing slip capacities were considered and assessed. The applicability of this assessment is very likely to be affected and should be revised so as to assess whether the mitigation proposed for Panners may be sufficient and to understand what standard of slip road is likely to be required.

55. Key links on which a significant increase in forecast development flows are forecast, may indicate that adjacent junctions could become under pressure. Out of the 19 key link sections considered, flows on the A12 around junction 25 and on B1256 – Dunmow road were found to be the most likely to have an impact. Therefore consideration may need to be given to investigating the potential impacts on junction 25 and also on the local junctions along B1256.

56. The local plan study provided a detailed assessment of 21 key junction. Despite the new information on the Garden Community developments, this study suggests that the following junctions will be subject to flows similar to those identified in the Preferred Option Assessment and that the suggestions made in that study therefore remain valid.
    - Head Street – Halstead
    - Rye Mill Lane – Kelvedon
    - Feering Hill – Kelvedon
    - Chipping Hill – Witham
    - Newland Street – Witham
    - Gershwin Boulevard – Witham
    - Cuckoo Way – Great Notley
    - Springwood Drive – Braintree
    - Aetheric Road – Braintree
    - A131/London Road – Great Notley
    - Church Lane – Braintree
    - Broad Road – Braintree
    - Cressing Road – Braintree
    - Deanery Hill – Braintree
    - Courtauld Road/Coggeshall Road – Braintree

57. The analysis of the remaining junctions has identified that the following are likely to be affected by the revised forecast development traffic flows.

    - A120 – Colne Road and Marks Farm: The junctions were previously found to be likely to operate over capacity in 2033, and are both the subject of investigation by Highways England to improve their operation. Since the updated flows have dramatically reduced the amount of development trips forecast, this may impact on any mitigation Highways England are considering. In the long term however, the work on a new A120 route[4] indicates that future year flows would be significantly lower at these two junctions if any option, except “Option A”, which basically comprises dualling most of the route along the existing alignment, is chosen.

[4] See Braintree Local Plan – Preferred Option Assessment: Update on A120 & A12 Studies, May 2017.

- The considerable differences in forecast development flows for Panners Interchange are likely to affect the junction results presented in the Preferred Option Assessment. It is therefore advised that this junction is remodelled and mitigation reinvestigated. It is also to be noted that the junction will benefit from the new/upgraded A120 route in the long term.
- Rickstones Road should be remodelled as the general decrease in flows across all arms may bring the junction to just within capacity.

- The decrease in forecast development flows on all arms of the Church Hill junction, in some instances, significant, therefore should warrant remodelling of the junction and in particular reinvestigation of the proposed mitigation.

58. It should be noted that there are a number of ongoing studies aiming at improving the transport network in Braintree District and the surrounding, including work on the A12 and A120. These are likely to have a significant impact on the network flows and may therefore affect the suggestions made in this report.

59. Traffic demand is also dependent on the development of user behaviour. The possibility of peak spreading and increase of public transport use as service availability increases as per the garden community initiative should therefore be acknowledged.

5. Conclusions

60. "Braintree Local Plan Preferred Option Assessment" investigated the likely transport impact of the Local Plan preferred option and identified possible mitigation measures. This study was undertaken to assess whether additional work is required in light of the refined trip generation and distribution provided by the May 2017 North Essex Garden Community Movement and Access Study.

61. On a network level, the revised traffic flows appeared to be generally below or similar to the Local plan flows which indicates that core of the local plan study is still valid. Since a higher variance of flows were found, it is advised to further investigate junctions in proximity to the modelled stretch of the A120 east of Dunmow South Interchange, Picotts Lane / Victoria Hill, junction 25 of the A12 and B1256 – Dunmow road.

62. The original and updated flows were compared at the 21 key junctions, and were found to be very similar for 11 of them. Table 5.1 below outlines which junctions have been forecast to be overcapacity in 2033, and whether any further investigation is required following this study. Summary comments have been provided to indicate either where further work is required or where the previous work is still likely to applicable despite changes to the forecast development flows.

Table 5.1: Summary of junction further work advice

Junction	Previously Forecast Over Capacity in 2033?	Additional Work Advised?	Additional Comments
Head Street, Halstead	Y	N	-
A120 – Colne Road, Coggeshall	Y	Y	Base junction model to be revisited. Mitigation to be investigated by Highways England.
Rye Mill Lane, Kelvedon	Y	N	-
Rickstones Road, Witham	Y	Y	Base junction model to be revisited.
Chipping Hill, Witham	Y	N	-
Newland Street, Witham	Y	N	-
Gershwin Boulevard, Witham	N	N	-
Maldon Road – The Street, Hatfield Peverel	Y	N	-
Cuckoo Way, Great Notley	Y	N	Proposed mitigation is likely to still be appropriate.
Panners Interchange, Braintree/Great Notley	Y	Y	Base junction model to be revisited along with proposed mitigation.

Junction	Previously Forecast Over Capacity in 2033?	Additional Work Advised?	Additional Comments
Springwood Drive, Braintree	Y	N	Proposed mitigation is likely to still be appropriate.
Aetheric Road, Braintree	Y	N	-
Church Lane, Braintree	Y	N	-
Broad Road, Braintree	Y	N	Proposed mitigation is likely to still be appropriate.
Marks Farm, Braintree	Y	Y	Base junction model to be revisited. Mitigation to be investigated by Highways England.
Feering Hill, Kelvedon	Y	N	-
Cressing Road – Coggeshall Road, Braintree	Y	N	-
Deanery Hill, Braintree	Y	N	Proposed mitigation is likely to still be appropriate.
Courtauld Road - Coggeshall	Y	N	-
A131 – London Road, Great Notley	Y	N	Proposed mitigation is likely to still be appropriate.
Church Hill, Earls Colne	Y	Y	Base junction model to be revisited along with proposed mitigation.

63. Although the Ambitious scenario development flows were generally lower than the Census scenario, the advice provided in this technical note remains the same regardless of whether the ambitious scenario is considered realistic or not.

64. As stated in the Preferred Option Assessment report, it is likely that some trips will spread into the hours either side of the peak hour. In addition, a number of ongoing studies and projects are aimed at improving the existing transport network and alleviating current issues within the Local Plan area. It is therefore to be noted that the reported trips along the links assessed and at the key junctions for the Ambitious and Census scenarios could be further affected by the outcomes of these studies.