Adastral Park, Ipswich
Technical Note : Traffic Sensitivity Test
23rd November 2017

1   Introduction

Brookbanks Consulting Limited (BCL) is commissioned by Commercial Estates Group (CEG) Ltd to provide technical advice on viability and delivery on a proposed mixed-use development at Adastral Park, Martlesham Heath, Suffolk.

Brookbanks have previously submitted information ion trip rates and trip generation. SCC has responded with various comments.

The purpose of this note is to provide a sensitivity test in relation to the trip generation for the site to demonstrate that the highway interventions mitigate the development impacts.

The full details are provided in subsequent sections. In brief, the revised assessment incorporates the following:

- Development Quantum
  - 2000 homes
  - 2,000 sqm employment
  - 630 primary places
  - 600 secondary places
  - 200 sixth form
- The trip rates that have been discussed and agreed by SCC
- SCC has agreed the education internalisation

2   Trip Generation – Sensitivity Test

Trip Rates

The trip base trip rates have been extracted from TRICS. The final trip rates have been discussed in detail with SCC. This has resulted in an agreed position. The agreed trip rates are presented below. These trip rates were continually discussed with SCC and the information presented below supersedes information contained in the Scoping Note.

Time Periods	Private Housing		Affordable Housing		Primary School		Employment	
	IN	OUT	In	Out	In	Out	In	Out
0700–0800	0.077	0.276	0.064	0.179	0.022	0.002	0.589	0.129
0800-0900	0.149	0.394	0.127	0.235	0.288	0.227	1.481	0.264
0900-1000	0.150	0.187	0.089	0.110	0.026	0.045	0.694	0.208
1600-1700	0.297	0.180	0.202	0.146	0.041	0.048	0.248	0.794
1700-1800	0.350	0.201	0.258	0.185	0.024	0.032	0.182	1.178
1800-1900	0.254	0.186	0.158	0.112	0.002	0.006	0.116	0.455

Figure 2a: Vehicle trip rates

The Suffolk Coastal Local Plan confirms that through Development Management Policy DM2 Affordable Housing on Residential Sites, one in three houses should be affordable. It is considered that a sensitivity test on 100% open market is not justified as this scenario would not be permitted. The development will deliver a percentage of affordable housing. An agreement has been reached that 25% of the housing will be affordable. However, to ensure a robust assessment, it has been assumed that 20% (one in five) of the housing stock will be affordable. The resultant housing trip rates (combining 20% affordable housing and 80% private housing) are identified below.

Time Periods	Housing (Private and Affordable Combined)	
	IN	OUT
0700–0800	0.074	0.257
0800-0900	0.145	0.362
0900-1000	0.138	0.172
1600-1700	0.278	0.173
1700-1800	0.332	0.198
1800-1900	0.235	0.171

Figure 2b: Resultant housing vehicle trip rates

Subsequently to the trip rates agreed by SCC, the additional trip rates for the secondary school and nursery places are highlighted below.

Time Periods	Secondary School		Sixth form	
	IN	OUT	IN	OUT
0700–0800	0.045	0.011	0.016	0.004
0800-0900	0.148	0.093	0.082	0.022
0900-1000	0.021	0.017	0.042	0.016
1600-1700	0.022	0.053	0.021	0.053
1700-1800	0.017	0.027	0.022	0.032
1800-1900	0.014	0.020	0.026	0.017

Figure 2c: Secondary school vehicle trip rates

The resultant trip rates used in the assessment are presented below.

Time Periods	Housing		Secondary School		Primary School		Employment		Sixth form	
	IN	OUT	In	Out	In	Out	In	Out	IN	OUT
0700–0800	0.074	0.257	0.045	0.011	0.022	0.002	0.589	0.129	0.016	0.004
0800-0900	0.145	0.362	0.148	0.093	0.288	0.227	1.481	0.264	0.082	0.022
0900-1000	0.138	0.172	0.021	0.017	0.026	0.045	0.694	0.208	0.042	0.016
1600-1700	0.278	0.173	0.022	0.053	0.041	0.048	0.248	0.794	0.021	0.053
1700-1800	0.332	0.198	0.017	0.027	0.024	0.032	0.182	1.178	0.022	0.032
1800-1900	0.235	0.171	0.014	0.020	0.002	0.006	0.116	0.455	0.026	0.017

Figure 2d: Vehicle trip rates

Total Trip Generation Excluding Internalisation

Based on the following development mix the resultant total trips expected to be generated by the development is indicated in Figure 2e.

- 2000 homes (80 / 20 split between open market and affordable)
- Primary provision providing 630 places
- Secondary provision providing 600 places
- Sixth form provision proving 200 places
- 2,000 sqm of employment (GFA equivalent to the 0.6ha to be delivered)

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Time Periods	Housing		Secondary School		Primary School		Employment		Sixth form	
	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
0700–0800	148	514	27	7	14	1	12	3	3	1
0800-0900	290	724	89	56	181	143	30	5	16	4
0900-1000	276	344	13	10	16	28	14	4	8	3
1600-1700	556	346	13	32	26	30	5	16	4	11
1700-1800	664	396	10	16	15	20	4	24	4	6
1800-1900	470	342	8	12	1	4	2	9	5	3

Figure 2e: Total vehicle trips

Total Trip Generation Including Internalisation

As indicated, the development will deliver a range of complimentary land uses on site. It is likely that a significant proportion of the generated trips from the individual land uses will be linked to a secondary journey purpose. To avoid double counting these trips and to present realistic trip generation, the individual trips from each land use has been assessed. This is described in the following sections.

Primary School Internalisation: The development will deliver primary school places. At the time of writing, it is considered that sufficient school places will be delivered to respond to the expected demand. The 2011 census statistic for the Martlesham Ward has been reviewed. This indicates that there are 317 primary school age children generated from 2198 households. This equates to 0.14 children per household. The development could deliver 2000 houses, resulting in 288 primary school age children generated by the development. The development could generate a demand for 630 places. The total of internal / external trips provided by the primary places is indicated below. This results in a number of external trips that will take account of staff trips as well.

Time Periods	Internal education trips		External education trips	
	IN	OUT	IN	OUT
0700–0800	6	1	8	1
0800-0900	83	65	98	78
0900-1000	7	13	9	15
1600-1700	12	14	14	16
1700-1800	7	9	8	11
1800-1900	1	2	1	2

Figure 2f: Internal / external primary education trips

Secondary School Internalisation: The development will also deliver secondary school places. As per the agreed methodology for the primary school, the 2011 census statistic for the Martlesham Ward has been reviewed. This indicates that there are 320 secondary school age children generated from 2198 households. This equates to 0.145 children per household. The development could deliver 2000 houses, resulting in 290 secondary school age children generated by the development. The total of internal / external trips provided by the secondary places is indicated below. This results in a number of external trips that will take account of staff trips as well.

Time Periods	Internal education trips		External education trips	
	IN	OUT	IN	OUT
0700–0800	13	3	14	3
0800-0900	43	27	46	29
0900-1000	6	5	6	5
1600-1700	6	15	7	16
1700-1800	5	8	5	8
1800-1900	4	6	4	6

Figure 2g: Internal / external secondary education trips

Sixth Form Internalisation: The development will also deliver a sixth form provision. As per the agreed methodology for the primary school, the 2011 census statistic for the Martlesham Ward has been reviewed. This indicates that there are 106 sixth form school age children generated from 2198 households. This equates to 0.048 children per household. The development could deliver 2000 houses, resulting in 96 sixth form age children generated by the development. The total of internal / external trips provided by the secondary places is indicated below. This results in a number of external trips that will take account of staff trips as well.

Time Periods	Internal education trips		External education trips	
	IN	OUT	IN	OUT
0700–0800	2	0	2	0
0800-0900	8	2	8	2
0900-1000	4	2	4	2
1600-1700	2	5	2	5
1700-1800	2	3	2	3
1800-1900	3	2	3	2

Figure 2h: Internal / external sixth form education trips

This results in the total external trip generation.

Time Periods	Housing		Secondary School		Primary School		Employment		Sixth form	
	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
0700–0800	149	513	14	3	8	1	12	3	2	0
0800-0900	289	724	46	29	98	78	30	5	8	2
0900-1000	276	343	6	5	9	15	14	4	4	2
1600-1700	556	346	7	16	14	16	5	16	2	5
1700-1800	663	396	5	8	8	11	4	24	2	3
1800-1900	470	342	4	6	1	2	2	9	3	2

Figure 2i: Total vehicle trips by land use

This equates to the following total trip generation.

Time Periods	Total	
	IN	OUT
0700–0800	185	520
0800-0900	471	838
0900-1000	309	369
1600-1700	584	399
1700-1800	682	442
1800-1900	480	361

Figure 2j: Total vehicle trips by land use

Sustainable Trips

As indicated by Chapter 7 of the TA, the delivery of the development will be supported by a travel plan that will achieve a 15% mode shift away from the single occupancy trip. Therefore, this has been taken into account in relation to the total external trips that is likely to be generated by the development. For the purposes of this assessment, only a 10% reduction has been included.

Time Periods	trips	
	IN	OUT
0700–0800	165	468
0800-0900	424	754
0900-1000	278	333
1600-1700	526	360
1700-1800	614	398
1800-1900	432	325

Figure 2k: Total external vehicle trips

The above traffic flows were assessed through the Paramics model, with the results presented below for the following traffic scenarios:

- Scenario 1: Base 2016, reflecting the base current operation of the road network
- Scenario 2: Reference Case 2027 reflecting the expected future operation of the road network without development
- Scenario 3: Do-Something 2027 reflecting the future year test plus the Adastral Park development, with mitigation, reflecting the results presented in the TA Rev6
- Scenario 4: Do-Something 2027 reflecting the future year test plus the Adastral Park development, with mitigation, 0% internalisation for housing / employment and 10% for travel plan measures

3   Network Statistics

Network Mean Delay

The result for the mean delay is presented below.

Time period	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Morning Peak (08:00 to 09:00)	284	481	367	386
Evening Peak (17:00 to 18:00)	333	558	298	335

Figure 3a: Network Mean Delay (s)

The results demonstrate that the development scenarios 3 and 4 predict improved results over the future year reference case (scenario 2). This demonstrates that the development impacts can be mitigated.

Average Speeds

The results for the average speeds over the modelling period is presented below.

Time period	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Morning Peak (08:00 to 09:00)	51	30	41	39
Evening Peak (17:00 to 18:00)	42	25	48	43

Figure 3b: Average speeds

The results demonstrate that development scenario (Scenario 3 and 4) predicts improved results over the future year reference case (scenario 2). This demonstrates that the development impacts can be mitigated.

4 Journey Times

The result for the journey times are presented below.

Route			Scenario 1		Scenario 2		Scenario 3		Scenario 4	
			8:00-9:00	17:00-18:00	8:00-9:00	17:00-18:00	8:00-9:00	17:00-18:00	8:00-9:00	17:00-18:00
1	A12 between A1214 and the A14	Northbound	341	373	536	842	388	322	430	331
		Southbound	365	494	491	880	509	426	533	536
2	The A1214 / Main Street between Ropes Drive and Felixstowe Road	Eastbound	350	259	589	284	344	274	356	286
		Westbound	245	256	295	292	251	267	254	272
3	Dobbs Lane between A1214 and Foxhall Road	Southbound	146	149	152	158	156	185	158	192
		Northbound	144	147	210	149	147	150	147	150
4	Bell Lane between A1214 and Foxhall Road	Southbound	126	134	136	155	132	169	136	205
		Northbound	212	154	251	195	152	146	154	146
5	Foxhall Road between Bell Lane and A12	Eastbound	230	115	475	116	184	124	203	127
		Westbound	116	118	118	121	109	126	112	137
6	Felixstowe Road / Gloster Road between Main Street and A12	Southbound	151	207	139	2797	141	143	143	145
		Northbound	185	179	141	141	149	152	150	158

Figure 4a: Journey time routes

The difference in flows has been assessed against the following criteria.

Rating	Score
Delay reduction	
No significant change with a difference of less 15%	
Minor increase with a difference between 15% and 25%	
Moderate Increase with a difference between 25% and 50%	
Major Increase with a difference greater than 50%	

Figure 4b: Impact assessment

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	Route		Scenario 2 Vs Scenario 3		Scenario 2 Vs Scenario 4	
			AM (8-9)	PM (5-6)	AM (8-9)	PM (5-6)
1	A12 between A1214 and the A14	Northbound	-28%	-62%	-20%	-61%
		Southbound	4%	-52%	9%	-39%
2	The A1214 / Main Street between Ropes Drive and Felixstowe Road	Eastbound	-42%	-4%	-40%	1%
		Westbound	-15%	-9%	-14%	-7%
3	Dobbs Lane between A1214 and Foxhall Road	Northbound	2%	17%	4%	21%
		Southbound	-30%	1%	-30%	1%
4	Bell Lane between A1214 and Foxhall Road	Northbound	-3%	9%	0%	32%
		Southbound	-40%	-25%	-39%	-25%
5	Foxhall Road between Bell Lane and A12	Eastbound	-61%	7%	-57%	10%
		Westbound	-7%	4%	-5%	13%
6	Felixstowe Road / Gloster Road between Main Street and A12	Southbound	1%	-95%	3%	-95%
		Northbound	6%	8%	6%	12%

Figure 4c: Routes with change

These results reflect those presented in the submitted TA. There is level of variation in the results which is expected but generally the results indicate that the identified interventions mitigate the impact of the development.

5 Junction Queues

The results presented above indicate that the interventions mitigate the development impact. The figure below reviews individual queuing for the following tests:

- Test 1: Reference case v's Scenario 4 represents 0% internalisation with travel plan increased to 10%

	Junction	Test 1	
		AM (8-9)	PM (5-6)
1	A12	-23	-84
	Bucklesham Lane	-1	1
	A14 East	-71	-74
	A1156	8	8
	A14 West	2	-14
2	A12 N	19	-78
	Newbourne Road	29	-70
	A12 South	-6	-230
	Foxhall Road	-93	7
3	A12 N	-29	0
	Barrack Square	-1	-60
	Eagle Way	-58	10
	A12 South	8	0
4	A12 N	-51	-44
	Anson Road	2	7
	A12 South	-1	13
	Eagle Way	-1	-1
5	A12 N	-17	-40
	Main Rd East	-14	-8
	A12 South	10	10
	Main Rd West	-5	1
	Park & Ride	1	1
6	A1214 East	0	0
	Dobbs Lane	-10	0

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Junction		Test 1	
		AM (8-9)	PM (5-6)
7	A1214 West	-73	-2
	Nern Arm	0	0
	A1214 East	1	1
	Ropes Drive	-5	0
8	A1214 West	-7	2
	A1214 East	1	1
	Ropes Drive	3	0
9	A1214 West	0	0
	A1214 East	1	2
	Bell Lane	-9	-8
10	A1214 West	1	2
	Bell Lane	3	11
	Foxhall Road East	6	19
	Monument Farm Lane	0	0
	Foxhall Road West	0	-2
11	Dobbs Lane	1	4
	Foxhall Road East	5	18
	Hall Road	0	0
	Foxhall Road West	1	-2

Figure 5a: Junctions with Queues

This chapter has provided a detailed review of the levels of queuing predicted at numerous junctions within the Paramics model. This assessment identifies the change in queuing following the introduction of the development. This has demonstrated that there are several junctions that will be improved significantly, with only a limited number experiencing a minor increase.

There are junctions where minor increases in queuing are predicted. However, this is balanced by queue reductions on adjacent approaches. This suggests the junctions will operate more equitably. The results of the journey time assessment suggest that the operation of these junctions will not affect the overall journey reliability of trips passing through these locations.

These increases are typically on a single arm rather than across the junction as a whole. This demonstrates that at this level of assessment the delivery of the residential element will not create a significant level of congestion. This is supported by the results of the journey time results, which predicts betterment across the majority of the routes.

6 Summary

On the basis of review, there are no locations that are highlighted that give rise to concern in relation to the level of queuing / congestion predicted and cannot be regarded as 'severe' as described in the NPPF. Therefore, it is considered that the development should be supported from a transport and highways view point.