HIF Hoo Peninsular Highway Scheme – Transport Assessment Information
29th March 2021

1.0 Introduction

During the current public consultation and engagement process for the HIF scheme, a request has been received for "*traffic assessments and projections of traffic numbers up to the estimated build out time for new homes in both Hoo and High Halstow".*

This note provides information available at the current time, setting out the assessment process used to define traffic growth on the Peninsula and the methodology for determining the impacts and performance of the network in the full build-out scenario.

A detailed Hoo Transport Assessment (TA) will be prepared in support of a Planning Application following public consultation. This process is linked to Medway's Strategic Transport Assessment of their Local Plan, which will take account of Local Plan elements throughout Medway and identify the impacts of the Plan on both the local and strategic road network.

Traffic generation and movement on the Peninsula has been assessed using the Medway AIMSUN model, which is also being used to develop the Local Plan's Strategic Transport Assessment.

It should be noted that the HIF TA will focus on the Peninsula, i.e., the specific predicted impacts of new trip generation on links and junctions leading to and from and within the Peninsula area.

2.0 AIMSUN Model

The Medway Aimsun model covers the whole of UK. The Medway local authority area and parts of Gravesham, Tonbridge and Malling, Maidstone, and Swale, are modelled in detail.

The model is calibrated and validated at both macroscopic and microscopic levels enabling both the wide-area strategic and local detailed effects of the Plan to be assessed. The model base year is 2016 and it covers the AM (0800 to 0900) and PM (1700 to 1800) peak hours, as well as an interpeak hour (1300 to 1400), which can be taken to be representative of the whole interpeak period (1000 to 1600).

Reference Case scenarios developed as part of the Local Plan modelling were adopted for HIF modelling. These scenarios included all committed developments and committed highway improvements (up to November 2017) that were expected to be in place by 2028 and 2035.

Some employment uses proposed on the Hoo Peninsula were not included within trip generation calculations for the HIF scheme as the Housing Infrastructure Fund was specifically set aside to enable the release of housing development at several locations in the UK. The HIF process specifically required Medway to demonstrate that infrastructure investment is necessary to release housing growth, therefore the assessment of options and interventions focussed solely on the housing element of the Plan. However, Medway's Strategic Transport Assessment will take account of all Local Plan elements throughout Medway, including potential housing and employment use on the Peninsula and its impacts on both the local and strategic road network. The STA work is ongoing and will be shared as part of the emerging Local Plan.

For the purposes of assessing the traffic impacts of HIF-associated development, the following scenarios were developed and assessed:

- Do Nothing - This included committed developments and committed highway improvements to be delivered by the end of the Plan period. No proposed HIF roads or rail infrastructure was included in this scenario to allow for the calculation of the amount of housing growth that could be accommodated without new infrastructure improvements.

- Do-Something – This included all housing development proposed with the HIF highway and rail infrastructure in place in the same design year.

Average person trip rates for each planned housing zone were extracted from the TRICS database, having regard to site location and scale. These were then used to calculate trip generation by site.

To account for the impacts associated with the delivery of the proposed passenger rail service at Sharnal Street, a mode shift was applied to car driver trips within the Do Something demand matrices. This figure represents the mode shift from car to rail and was calculated by Network Rail.

3.0 Traffic Assessment

In the do-nothing scenario, all existing and proposed vehicle trips generated on the Peninsula need to utilise the A228 and pass through the Four Elms roundabout to access the strategic road network.

In the do-something scenario, a new access road between A289 and the A228 was proposed to better distribute flow to and from the Peninsula by providing an alternate route for traffic wishing to access the A289 to travel to and from the A2/M2 in the west.

This new road provides more capacity by splitting trips between two routes. It also provides network resilience, as any problems experienced on the A228 currently isolate the Peninsula, with no realistic alternative routes available.

Other highway proposals on the Peninsula centre around capacity improvements at existing junctions of A228 with Ropers Lane, Bells Lane, and Main Road. Proposed improvements to the A289 corridor from Four Elms Hill to Anthony's Way were designed to provide more capacity to cope with trip generation from the Local Plan proposals, including those generated within Hoo.

The proposed highway package relies on all elements being in place to deliver the benefits, i.e., junction improvements on A289 would not cope on their own without the traffic relief provided by the A228 improvements.

The 2016 base year model and do-nothing and do-something models were interrogated to determine the potential impact of new trip generation from housing growth on the Hoo Peninsula, as illustrated below for the critical morning peak hour assessment:

HIF Homes	Combined Flow (pcu)	Reference Case Comparison (%)	Weighted Average Delay (s/pcu)				
			Four Elms	Sans Pareil	Anthonys Way	Main Road	Combined
Do Nothing							
0	18798	2%	87	29	70	25	54
1000	19251	5%	81	27	71	39	56
2000	19667	7%	76	38	72	63	64
3000	20026	9%	82	32	75	89	72
Do Something							
0	15704	-15%	13	5	64	12	24
7000	18194	-1%	23	5	59	31	31
8000	18669	2%	30	6	61	34	34
9000	19167	4%	48	6	62	56	47
10000	19669	7%	55	6	61	84	60
11000	19843	8%	60	6	64	126	79

The process utilised a calculation of weighted average delay per vehicle at critical junctions. An "acceptable" junction Level of Service (LoS) was applied at an average delay per vehicle of 65 seconds. This is as an average of the minimum LoS for signalised (80 seconds) and non-signalised junctions (50 seconds)[1]. An average was applied across the network. By utilising a single performance threshold, it was possible to compare the different scenarios without needing to account for local variation in junction flows from scenario to scenario.

The AM peak hour is clearly shown to be the critical peak (as shown above). AM results have therefore driven conclusions and decision-making regarding housing growth potential.

The AM peak scenario exceeds the threshold at 2,000 new homes in the do-nothing scenario, with problems experienced at all but the Sans Pareil roundabout. This includes 940 homes with extant planning permission, and therefore indicated that further growth of no more than 1060 homes could be accommodated before the threshold is met.

Local junctions on the Peninsula, most notably the Main Road junction, were shown to experience significant growth from side road arms, where housing zones would be delivered. As a result, delays were shown to increase exponentially at the existing Main Road roundabout. The capacity of this junction therefore defined the limit of growth that could be feasibly accommodated.

It should be noted that the strategic modelling process provides a limited level of confidence / certainty over local junction performance. There is therefore a need to undertake local junction modelling to refine individual layout designs. This process is ongoing, and the outcomes will be reported as part of a HIF Hoo Transport Assessment. In addition, the Strategic Transport Assessment for Medway will be used to confirm the scheme detail, and this will form part of the combined STA and Environmental Impact Assessment to be submitted in support of the Local Plan.

We are currently undertaking localised junction modelling at each of the impacted intersections on the Peninsula to ensure that the designs are refined and finessed to maximise capacity and ensure that the trip generation in the Do-Something (full build-out) scenario will be accommodated. The TA process includes a range of modelling approaches depending on the type of junction impacted. The outcomes of this modelling will be presented within a Transport Assessment. Work is ongoing and is not currently available for issue.

[1] Highway Capacity Manual https://en.wikipedia.org/wiki/Level_of_service.

4.0 Strategic Modelling Flow Outputs

The following strategic model extracts show predicted turning flows from the AIMSUN model for the full build-out scenario.

A289 Hasted Rd Off-Slip / Higham Road / Isligham Farm Road junction															
		AM							PM						
			A	B	C	D	E	TOT		A	B	C	D	E	TOT
A:	Higham Rd (West)	A	0	18	37	0		**55**	A	0	55	141	0		**196**
B:	Isligham Farm Rd	B	0	0	374	990		**1364**	B	0	0	11	104		**115**
C:	Higham Rd (East)	C	49	15	0	0		**64**	C	67	0	0	0		**67**
D:	A289 Hasted Rd Off-Slip	D	0	112	0	0		**112**	D	0	122	0	0		**122**
		E						**0**	E						**0**
		TOT	**49**	**145**	**411**	**990**	**0**	1595	TOT	**67**	**177**	**152**	**104**	**0**	500

B2108 Hoo Rd / A289 Hasted Rd / A228 Four Elms Hill roundabout															
		AM							PM						
			A	B	C	D	E	TOT		A	B	C	D	E	TOT
A:	A289 Hasted Road (North)	A	0	580	988	34		**1602**	A	0	1531	707	52		**2290**
B:	A228 Four Elms Hill	B	1067	7	1995	341		**3410**	B	1012	1	871	235		**2119**
C:	A289 Hasted Road (South)	C	776	1053	0	132		**1961**	C	735	1486	0	81		**2302**
D:	B2108 Hoo Road	D	167	344	103	0		**614**	D	104	121	96	0		**321**
		E						**0**	E						**0**
		TOT	**2010**	**1984**	**3086**	**507**	**0**	7587	TOT	**1851**	**3139**	**1674**	**368**	**0**	7032

A228 Frindsbury Hill / Wainscott Road / A228 Hasted Rd / A289 Berwick Way roundabout															
	Sans Pareill	AM							PM						
			A	B	C	D	E	TOT		A	B	C	D	E	TOT
A:	A228 Frindsbury Hill	A	0	97	241	544		**882**	A	0	49	185	549		**783**
B:	Wainscott Road	B	224	0	0	216		**440**	B	144	0	0	213		**357**
C:	A289 Hasted Road	C	508	8	60	2510		**3086**	C	348	0	0	1326		**1674**
D:	A289 Berwick Way	D	400	51	1660	144		**2255**	D	751	273	2118	110		**3252**
		E						**0**	E						**0**
		TOT	**1132**	**156**	**1961**	**3414**	**0**	6663	TOT	**1243**	**322**	**2303**	**2198**	**0**	6066

Woodfield Way / Lochat Road / New Relief Road / Upchat Road roundabout															
		AM							PM						
			A	B	C	D	E	TOT		A	B	C	D	E	TOT
A:	Woodfield Way	A	0	0	110	85	113	**308**	A	0	0	109	101	73	**283**
B:	Lochat Road	B	0	0	0	0	0	**0**	B	0	0	0	0	0	**0**
C:	New Relief Road	C	1246	0	0	0	86	**1332**	C	120	0	0	0	0	**120**
D:	Kitchener Road	D	231	0	0	0	72	**303**	D	26	0	0	0	178	**204**
E:	Upchat Road	E	50	0	111	26	0	**187**	E	4	0	68	39	0	**111**
		TOT	**1527**	**0**	**221**	**111**	**271**	2130	TOT	**150**	**0**	**177**	**140**	**251**	718

Kirby Road / Chattenden Lane / Relief Road junction															
		AM							PM						
			A	B	C	D	E	TOT		A	B	C	D	E	TOT
A:	Chattenden Lane (North)	A	0	253	0	0		**253**	A	0	134	0	0		**134**
B:	SK Relief Rd	B	0	0	273	1329		**1602**	B	0	0	98	120		**218**
C:	Chattenden Lane (South)	C	0	0	0	4		**4**	C	0	0	0	0		**0**
D:	Kirby Road	D	0	221	0	0		**221**	D	0	177	0	0		**177**
		E						**0**	E						**0**
		TOT	**0**	**474**	**273**	**1333**	**0**	2080	TOT	**0**	**311**	**98**	**120**	**0**	529

Relief Rd / Gladman Rd / Access Rd roundabout

A: SK Relief Rd (North)
B: Glandman Rd
C: SK Relief Rd (South)
D: Access Rd

AM

	A	B	C	D	TOT
A	0	168	260	0	**428**
B	621	0	267	3	**891**
C	935	187	29	0	**1151**
D	11	11	21	0	**43**
TOT	**1567**	**366**	**577**	**3**	2513

PM

	A	B	C	D	TOT
A	0	161	145	1	**307**
B	0	0	233	5	**238**
C	117	268	161	0	**546**
D	3	2	19	0	**24**
TOT	**120**	**431**	**558**	**6**	1115

A1128 Peninsula Way / SK Relief Rd / Main Rd Hoo junction

A: Relief Rd
B: A1128 Peninsula Way (East)
C: Main Rd Hoo
D: A1128 Peninsula Way (West)

AM

	A	B	C	D	TOT
A	0	238	396	148	**782**
B	326	0	40	2147	**2513**
C	824	0	0	1187	**2011**
D	81	1366	380	0	**1827**
TOT	**1231**	**1604**	**816**	**3482**	7133

PM

	A	B	C	D	TOT
A	0	56	441	72	**569**
B	74	0	16	1397	**1487**
C	105	0	0	710	**815**
D	376	1829	806	0	**3011**
TOT	**555**	**1885**	**1263**	**2179**	5882

A1128 Peninsula Way / Gladman Rd roundabout

A: A1128 Peninsula Way (East)
B: A1128 Peninsula Way (West)
C: Gladman Rd

AM

	A	B	C	D	TOT
A	0	2226	486		**2712**
B	1255	67	282		**1604**
C	61	244	0		**305**
D					**0**
TOT	**1316**	**2537**	**768**	**0**	4621

PM

	A	B	C	D	TOT
A	0	1501	93		**1594**
B	1806	0	113		**1919**
C	80	67	0		**147**
D					**0**
TOT	**1886**	**1568**	**206**	**0**	3660

Peninsula Way / Dux Court Road / Bell's Lane roundabout

A: Peninsula Way (west)
B: Dux Court Road
C: Peninsula Way (east)
D: Bell's Lane

AM

	A	B	C	D	TOT
A	0	150	1011	155	**1316**
B	117	0	140	12	**269**
C	2144	3	0	39	**2186**
D	451	66	22	0	**539**
TOT	**2712**	**219**	**1173**	**206**	4310

PM

	A	B	C	D	TOT
A	0	221	1323	342	**1886**
B	10	0	33	38	**81**
C	1424	1	0	60	**1485**
D	160	81	19	0	**260**
TOT	**1594**	**303**	**1375**	**440**	3712

Peninsula Way / Ratcliffe Highway / Ropers Lane roundabout

A: Peninsula Way
B: Ratcliff Highway (north)
C: A228 Ratcliff Highway (east)
D: Ropers Lane

AM

	A	B	C	D	TOT
A	0	0	353	820	**1173**
B	0	0	0	0	**0**
C	819	0	0	296	**1115**
D	1367	0	91	0	**1458**
TOT	**2186**	**0**	**444**	**1116**	3746

PM

	A	B	C	D	TOT
A	0	0	472	904	**1376**
B	0	0	0	0	**0**
C	480	0	0	196	**676**
D	1004	0	237	0	**1241**
TOT	**1484**	**0**	**709**	**1100**	3293

Christmas Ln / Ratcliffe Highway / Sharnal St roundabout

A: A228 Ratcliff Highway (West)
B: Christmas Lane
C: Sharnal St

AM

	A	B	C	D	TOT
A	0	88	356		**444**
B	458	0	23		**481**
C	658	0	0		**658**
D					**0**
TOT	**1116**	**88**	**379**	**0**	1583

PM

	A	B	C	D	TOT
A	0	132	577		**709**
B	245	0	1		**246**
C	431	0	0		**431**
D					**0**
TOT	**676**	**132**	**578**	**0**	1386