LDF Sensitivity Assessment

March 2012

East Sussex County Council

Mott MacDonald

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Content

Appendices

Tables

Figures

1. Introduction

Mott MacDonald has been commissioned by East Sussex County Council (ESCC), Hastings Borough Council (HBC) and Rother District Council (RDC) to carry out an assessment of traffic conditions in Bexhill and Hastings for 2028. The assessment is being undertaken to inform the Local Development Framework processes for Hastings Borough Council and Rother District Council and specifically to provide an assessment of the levels and broad distribution of development in the respective Core Strategies.

This report follows on from the December 2011 Glyne Gap Capacity Assessment Report (revG) and the January 2012 Glyne Gap Development Assessment Report (rev B) which assessed the impact of additional traffic as a result of development in Bexhill and Hastings on the critical part of the network linking the two towns, i.e. A259 Glyne Gap, in isolation. The Glyne Gap Capacity Assessment report used existing traffic count, journey time, and queue length survey data to quantify existing levels of delay through Glyne Gap and to validate junction models for either end of Glyne Gap, namely the junctions of A259/Harley Shute Road in Hastings and Ravenside roundabout in Bexhill. The increase in delays through Glyne Gap as a result of background traffic growth, without any additional development, was calculated. The Glyne Gap Development Assessment Report calculated the further increase in delay which would occur with additional new development in Bexhill and Hastings. The calculated delays in both reports assumed that the routes followed by traffic would not change as a result of increased congestion.

This report uses a traffic model of Bexhill and Hastings to estimate the re-routeing of traffic which could occur as a result of increased congestion at Glyne Gap, and hence the traffic impact of new development over a wider area. Three scenarios have been tested, representing a range of network and development assumptions.

The proposed development and highway network inputs into the modelling process have been provided by ESCC, HBC and RDC. This report sets out the results of the assessments focusing on impacts on junction operation in Bexhill and Hastings in 2028, for three scenarios with varying levels of development and new infrastructure. The modelling undertaken highlights the locations where the congestion is likely to occur across the network.

The assessments were carried out using the traffic model of Bexhill and Hastings developed previously by Mott MacDonald for ESCC and updated most recently in August 2011 for the Bexhill Hastings Link Road (BHLR) Best and Final Funding Bid (BAFFB) submitted to the Department for Transport by ESCC. Full details of the modelling undertaken to support the BAFFB case for the BHLR can be found here: http://www.eastsussex.gov.uk/roadsandtransport/bexhillhastingslinkroad/default.htm

The BHLR traffic model consists of a highway model and a public transport model. The model used for the assessments described in this report is the highway assignment component only of the BHLR multi-modal model. It has been used as a highway only model, and does not use variable demand modelling. Trip re-distribution and mode choice are therefore not considered.

2. Model Development

2.1 Model Background

The existing Bexhill Hastings Link Road traffic model was created in 2004 and validated to 2004 traffic flows. The model was then updated in line with variable demand modelling guidance issued in September 2005. In August 2011, to support ESCC's BAFFB to the DfT, the model was revalidated to May 2011 data. It is this version of the highway assignment model only that has been used for these assessments.

The highway assignment model was built using the SATURN suite of programs and covers the two peak periods and the interpeak. The analyses in this report were carried out only for the peak periods. The AM peak is represented by the hour between 0800 and 0900 and the PM peak model represents an average hour between 1600 and 1800.

Five distinct user classes are represented in the highway models. These are:

- Car commuting
- Car on employers business
- Car other
- LGV and
- HGV.

These distinctions were retained for the analyses carried out.

2.2 Future Year Networks

Three future year scenarios were modelled for forecast year 2028:

- Scenario 1 – without BHLR or development connections and reduced housing and employment levels
- Scenario 2 – with BHLR including any complementary measures to the BHLR, and development connections and with full housing and full employment allocation.
- Scenario 3 – with development connections and with full housing and full employment allocation.

2.2.1 Scenario 1 Network

There are no major committed highway schemes planned between 2011 and 2028 which have been included in the networks. There are however planned junction improvements associated with the development at North East Bexhill. The signalised junctions of B2182 Holliers Hill/A2036 Wrestwood Road and B2182 HolliersHill/A269 London Road and the traffic calming measures along Woodsgate Park Road in Bexhill are assumed to be provided as part of this development. Signal timings for these junctions have been taken from the appropriate 2028 networks created for the BAFFB work, which were based on LinSig assessments undertaken with forecast levels of flow.

Elsewhere in the study area, the Scenario 1 network remains the same as the 2011 validation network and signal timings for unchanged junctions in the Scenario 1 network have been retained at the same values as those in the 2011 BAFFB validation networks.

2.2.2Y ScenY io 2 NeYwo k Y

In addition to the network changes associated with the North East Bexhill development described above, the Scenario 2 network also includes the BHLR and any associated complementary measures as well as new development connections through North East and North Bexhill development areas. The BHLR, complementary measures and new development connections are all shown in Figure 2.1.

The BHLR will start on the A259 trunk road at the Belle Hill junction with a new traffic signal controlled junction. A further traffic signal controlled junction just north of the A259 will facilitate access to and from the A269 London Road to North Bexhill. A further signal junction is included north east of Bexhill to allow access to the proposed North East Bexhill developments. Finally the BHLR meets the B2092 Queensway in Hastings at another signal junction. The signal timings at all future signalised junctions are consistent with those used in the 2028 BAFFB networks.

The proposed Link Road will be 5.58km long in total. The first 1.4km section of the road (the Bexhill Connection) will be located along the bed of an abandoned railway line cutting to pass through the built up area of Bexhill and constructed to a standard single two lane carriageway standard. The remainder of the road will be constructed to wide two lane single carriageway standard. Crowhurst Road is signalised at the railway bridge just west of the junction with Queensway, this makes traffic cross the bridge in one direction at a time to allow space for non motorised traffic to safely use the bridge.

The network also includes a number of complementary measures designed to ensure traffic reductions resulting from the Link Road remain in future years and ameliorate any adverse impacts. The complementary measures included in the network are:

- Improved roundabout junction of B2093 The Ridge/B2092 Queensway, Hastings
- A259 westbound bus lane on approach to Glyne Gap roundabout
- A259 eastbound bus lane on approach to Harleyshute Road
- A259 westbound bus lane between Filsham Road and Harleyshute Road
- An improved roundabout will be provided at the junction of Harrow Lane with The Ridge

In addition to the Link Road, the network also includes a connection from the development access junction south to a new signal junction on Wrestwood Road. This connection is associated with the North East Bexhill development and will be provided by the developers. In 2028 there is also a connection north from the development access junction to a roundabout at Watermill Road and then on to another roundabout at Ninfield Road associated with the North Bexhill development.

Signal timings for unchanged junctions in the Scenario 2 networks have been retained at the same values as those in the validation networks. Signal timings for the complementary measures have been taken from the appropriate BAFFB assignments.

2.2.3 Scenario 3 network

The Scenario 3 network includes the planned junction improvements associated with the development at North East Bexhill as in Scenario 1 and the new development connections through North East and North Bexhill development areas, but excludes the BHLR and its associated complementary measures. Figure 2.2 shows the network elements included.

Figure 2.1: Scenario 2 network

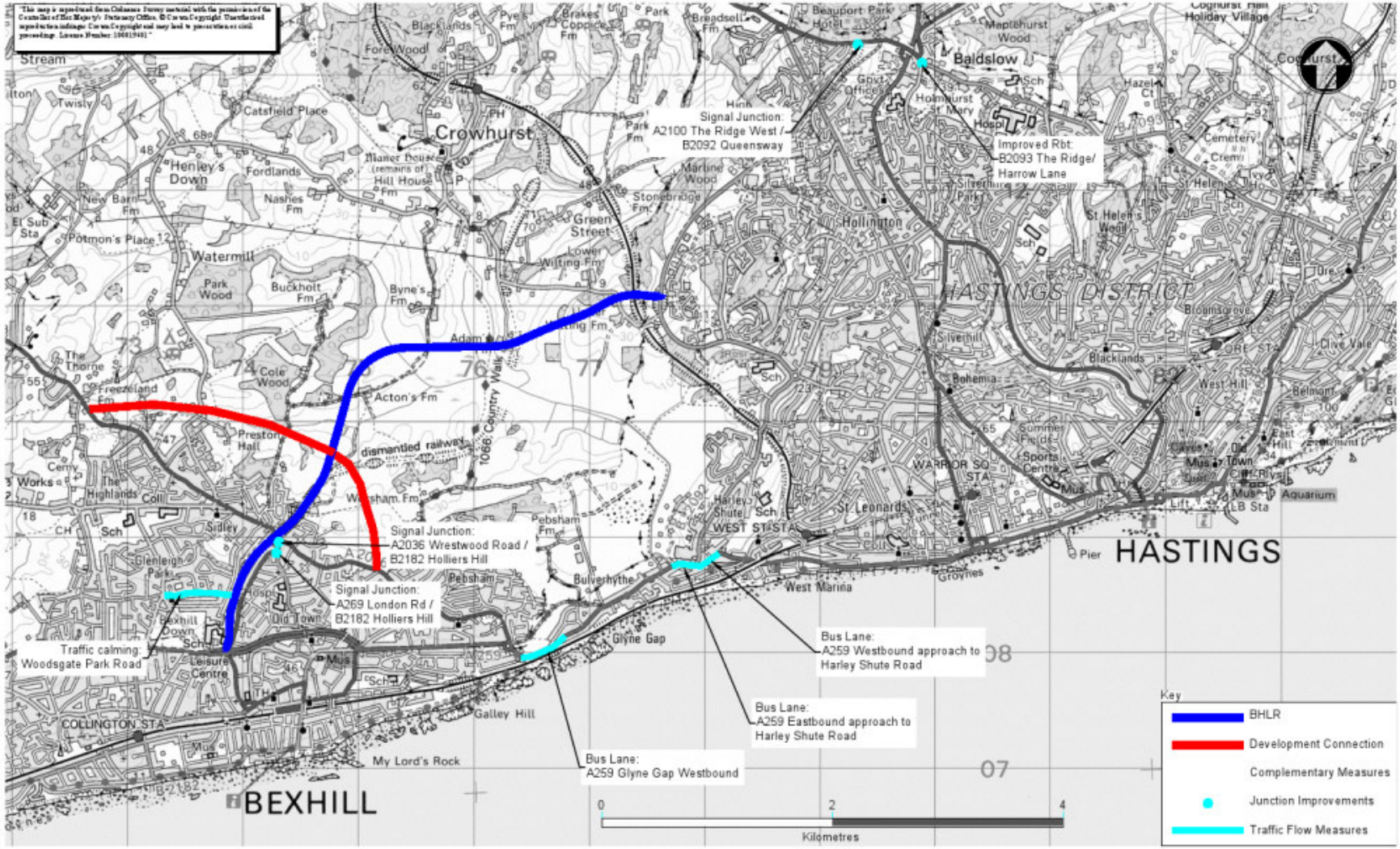
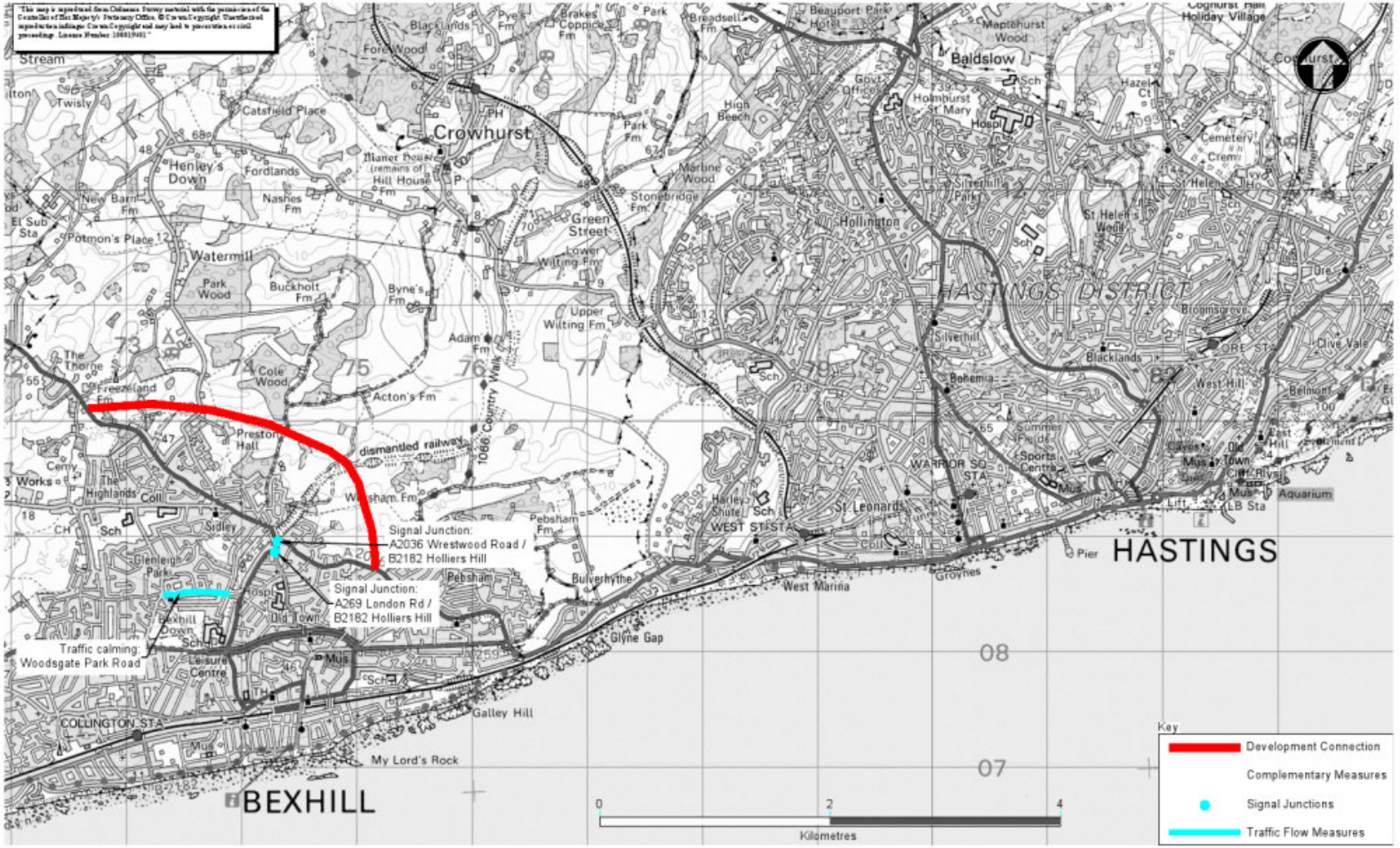


Figure 2.2: Scenario 3 network



2.3 Matrix Building

This section describes the development of trip matrices for each of the three Scenarios for 2028, based on the planning information supplied by ESCC, Hastings Borough Council and Rother District Council and the information available in TEMPRO 6.2. Tables 2.1 and 2.2 below show the numbers of households and the employment information to 2028. Housing and employment development is the same for Scenarios 2 and 3, however reduced levels of housing and employment in Bexhill are assessed in Scenario 1.

Table 2.1: Housing Forecasts

	All Scenarios	Scenario 1		Scenarios 2 & 3	
Ward	**2011 2015**	**2015 2028**	**Notes**	**2015 2028**	**Notes**
Ashdown	19	22		22	
Baird	199	258		258	
Braybrooke	46	118		118	
Castle	107	129		129	
Central St. Leonards	68	159		159	
Conquest	46	184		184	
Gensing	43	196		196	
Hollington	78	103		103	
Maze Hill	58	344		344	
Old Hastings	36	25		25	
Ore	63	43		43	
Silverhill	36	34		34	
St. Helens	4	67		67	
Tressell	94	270		270	
West St. Leonards	89	369		369	
Wishing Tree	13	74		74	
Hastings total	**999**	**2395**		**2395**	
Battle Town (rest of Rother)	158	148		148	
Crowhurst	18	5		5	
Bexhill Central	52	100		28	
Bexhill Collington	30	14		4	
Bexhill Kewhurst	18	2		2	
Bexhill Old Town	63	108	100 in NE Bexhill	1133	1125 in NE Bexhill
Bexhill Sackville	150	7		7	
Bexhill St Marks	18	612	600 in W Bexhill	237	225 in W Bexhill
Bexhill St Michaels	19	6		6	
Bexhill St Stephens	50	46		6	
Bexhill Sidley	62	359	350 in N Bexhill	369	360 in N Bexhill
Bexhill total	**462**	**1254**		**1792**	

Ward	All Scenarios 2011 2015	Scenario 1 2015 2028	Notes	Scenarios 2 & 3 2015 2028	Notes
Remainder of Rother SCTS					
Marsham	40	46		46	
Rye	170	152		152	
Eastern Rother	109	36		36	
Sum Rother SCTS	**957**	**1641**		**2179**	

Table 2.2: Employment Development

Ward	Site Location	Scenario 1 GFA (sqm) 2011 2028	Scenarios 2 & 3 GFA (sqm) 2011 2028
Bexhill Old Town	NE Bexhill: West of proposed Link Road 100% B1 (20% office 80% light Ind)		28,000
Bexhill Sidley	NE Bexhill: East of proposed Link Road 70%-B1, 10%-B2, 20%-B8		23,500
Bexhill Sidley	Off A269 Ninfield Road 70%-B1, 10%-B2, 20%-B8	5,000	
Bexhill St Marks	West Bexhill - B1	17,000	5,000
Bexhill Central	Central Bexhill - B1	3,000	3,000
Marsham	Ivyhouse Lane 50%-B2, 50%-B8		3,000
Hastings Hollington	northwest of Queensway - north - 70%-B1, 30%-B2	10,000	10,000
Hastings Hollington	northwest of Queensway - south - 70%-B1, 30%-B2	7,050	7,050
Hastings Broomgrove	Ivyhouse Lane, north of The Ridge 50%-B2, 50%-B8	11,400	11,400
Hastings Baldslow	Baldslow 50%-B1, 30%-B2, 20%-B8		
Hastings Castle	University Centre Phase I		
Hastings Castle	Gap Site - B1	4,770	4,770
Hastings Castle	Gap Site - Retail	275	275
Hastings Castle	Priory Quarter - B1	17,485	26,900
Hastings Castle	Priory Quarter - University Centre Phase II		
Hastings Castle	Priory Quarter - retail	1,620	4,500
Hastings Castle	Priory Quarter - cinema		1,700
Hastings Castle	Hastings Town Centre - retail		30,000
Hastings Castle	Pelham - B1		3,800
Hastings Castle	Pelham - retail		2,300
Hastings Castle	Pelham - leisure		1,000
Hastings Ashdown	Whitworth Road - B1, B2 and B8 mix	8,100	8,100

The three potential housing development areas in Bexhill, namely North East Bexhill, North Bexhill and West Bexhill, were considered separately for matrix building from all other housing developments. Likewise, trips generated by NE Bexhill, W Bexhill and Central Bexhill employment developments were considered separately from all other employment trips for matrix building. The distribution of trips from these developments came from the work done for the Public Inquiry and is consistent with the distributions used for that work.

All forecast matrices were based on the validated 2011 AM and PM peak matrices, with the background growth from TEMPRO 6.2 applied to bring them to the forecast year 2028.

2.3.1 Background Growth

The Department for Transport maintain the TEMPRO database, which estimates traffic growth rates for each local authority district in the UK. The current TEMPRO Version 6.2 (dataset version 6.2) has been used to calculate growth in car background traffic between 2011 and 2028. Separate growth factors have been calculated by time period, user class and location, excluding any traffic growth due to increases in households or employment in the areas where these have been specifically defined in Tables 2.1 and 2.2. For the zones within East Sussex districts, the appropriate growth rate for that district has been used. For those zones outside of East Sussex, an East Sussex growth rate has been used as most trips from these zones have either an origin or a destination within East Sussex. Appendix A contains tables of the TEMPRO growth factors used.

2.3.2 LGV and HGV Traffic growth

Growth for LGV and HGV traffic was based on NTM 2009 forecasts for the South East region. These are shown in Table 2.3 below. The split of articulated and rigid HGVs has been taken from the classified count at Glyne Gap roundabout and used to calculate an overall HGV growth factor.

Table 2.3: LGV and HGV traffic growth

	LGV	HGV	
Growth	AM and PM	AM	PM
2011-2028	1.456	1.144	1.136

2.3.3 Committed Development

After applying the background growth, additional trip generation due to the specific developments specified in Tables 2.1 and 2.2 is added to the matrices using matrix furnessing to produce the 2028 Scenario 1 matrices with development. Trip rates used to calculate trip generation from these developments are presented in Appendix B. The split between the different car user classes was taken from the user class split in the 2011 AM and PM validated matrices and was applied to all newly generated trips by time period. As furnessing was used to add in the additional development trips, the existing trip distributions in the matrix were applied to the newly generated development trips.

The one exception to this was the housing and employment developments at North, North East and West Bexhill where the distribution of trips was taken from the earlier Public Inquiry work, defined separately by

user class for AM and PM peak periods. The trips from these developments were therefore dealt with separately and were added to the AM and PM 2028 matrices with developments.

Finally, an income and fuel adjustment factor was applied to account for the changes in incomes and fuel prices between the base year 2011 and forecast year 2028. The factors are based on data in Table 1 of WebTAG Unit 3.15.2 and have been calculated as 1.053 for income and 1.023 for fuel, giving a combined income and fuel adjustment factor of 1.077.

2.4 Total Matrix Growth

Table 2.4 below summarises the total trip numbers in the 2011 base matrices and 2028 matrices for each scenario. The 2028 matrices take account of the TEMPRO growth factors shown in Appendix A, fuel and income adjustment factors, and the relevant development scenarios. The forecast growth equates to a 25% growth from 2011 Base to 2028 Scenario 1 and 30% growth from 2011 Base to 2028 Scenarios 2 and 3.

Table 2.4: Matrix Totals (vehs)

Vehicle Type	2011 Base		2028 Scenario 1		2028 Scenarios 2 & 3	
	AM	PM	AM	PM	AM	PM
Cars	26,713	26,309	32,750	32,275	33,746	34,050
LGVs	3,863	4,998	5,625	7,277	5,625	7,277
HGVs	2,195	1,518	2,511	1,724	2,511	1,724
Total	**32,771**	**32,825**	**40,885**	**41,276**	**41,882**	**43,051**

2.5 Assignment Methodology

To ensure the full impact of additional trips from the new developments is captured, use was made of the BHLR highway model only without variable demand responses, i.e. in fixed trip matrix mode. Although this did not allow trips to re-distribute or change mode in response to forecast levels of congestion, it provided a direct comparison of the parts of the network under pressure for each scenario tested.

3. Results

3.1 Introduction

SATURN assignments were undertaken for the AM and PM peaks in 2028 for the three scenarios. For these assessments, variable demand modelling was not undertaken and redistribution and mode choice have not been considered. The modelling undertaken highlights where the congestion is likely to occur across the network. The potential solutions identified for congested locations are based on the modelling output alone and no feasibility or design work has been undertaken. Where signal timing changes are proposed, this may not be achievable on-street due to site constraints.

3.2 Network Wide Impacts

Table 3.1 below summarises how many junctions are within each capacity category for each option. It also gives network-wide summary statistics in terms of total pcu-hrs and pcu-km travelled and total network speeds.

The number of junctions varies between the three 2028 scenarios due to the differing highway network assumptions assessed. The number of junctions in Scenario 1 is the same as the 2011 base as no new highway network links have been assumed. The 25% increase in trip numbers from the 2011 base to 2028 Scenario 1 equates to a 42 to 50% increase in travel time across the network.

The same level of development has been assessed in both Scenarios 2 and 3 with the highway infrastructure in place the only difference. By comparing the results for Scenarios 2 and 3 in Table 3.1, it can be seen that BHLR and associated complementary measures are forecast to reduce travel times across the network and increase network speeds in both time periods assessed.

Table 3.1: Summary Statistics

	AM				PM			
	2011	Scenario 1	Scenario 2	Scenario 3	2011	Scenario 1	Scenario 2	Scenario 3
No and % of junctions with max V/C < 80%	267 (89%)	223 (74%)	218 (71%)	213 (70%)	268 (89%)	238 (79%)	226 (74%)	232 (77%)
No and % of junctions with max V/C > 80% but < 100%	21 (7%)	42 (14%)	45 (15%)	50 (17%)	17 (6%)	30 (10%)	35 (11%)	36 (12%)
No and % of junctions with max V/C > 100% but < 120%	12 (4%)	34 (11%)	42 (14%)	40 (13%)	12 (4%)	30 (10%)	40 (13%)	33 (11%)
No and % of junctions with max V/C > 120%	0 (0%)	1 (0%)	0 (0%)	0 (0%)	3 (1%)	2 (1%)	4 (1%)	2 (1%)
Total travel time (pcuhrs)	4311.3	6434.3	6105.6	6502.8	4622.5	6526.9	7018.2	7251.6
Total travel distance (pcukm)	169530.7	213814.5	217270.9	218782.5	162291.1	206106.0	212233.8	214359.9
Network speed (km/hr)	39.3	33.2	35.6	33.6	35.1	31.6	30.2	29.6

The previous Glyne Gap Capacity Assessment Report detailed the existing levels of delay along the A259 through Glyne Gap which reach about 10 minutes per vehicle in the PM Peak in both directions. Increases in demand to travel between Bexhill and Hastings is therefore likely to result in traffic seeking alternative routes

Tables 3.2 and 3.3 show the flows in each time period and scenario across a screenline between Bexhill and Hastings. Between the 2011 base and 2028 Scenario 1 total traffic across the screenline increases by around 27% with traffic increasing significantly on A271, Telham Lane, and Henley's Down.

The comparison of Scenarios 2 and 3 which have the same level of development, shows that flows increase significantly by a minimum of 19% on alternative routes such as the A271 and B2095 into Battle and the local Crowhurst routes via Telham Lane and Henley's Down without the inclusion of BHLR. Additionally flows on the A259 Glyne Gap are significantly higher, at least 28%, in both directions and time periods without the BHLR. With the introduction of BHLR, flows in 2028 Scenario 2 on the A259 through Glyne Gap, reduce to less than observed levels in 2011.

Table 3.2: AM Peak Screenline Flows

	Eastbound (vehs)					Westbound (vehs)				
Route	2011	Scenario 1	Scenario 2	Scenario 3	Sc 3 / Sc 2	2011	Scenario 1	Scenario 2	Scenario 3	Sc 3 / Sc 2
A271	467	745	535	755	1.41	554	756	587	720	1.23
B2095	436	445	390	465	1.19	383	469	373	497	1.33
Telham Lane	20	195	25	279	11.16	29	45	36	44	1.22
Henley's Down	320	260	122	284	2.33	174	453	61	591	9.69
BHLR	-	-	1020	-	-	-	-	1229	-	-
A259 Glyne Gap	1097	1269	1000	1289	1.29	1197	1239	793	1197	1.51
TOTAL	**2340**	**2914**	**3092**	**3072**	**0.99**	**2337**	**2962**	**3079**	**3049**	**0.99**

Table 3.3: PM Peak Screenline Flows

	Eastbound (vehs)					Westbound (vehs)				
Route	2011	Scenario 1	Scenario 2	Scenario 3	Sc 3 / Sc 2	2011	Scenario 1	Scenario 2	Scenario 3	Sc 3 / Sc 2
A271	475	759	542	770	1.42	444	750	569	718	1.26
B2095	411	417	372	442	1.19	415	419	353	420	1.19
Telham Lane	16	28	17	58	3.41	17	31	13	31	2.38
Henley's Down	88	167	65	303	4.66	158	274	89	456	5.12
BHLR	-	-	932	-	-	-	-	1111	-	-
A259 Glyne Gap	1119	1394	1102	1410	1.28	1161	1287	777	1279	1.65
TOTAL	**2109**	**2765**	**3030**	**2983**	**0.98**	**2195**	**2761**	**2912**	**2904**	**1.00**

3.3 Junction Assessment

This section discusses the junctions which are overcapacity in each assessment option. Figures 3.1 to 3.3 show the results of the AM Peak Scenarios 1, 2 and 3 respectively. The coloured dots indicate the highest volume over capacity (V/C) ratio across all turning movements at each junction. All green dots indicate V/C ratios below 80%. At these junctions no capacity problems are expected in the forecast year. Blue dots represent V/C ratios between 80% and 100%, yellow dots indicate V/C ratios between 100% and 120% and red dots indicate V/C's above 120%. Delays and congestion may occur for any junctions where V/C ratios at or above 100% are forecast.

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3.3.1 Scenario 1

3.3.1.1 Glyne Gap

Whilst Figure 3.1 only shows the forecast junction operation, earlier work carried out by Mott MacDonald for ESCC identified that the main capacity constraint in the local Glyne Gap area is the A259 Glyne Gap link. Capacity constraints on Glyne Gap link cause around 8% of eastbound traffic and over 20% of westbound traffic that would wish to route along Glyne Gap in 2028 Scenario 1 to transfer away from Glyne Gap and onto other less suitable east-west routes through Crowhurst and Battle.

3.3.1.2 Bexhill

The westbound A2036 approach and northbound Penland Road approach to the A2036/Penland Road signal junction are overcapacity. The model suggests that adjustment of the signal timings would reduce the V/C to less than 100% for all arms at this junction. The A2036 westbound approach to the junction with A269 London Road is also overcapacity but again the model suggests that adjustment of the signal timings would reduce the V/C to less than 100% for all arms at this junction.

The right turn from the A259 eastbound and both the A269 London Road approaches at the signal junction of the A259/A269 are overcapacity. The model suggests that adjustment of the signal timings would reduce the V/C to less than 100% for all arms at this junction. The Peartree Lane approach to A259 Little Common roundabout is overcapacity.

The Watermill Lane approach to the junction with A269 Ninfield Road is overcapacity as is the B2095 approach to the junction with A259 Barnhorn Road.

3.3.1.3 Hastings

In Hastings high flows along the A259 result in a number of junctions being overcapacity. Each of the arms at the signal junction of A259/B2093 is overcapacity. The minor road approaches of Richland Close, Saxon Road, Ashburnham Road and Harold Road onto the A259 are overcapacity. All approaches at the A259 Old London Road/Priory Road/Frederick Road are overcapacity. The model currently assumes an all red pedestrian stage is called every cycle. If the pedestrian stage was called only every other cycle then this would reduce the V/C to less than 100% for all arms at this junction. The A259 westbound is overcapacity at the junction with the A2102 London Road. The model suggests that adjustment of the signal timings would reduce the V/C to less than 100% for all arms at this junction. All arms at the junctions of the A259 with Harley Shute Road and Filsham Road are overcapacity

Another area suffering from overcapacity is the area around Baldslow. The A2100 The Ridge westbound at the junction with Queensway is just at capacity. An enlarged roundabout here would reduce the V/C to less than 100% for all arms. The Maplehurst Road approach onto The Ridge is overcapacity. The Ridge eastbound approach to the junction with Harrow Lane is overcapacity. Additionally the A28 approach to its junction with the A21 is overcapacity.

Within Hastings town centre, the southbound approach of Braybrooke Road to the junction with Priory Avenue and South Terrace is overcapacity, but the model suggests that adjustment of the signal timings would reduce the V/C to less than 100% for all arms at this junction. The northbound approach of A21 Havelock Road to the junction with Cornwallis Terrace is overcapacity but again the model suggests that adjustment of the signal timings would reduce the V/C to less than 100% for all arms at this junction.

In the Hollington area, the minor road approach of Upper Church Road onto A21 Seddlescombe Road is overcapacity, as are both A21 approaches at the junction with Old Harrow Road. All approaches except the Ashbrook Road approach to the signal junction with B2159 Battle Road are overcapacity. The right turn from Old Church Road onto the B2159 Battle Road is overcapacity but the model suggests that adjustment of the signal timings would reduce the V/C to less than 100% for all arms at this junction.

The right turn from the A21 London Road onto A21 Seddlescombe Road and the Seddlescombe Road south approaches at the signal junction with the B2159 Battle Road are overcapacity. The model suggests that adjustment of the signal timings would reduce the V/C to less than 100% for all arms at this junction. The A21 Bohemia Road northbound approach to the junction with A2101 London Road is overcapacity. The model suggests that adjustment of the signal timings would reduce the V/C to less than 100% for all arms at this junction. The Gillsmans Hill approach to the junction with Seddlescombe Road South is also overcapacity but again the model suggests that adjustment of the signal timings would reduce the V/C to less than 100% for all arms at this junction. The Marline Road approach to the junction with Blackman Avenue is overcapacity but again the model suggests that adjustment of the signal timings would reduce the V/C to less than 100% for all arms at this junction.

Finally, the Gresham Way approach to the junction with Filsham Road is overcapacity.

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3.3.2.1 Glyne Gap

As mentioned in 3.2.1.1, the main capacity constraint in the local Glyne Gap area is the A259 Glyne Gap link. Capacity constraints on Glyne Gap link combined with the presence of a new BHLR cause around 33% of eastbound traffic and over 50% of westbound traffic that would otherwise have routed via Glyne Gpa without BHLR, to transfer onto the BHLR. Flows on the alternative east-west routes through Crowhurst and Battle also reduce by around 35% as traffic is diverted onto the BHLR. It should be noted however that the bus lanes forming part of complementary measures reduce the capacity at Glyne Gap relative to Scenario 1 so that the real benefit of the BHLR on the flows and traffic conditions on the Glyne Gap link is not captured in Figure 3.2.

3.3.2.2 Bexhill

In Bexhill, the Peartree Lane approach to Little Common roundabout is only just overcapacity at 101% with BHLR. The A2036 Wrestwood Road approach to the junction with the A269 is also overcapacity as are the A2036 westbound and Penland Road approaches to this signal junction. The model suggests that adjustment of the signal timings would reduce the V/C to less than 100% for all arms at both junctions. In addition, the B2098 Terminus Road eastbound approach to the junction with Buckhurst Place and Sackville Road is overcapacity as are sections of the A269 Buckhurst Place one-way system.

The junction of the A259 London Road with BHLR is shown to be overcapacity, and the development connections on to the Link Road. However, it was demonstrated at Public Inquiry that when redistribution and mode choice issues are considered, and with more detailed assessments using LINSIG, all Link Road junctions have adequate capacity for forecast traffic with development.

Finally, the B2095 approach to the junction with A259 Barnhorn Road is overcapacity.

3.3.2.3 Hastings

There are a number of new locations in Hastings where overcapacity is present in Scenario 2 but not in Scenario 1. These are the Chowns Hill approach to The B2093 The Ridge and the Highfield Drive approach to the junction with Churchwood Drive. The Queensway approaches to the junction with the BHLR are overcapacity as are the development connections onto the Link Road. However, it was demonstrated at Public Inquiry that when redistribution and mode choice issues are considered, Link Road junctions have adequate capacity for forecast traffic with development. The A2101 Albert Road approach to the A259 is overcapacity as is the Castle Hill Road approach to the A2101. The model suggests that adjustment of the signal timings at the A2101/A259 junction would reduce the V/C to less than 100% for all arms. The Hollinghurst Road approach to Harrow Lane is also overcapacity.

In Hastings high flows along the A259 result in a number of junctions being overcapacity. Each of the arms at the signal junction of A259/B2093 is overcapacity. The minor road approaches of Richland Close, Saxon Road, Ashburnham Road and Harold Road onto the A259 are overcapacity. All approaches at the A259 Old London Road/Priory Road/Frederick Road are overcapacity. The model currently assumes an all red pedestrian stage is called every cycle. If the pedestrian stage was called only every other cycle then this would reduce the V/C to less than 100% for all arms at this junction. The A259 westbound is overcapacity at the junction with the A2102 London Road. The model suggests that adjustment of the signal timings would reduce the V/C to less than 100% for all arms at this junction. With the introduction of the BHLR, there is no longer any overcapacity at the junction of the A259 with Harley Shute Road. The model suggests that signal timing changes at the junction of the A259/Filsham Road would reduce the V/C to less than 100% for all arms at this junction.

Another area suffering from overcapacity is the area around Baldslow. The Junction Road approach onto The Ridge and the right turn from The Ridge into Junction Road are at capacity as is the Maplehurst Road approach to The Ridge. Two lanes for the A2100 Ridge eastbound and the Junction Road approaches would be required to reduce V/C ratios to less than 100%. Both approaches of The Ridge to the junction with Harrow Lane are overcapacity.

Within Hastings town centre, the northbound approach of South Terrace and the southbound approach of Braybrooke Road to their junction are overcapacity. The model currently assumes an all red pedestrian stage is called every cycle. If the pedestrian stage was called only every other cycle then this would reduce

the V/C to less than 100% for all arms at this junction. The northbound approach of A21 Havelock Road to the junction with Cornwallis Terrace is overcapacity but again the model suggests that adjustment of the signal timings would reduce the V/C to less than 100% for all arms at this junction.

In the Hollington area, the minor road approach of Upper Church Road onto A21 Seddlescombe Road is overcapacity, as is the A21 northbound approach to the A21/Old Harrow Road mini-roundabout. All approaches except the Ashbrook Road approach to the signal junction with B2159 Battle Road are overcapacity.

The right turn from the A21 London Road onto A21 Seddlescombe Road and the Seddlescombe Road south approaches at the signal junction with the B2159 Battle Road are overcapacity. The model suggests that adjustment of the signal timings would reduce the V/C to less than 100% for all arms at this junction. The A21 Bohemia Road northbound approach to the junction with A2101 London Road is overcapacity. The model suggests that adjustment of the signal timings would reduce the V/C to less than 100% for all arms at this junction. The Gillsmans Hill and Springfield Road approaches to the junction with Seddlescombe Road South are also overcapacity but again the model suggests that adjustment of the signal timings would reduce the V/C to less than 100% for all arms at this junction. The Marline Road approach to the junction with Blackman Avenue is overcapacity but again the model suggests that adjustment of the signal timings would reduce the V/C to less than 100% for all arms at this junction.

Finally, the Gresham Way approach to the junction with Filsham Road is overcapacity.

3.3.3Y ScenY io 3 Y

3.3.3.1 Glyne Gap

Whilst Figure 3.3 only shows the forecast junction operation, earlier work carried out by Mott MacDonald for ESCC identified that the main capacity constraint in the local Glyne Gap area is the A259 Glyne Gap link. Capacity constraints on Glyne Gap link cause around 14% of eastbound traffic and over 25% of westbound traffic that would wish to route along Glyne Gap in 2028 Scenario 3 to transfer away from Glyne Gap and onto other less suitable east-west routes through Crowhurst and Battle.

3.3.3.2 Bexhill

The A2036 westbound and Penland Road approaches to the signal junction are overcapacity. The model suggests that adjustment of the signal timings would reduce the V/C to less than 100% for all arms at this junction. The A2036 westbound approach to the signal junction with the A269 London Road is overcapacity but again the model suggests that adjustment of the signal timings would reduce the V/C to less than 100% for all arms at this junction.

The right turn from the A259 eastbound and both the A269 London Road approaches at the signal junction of the A259/A269 are overcapacity. The model suggests that adjustment of the signal timings would reduce the V/C to less than 100% for all arms at this junction. The B2095 approach to the junction with A259 Barnhorn Road is overcapacity.

The development connection westbound to the proposed roundabout with Watermill Lane is overcapacity but the addition of a flare to the approach would reduce the V/C to less than 100% for all arms at this

junction. The right turn from the development connection onto the A2036 Wrestwood Road is overcapacity but the model suggests that adjustment of the signal timings would reduce the V/C to less than 100% for all arms at this junction.

3.3.3.3 Hastings

In Hastings high flows along the A259 result in a number of junctions being overcapacity. Each of the arms at the signal junction of A259/B2093 is overcapacity. The minor road approaches of Richland Close, Saxon Road, Ashburnham Road and Harold Road onto the A259 are overcapacity. All approaches at the A259 Old London Road/Priory Road/Frederick Road are overcapacity. The model currently assumes an all red pedestrian stage is called every cycle. If the pedestrian stage was called only every other cycle then this would reduce the V/C to less than 100% for all arms at this junction.

The A2101 Albert Road approach to the A259 is overcapacity as is the Castle Hill Road approach to the A2101. The model suggests that adjustment of the signal timings at the A2101/A259 junction would reduce the V/C to less than 100% for all arms. The A259 westbound is overcapacity at the junction with the A2102 London Road. The model suggests that adjustment of the signal timings would reduce the V/C to less than 100% for all arms at this junction. Without the BHLR, all approaches at the junctions of A259 with Harley Shute Road and Filsham Road are overcapacity.

Another area suffering from overcapacity is the area around Baldslow. The A2100 The Ridge westbound at the junction with Queensway is just at capacity. An enlarged roundabout here would reduce the V/C to less than 100% for all arms. The Maplehurst Road approach to its junction with The Ridge is overcapacity. The eastbound approach of The Ridge to the junction with Harrow Lane is overcapacity. The Junction Road approach to the A21 is overcapacity. Signalisation and upgrade of the A21/Junction Road junction may be able to reduce V/C ratios but this would need to be investigated further. Additionally the A28 approach to its junction with the A21 is just at capacity.

Within Hastings town centre, the northbound approach of South Terrace and the southbound approach of Braybrooke Road to their junction are overcapacity. The model currently assumes an all red pedestrian stage is called every cycle. If the pedestrian stage was called only every other cycle then this would reduce the V/C to less than 100% for all arms at this junction. The northbound approach of A21 Havelock Road to the junction with Cornwallis Terrace is overcapacity but again the model suggests that adjustment of the signal timings would reduce the V/C to less than 100% for all arms at this junction.

In the Hollington area, the minor road approach of Upper Church Road onto A21 Seddlescombe Road is overcapacity, as are both A21 approaches to the A21/Old Harrow Road mini-roundabout. Both B2159 Battle Road approaches to the signal junction with Ashbrook Road and Blackman Avenue are overcapacity. The right turns from Old Church Road and Upper Church Road at the signal junction with B2159 are also overcapacity. The model suggests that adjustment of the signal timings would reduce the V/C to less than 100% for all arms at this junction. Additionally the right turn from Parkstone Road onto A2101 St Helen's Road is overcapacity.

The right turn from the A21 London Road onto A21 Seddlescombe Road and the Seddlescombe Road south approaches at the signal junction with the B2159 Battle Road are overcapacity. The model suggests that adjustment of the signal timings would reduce the V/C to less than 100% for all arms at this junction. The A21 Bohemia Road northbound approach to the junction with A2101 London Road is overcapacity. The model suggests that adjustment of the signal timings would reduce the V/C to less than 100% for all arms at this junction. The Gillsmans Hill approach to the junction with Seddlescombe Road South is also

overcapacity but again the model suggests that adjustment of the signal timings would reduce the V/C to less than 100% for all arms at this junction. The Marline Road approach to the junction with Blackman Avenue is overcapacity but again the model suggests that adjustment of the signal timings would reduce the V/C to less than 100% for all arms at this junction.

Finally, the Gresham Way approach to the junction with Filsham Road is overcapacity.

3.4 Uncertainty Test PM Peak Analysis

Figures 3.4 to 3.6 show the results of the PM Peak Scenarios 1, 2 and 3 respectively.

3.4.1 Scenario 1

3.4.1.1 Glyne Gap

As discussed in 3.2.1.1, earlier work carried out by Mott MacDonald for ESCC identified that the main capacity constraint in the local Glyne Gap area is the A259 Glyne Gap link. Capacity constraints on Glyne Gap link cause around 8% of eastbound traffic and 12% of westbound traffic that would wish to route along Glyne Gap in 2028 Scenario 1 to transfer away from Glyne Gap and onto other less suitable east-west routes through Crowhurst and Battle.

3.4.1.2 Bexhill

The westbound A2036 approach and northbound Penland Road approach to the A2036/Penland Road signal junction are overcapacity. The model suggests that adjustment of the signal timings would reduce the V/C to less than 100% for all arms at this junction. The right turn from the A259 eastbound and both the A269 London Road approaches at the signal junction of the A259/A269 are overcapacity. The model suggests that adjustment of the signal timings would reduce the V/C to less than 100% for all arms at this junction.

3.4.1.3 Hastings

In Hastings high flows along the A259 result in a number of junctions being overcapacity. The A259 eastbound and The Ridge southbound at the junction of A259/B2093 are overcapacity. The model suggests that adjustment of the signal timings would reduce the V/C to less than 100% for all arms at this junction. The minor road approach of Saxon Road onto the A259 is overcapacity. The right turn from Priory Road at the signal junction with A259 Old London Road is overcapacity but the model suggests that adjustment of the signal timings would reduce the V/C to less than 100% for all arms at this junction. The A2010 Albert Road approach to the A259 is overcapacity but the model suggests that adjustment of the signal timings would reduce the V/C to less than 100% for all arms at this junction. The A259 westbound at Robertson Street is overcapacity. The model currently assumes an all red pedestrian stage is called every cycle. If the pedestrian stage was called only every other cycle then this would reduce the V/C to less than 100% for all arms at this junction. The A259 westbound is overcapacity at the junction with the A2102 London Road. The model suggests that adjustment of the signal timings would reduce the V/C to less than 100% for all arms at this junction. All arms at the junctions of the A259 with Harley Shute Road and Filsham Road are overcapacity.

Another area suffering from overcapacity is the area around Baldslow. The Junction Road approach onto The Ridge is at capacity as is the Maplehurst Road approach. If Junction Road could be widened to two entry lanes at its junction with The Ridge this would reduce V/C ratios to less than 100%. The Junction Road approach to the A21 is overcapacity as is The Ridge eastbound approach to the junction with Harrow Lane. Signalisation and upgrade of the A21/Junction Road junction may be able to reduce V/C ratios but this would need to be investigated further. Additionally the A28 approach to its junction with the A21 is just at capacity.

Within Hastings town centre, the South Terrace approach to the signal junction with A2101 Queens Road is overcapacity. The model suggests that adjustment of the signal timings would reduce the V/C to less than 100% for all arms at this junction. The northbound approach of South Terrace and both Braybrooke Road approaches to their junction with Priory Avenue are overcapacity. The model currently assumes an all red pedestrian stage is called every cycle. If the pedestrian stage was called only every other cycle then this would reduce the V/C to less than 100% for all arms at this junction. The northbound approach of A21 Havelock Road to the junction with Cornwallis Terrace is overcapacity and causing blocking back issues along Havelock Road, but again the model suggests that adjustment of the signal timings would reduce the V/C to less than 100% for all arms at this junction and remove the blocking back problems.

In the Hollington area, both A21 approaches at the junction with Old Harrow Road are overcapacity. The B2159 Battle Road approaches to the junction with Ashbrook Road and Blackman Avenue are overcapacity. The model suggests that adjustment of the signal timings would reduce the V/C to less than 100% for all arms at this junction. The right turn from Old Church Rd onto the B2159 Battle Road is overcapacity but again the model suggests that adjustment of the signal timings would reduce the V/C to less than 100% for all arms at this junction.

The Gillsmans Hill approach and southbound approach of Seddlescombe Road South to the junction with The Green are also overcapacity but again the model suggests that adjustment of the signal timings would reduce the V/C to less than 100% for all arms at this junction. The Marline Road approach to the junction with Blackman Avenue is overcapacity but again the model suggests that adjustment of the signal timings would reduce the V/C to less than 100% for all arms at this junction.

The B2092 Crowhurst Road to Wishing Tree roundabout is overcapacity. Finally, the Gresham Way approach to the junction with Filsham Road is overcapacity.

3.4.2Y ScenY io 2 Y

3.4.2.1 Glyne Gap

As mentioned in 3.2.1.1, the main capacity constraint in the local Glyne Gap area is the A259 Glyne Gap link. Capacity constraints on Glyne Gap link combined with the presence of a new BHLR cause around 37% of eastbound traffic and over 50% of westbound traffic that would otherwise have routed via Glyne Gap without BHLR, to transfer onto the BHLR. Flows on the alternative east-west routes through Crowhurst and Battle also reduce by around 35% as traffic is diverted onto the BHLR. It should be noted however that the bus lanes forming part of the complementary measures reduce the capacity at Glyne Gap relative to Scenario 1 so that the real benefit of the BHLR on the flows and traffic conditions on the Glyne Gap link is not captured in Figure 3.4.

3.4.2.2 Bexhill

The right turn from Sutherland Avenue onto the A259 is just at capacity (100%) with BHLR as is the A259 eastbound (101%) at Little Common roundabout and sections of the A269 Buckhurst Place one-way system. The A2036 westbound approach to the signal junction with Penland Road is overcapacity. The model suggests that adjustment of the signal timings would reduce the V/C to less than 100% for all arms at this junction. The A2036 westbound approach to the signal junction with the A269 London Road is overcapacity but again the model suggests that adjustment of the signal timings would reduce the V/C to less than 100% for all arms at this junction.

The A259 London Road /BHLR junction is shown to be overcapacity as are the development connections onto the Link Road and onto A2036 Wrestwood Road. However, it was demonstrated at Public Inquiry that when redistribution and mode choice issues are considered, and with more detailed capacity assessments using LINSIG, Link Road junctions have adequate capacity for forecast traffic with development.

3.4.2.3 Hastings

There are a number of new locations in Hastings where overcapacity is present in Scenario 2 but not in Scenario 1. These are Highfield Drive approach to the junction with Churchwood Drive and the Grange Road approach to B2093 The Ridge. All movements out of Junction Road onto The Ridge and onto the A21 become severely overcapacity, exceeding 120% volume to capacity. The Seddlescombe Road South approach to the junction with the A21 and B2159 is at capacity but the model suggests that adjustment of the signal timings would reduce the V/C to less than 100% for all arms at this junction. The A259 eastbound at the junction with A21 Harold Place is overcapacity but the model suggests that adjustment of the signal timings would reduce the V/C to less than 100% for all arms at this junction. The Castle Hill Road approach to the junction with A2101 Albert Road is also overcapacity. The Queensway approaches to the junction with the BHLR are overcapacity as are the development connections onto the Link Road. However, it was demonstrated at Public Inquiry that when redistribution and mode choice issues are considered, Link Road junctions have adequate capacity for forecast traffic with development.

In Hastings high flows along the A259 result in a number of junctions being overcapacity. The A259 eastbound and The Ridge southbound at the junction of A259/B2093 are overcapacity. The model suggests that adjustment of the signal timings would reduce the V/C to less than 100% for all arms at this junction. The minor road approach of Saxon Road onto the A259 is overcapacity. The right turn from Priory Road at the signal junction with A259 Old London Road is overcapacity but the model suggests that adjustment of the signal timings would reduce the V/C to less than 100% for all arms at this junction. The A2010 Albert Road approach to the A259 is overcapacity but the model suggests that adjustment of the signal timings would reduce the V/C to less than 100% for all arms at this junction. The A259 westbound at Robertson Street is also overcapacity. The model currently assumes an all red pedestrian stage is called every cycle. If the pedestrian stage was called only every other cycle then this would reduce the V/C to less than 100% for all arms at this junction. The A259 westbound is overcapacity at the junction with the A2102 London Road. The model suggests that adjustment of the signal timings would reduce the V/C to less than 100% for all arms at this junction. With the introduction of the BHLR, there is no longer any overcapacity at the junction of the A259 with Harley Shute Road. The model suggests that signal timing changes at the junction of the A259/Filsham Road would reduce the V/C to less than 100% for all arms at this junction.

Another area suffering from overcapacity is the area around Baldslow. The Junction Road approach onto The Ridge and the right turn from The Ridge into Junction Road is overcapacity as is the Maplehurst Road approach. Two lanes for the A2100 Ridge eastbound and the Junction Road approaches would be required

to reduce V/C ratios to less than 100%. The Junction Road approach to the A21 is overcapacity as are The Ridge approaches to the junction with Harrow Lane. Signalisation and upgrade of the A21/Junction Road junction may be able to reduce V/C ratios but this would need to be investigated further. Additionally the A28 approach to its junction with the A21 is just overcapacity.

Within Hastings town centre, the A2101 Queens Road southbound approach to the signal junction with South Terrace is overcapacity. The model currently assumes an all red pedestrian stage is called every cycle. If the pedestrian stage was called only every other cycle then this would reduce the V/C to less than 100% for all arms at this junction. The northbound approach of South Terrace and both Braybrooke Road approaches to their junction with Priory Avenue are overcapacity. The model currently assumes an all red pedestrian stage is called every cycle. If the pedestrian stage was called only every other cycle then this would reduce the V/C to less than 100% for all arms at this junction. The northbound approach of A21 Havelock Road to the junction with Cornwallis Terrace is overcapacity and causing blocking back issues downstream along Havelock Road, but again the model suggests that adjustment of the signal timings would reduce the V/C to less than 100% for all arms at this junction and remove the blocking back problems.

In the Hollington area, both A21 approaches at the junction with Old Harrow Road are overcapacity. The B2159 Battle Road approaches to the junction with Ashbrook Road and Blackman Avenue are overcapacity. The model currently assumes an all red pedestrian stage is called every cycle. If the pedestrian stage was called only every other cycle then this would reduce the V/C to less than 100% for all arms at this junction. The Old Church Road and Upper Church Road approaches to B2159 Battle Road are overcapacity, but the model suggests that adjustment of the signal timings would reduce the V/C to less than 100% for all arms at this junction. The Gillsmans Hill, Springfield Road and southbound approach of Seddlescombe Road South to the junction with The Green are also overcapacity. The Marline Road approach to the junction with Blackman Avenue is overcapacity but again the model suggests that adjustment of the signal timings would reduce the V/C to less than 100% for all arms at this junction.

The B2092 Crowhurst Road to Wishing Tree roundabout is overcapacity. Finally, the Gresham Way approach to the junction with Filsham Road is overcapacity.

3.4.3Y ScenY io 3 Y

3.4.3.1 Glyne Gap

As discussed in 3.2.1.1, earlier work carried out by Mott MacDonald for ESCC identified that the main capacity constraint in the local Glyne Gap area is the A259 Glyne Gap link. Capacity constraints on Glyne Gap link cause around 18% of eastbound traffic and 20% of westbound traffic that would wish to route along Glyne Gap in 2028 Scenario 3 to transfer away from Glyne Gap and onto other less suitable east-west routes through Crowhurst and Battle.

3.4.3.2 Bexhill

The A2036 westbound and Penland approaches to their signal junction are overcapacity. The model suggests that adjustment of the signal timings would reduce the V/C to less than 100% for all arms at this junction. The right turn from the A259 eastbound and both the A269 London Road approaches at the signal

junction of the A259/A269 are overcapacity. The model suggests that adjustment of the signal timings would reduce the V/C to less than 100% for all arms at this junction.

The right turn from the development connection onto the A2036 Wrestwood Road is overcapacity but the model suggests that adjustment of the signal timings would reduce the V/C to less than 100% for all arms at this junction.

3.4.3.3 Hastings

In Hastings high flows along the A259 result in a number of junctions being overcapacity. The A259 eastbound and The Ridge southbound at the junction of A259/B2093 are overcapacity. The model suggests that adjustment of the signal timings would reduce the V/C to less than 100% for all arms at this junction. The minor road approach of Saxon Road onto the A259 is overcapacity. The A259 eastbound and A21 Harold Road approaches at their signal junction are overcapacity but the model suggests that adjustment of the signal timings would reduce the V/C to less than 100% for all arms at this junction. The A2010 Albert Road approach to the A259 is overcapacity but the model suggests that adjustment of the signal timings would reduce the V/C to less than 100% for all arms at this junction. The Castle Hill Road approach to the junction with A2101 Albert Road is also overcapacity. The A259 westbound at Robertson Street is also overcapacity. The model currently assumes an all red pedestrian stage is called every cycle. If the pedestrian stage was called only every other cycle then this would reduce the V/C to less than 100% for all arms at this junction. The A259 westbound is overcapacity at the junction with the A2102 London Road. The model suggests that adjustment of the signal timings would reduce the V/C to less than 100% for all arms at this junction. Without the BHLR, all approaches at the junctions of A259 with Harley Shute Road and Filsham Road are overcapacity.

Another area suffering from overcapacity is the area around Baldslow. The Junction Road approach onto The Ridge is overcapacity as is the Maplehurst Road approach. Two lanes for the Junction Road approaches would be required to reduce V/C ratios to less than 100%. The Junction Road approach to the A21 is overcapacity as are The Ridge approaches to the junction with Harrow Lane. Signalisation and upgrade of the A21/Junction Road junction may be able to reduce V/C ratios but this would need to be investigated further. As with Scenario 2, the Grange Road approach to B2093 The Ridge is overcapacity.

Within Hastings town centre, the A2101 Queens Road southbound approach and South Terrace approaches to their signal junction are overcapacity. The model currently assumes an all red pedestrian stage is called every cycle. If the pedestrian stage was called only every other cycle then this would reduce the V/C to less than 100% for all arms at this junction. The northbound approach of South Terrace and both Braybrooke Road approaches to their junction with Priory Avenue are overcapacity. The model currently assumes an all red pedestrian stage is called every cycle. If the pedestrian stage was called only every other cycle then this would reduce the V/C to less than 100% for all arms at this junction. The northbound approach of A21 Havelock Road to the junction with Cornwallis Terrace is overcapacity and causing blocking back issues downstream along Havelock Road, but again the model suggests that adjustment of the signal timings would reduce the V/C to less than 100% for all arms at this junction and remove the blocking back problems.

In the Hollington area, both A21 approaches at the junction with Old Harrow Road are overcapacity. The B2159 Battle Road approaches to the junction with Ashbrook Road and Blackman Avenue are overcapacity. The model currently assumes an all red pedestrian stage is called every cycle. If the pedestrian stage was called only every other cycle then this would reduce the V/C to less than 100% for all arms at this junction. The Old Church Road and Upper Church Road approaches to B2159 Battle Road are

overcapacity, but the model suggests that adjustment of the signal timings would reduce the V/C to less than 100% for all arms at this junction. The Gillsmans Hill and southbound approach of Seddlescombe Road South to the junction with The Green are also overcapacity. The Marline Road approach to the junction with Blackman Avenue is overcapacity but again the model suggests that adjustment of the signal timings would reduce the V/C to less than 100% for all arms at this junction.

The B2092 Crowhurst Road to Wishing Tree roundabout is overcapacity. Finally, the Gresham Way approach to the junction with Filsham Road is overcapacity.

3.5 Potential Impact of Smarter Choices

The potential impact of Smarter Choices has been assessed previously for the BHLR Public Inquiry in November 2009. In order to estimate whether the introduction of Smarter Choice measures could reduce traffic on the A259 to a level that would allow development to take place in North-east Bexhill without BHLR, the assumptions shown in Table 3.4 below were adopted. These were based on local targets, and a high intensity of effectiveness.

Table 3.4: Smarter Choice Measures assumptions summary

	High Intensity
Hastings and Battle Quality Bus Partnership	42% increase in bus passengers with 30% transfer from car
Bexhill Bus Improvements	42% increase in bus passengers with 30% transfer from car
School Travel Plans	15% reduction in school trips by car
Workplace Travel Plans	30% reduction in car commuter trips for LDF developments and other employment areas
Rail Schemes	44% of total new rail trips removed from car matrices past station locations

Source: BHLR BAFFB Forecastign Report, Table 11-2

The trip matrices for 2028 with BHLR were adjusted to take account of each measure. The workplace travel plans were assumed to be implemented at existing major employment sites and all new employment sites.

The overall reduction in the number of trips was less than 5% in each time period as a result of implementing the measures. On their own, Smarter Choices cannot reduce traffic on the A259 by enough to provide good access to north-east Bexhill, and do not achieve the objectives of the BHLR.

Figure 3.1: 2028 AM Peak Scenario 1

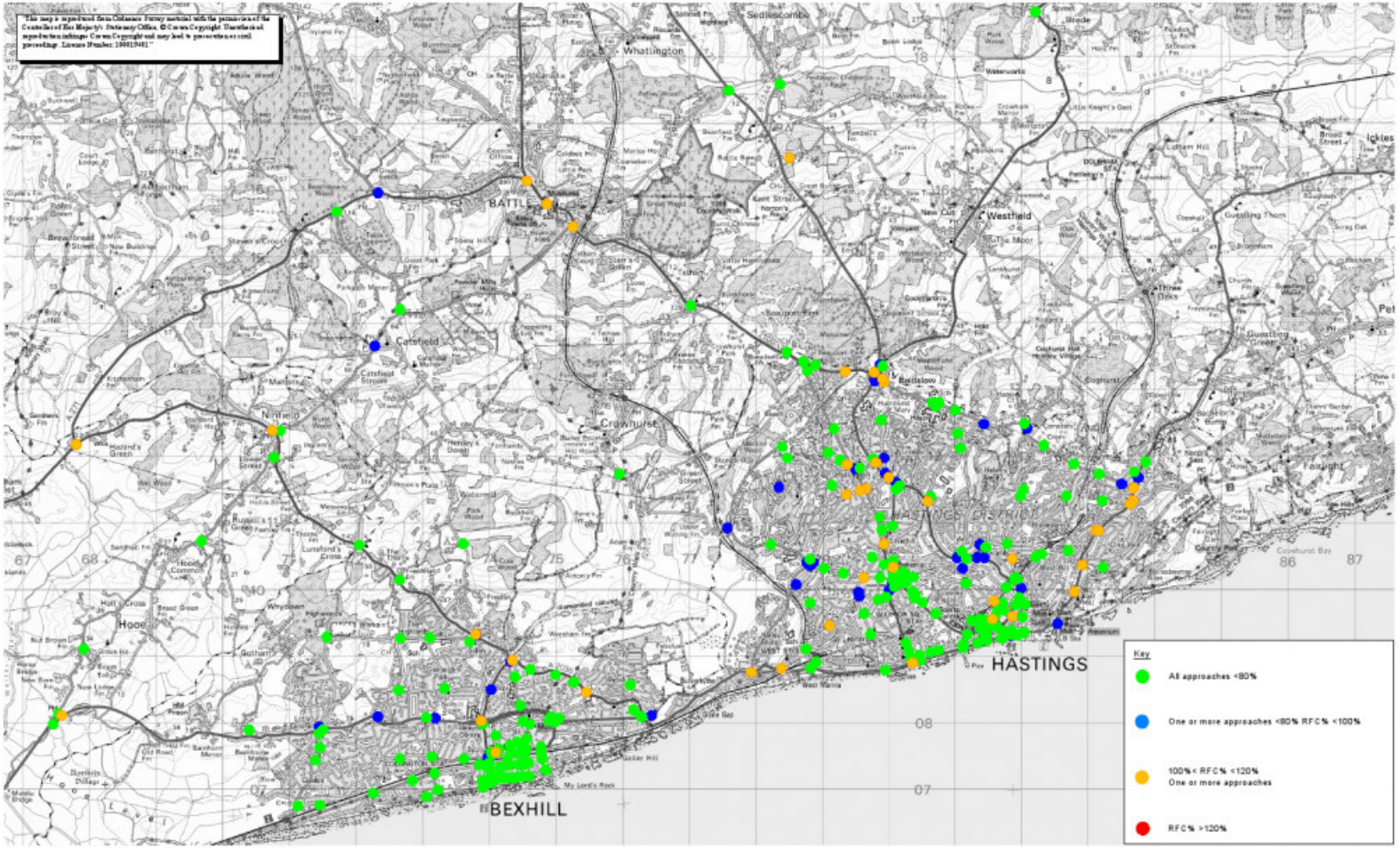


Figure 3.2: 2028 AM Peak Scenario 2

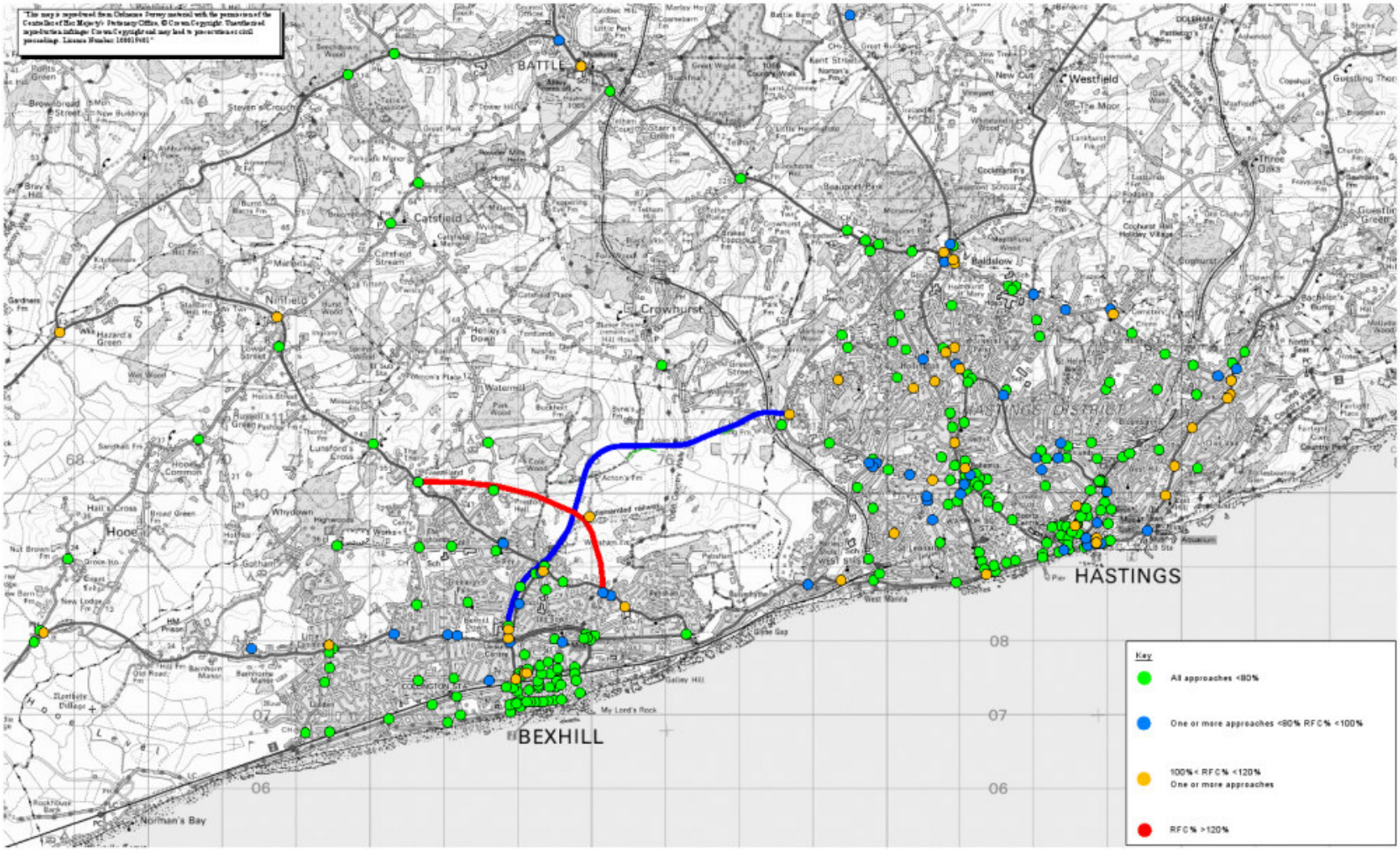


Figure 3.3: 2028 AM Peak Scenario 3

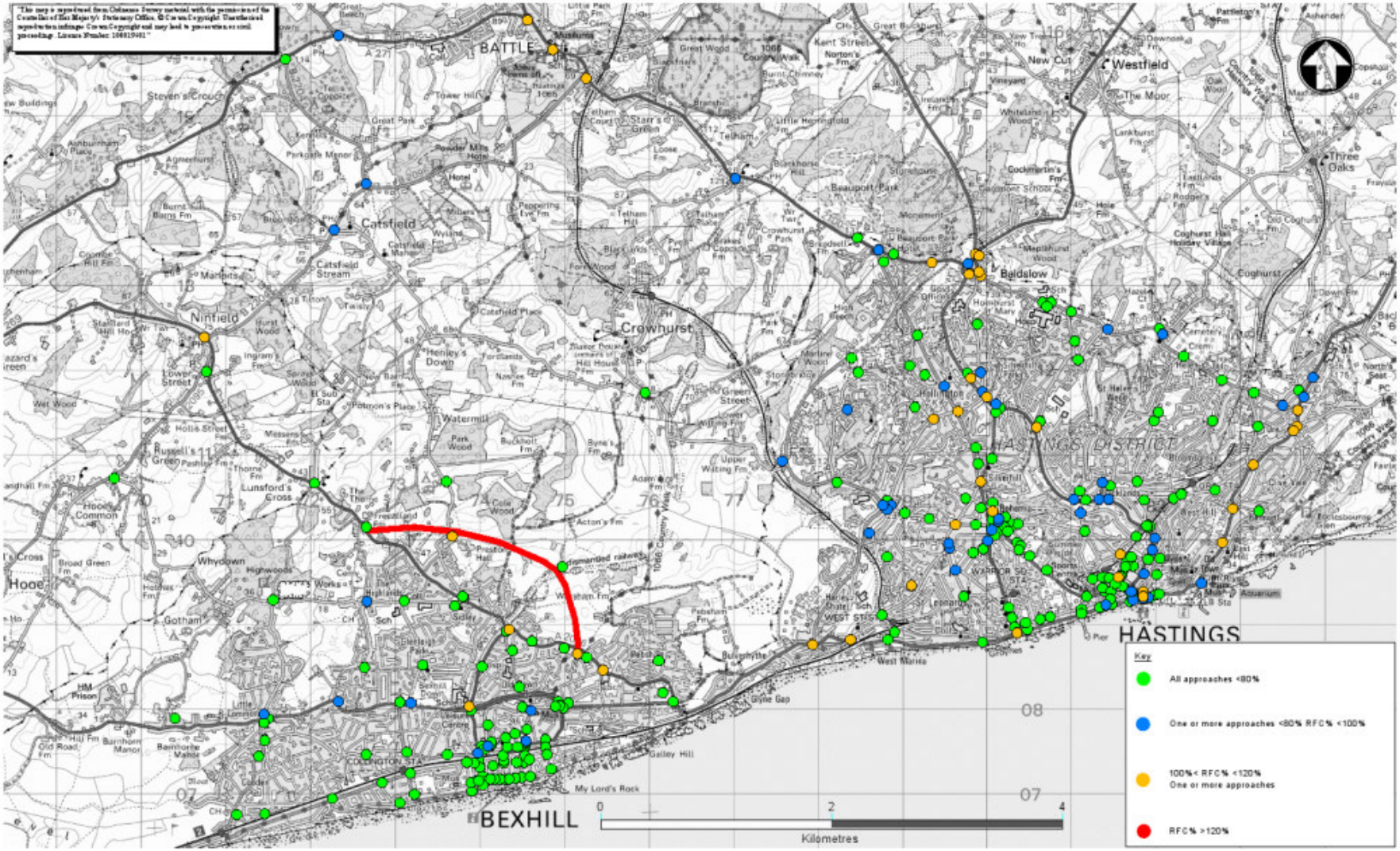


Figure 3.4: 2028 PM Peak Scenario 1

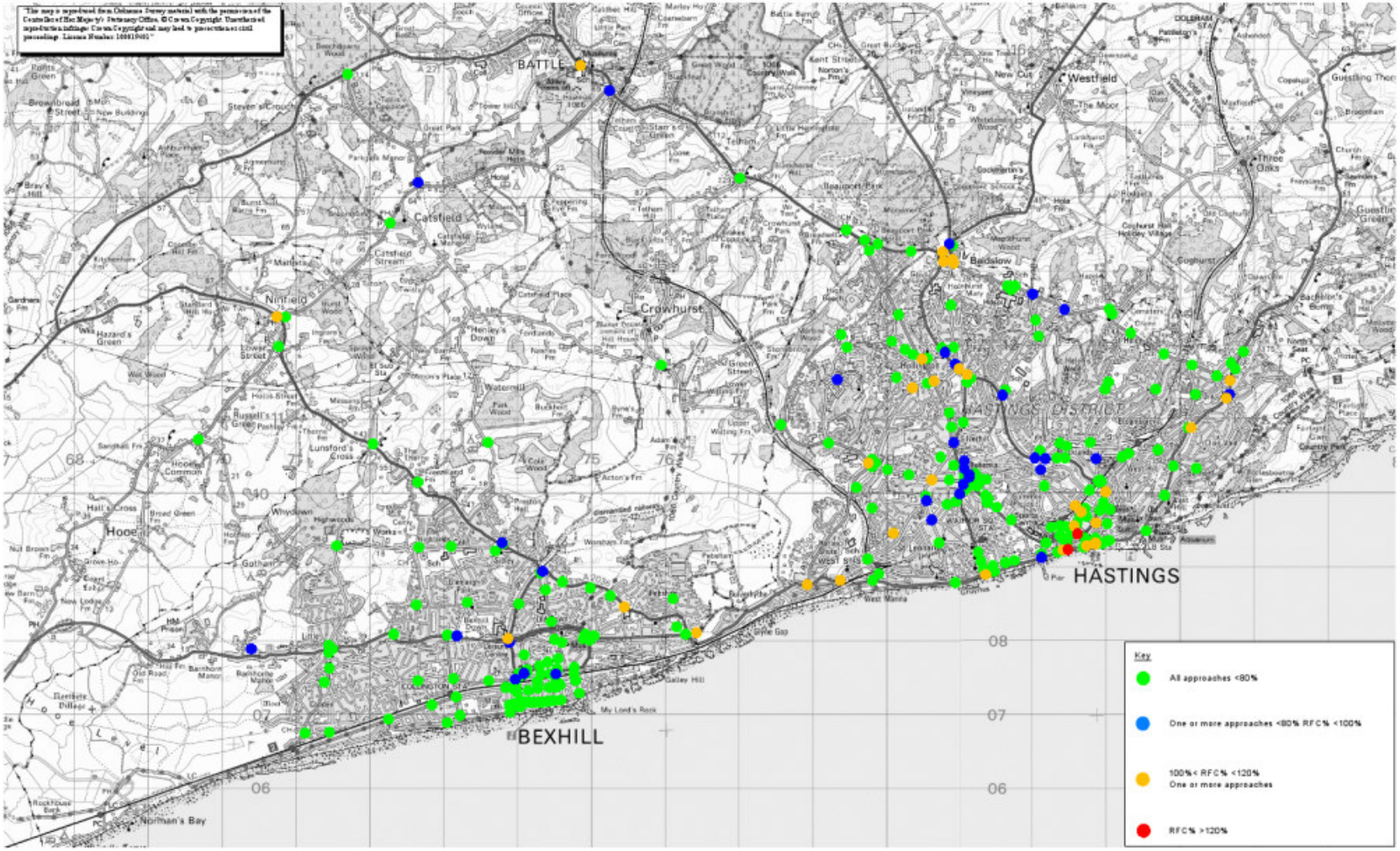


Figure 3.5: 2028 PM Peak Scenario 2

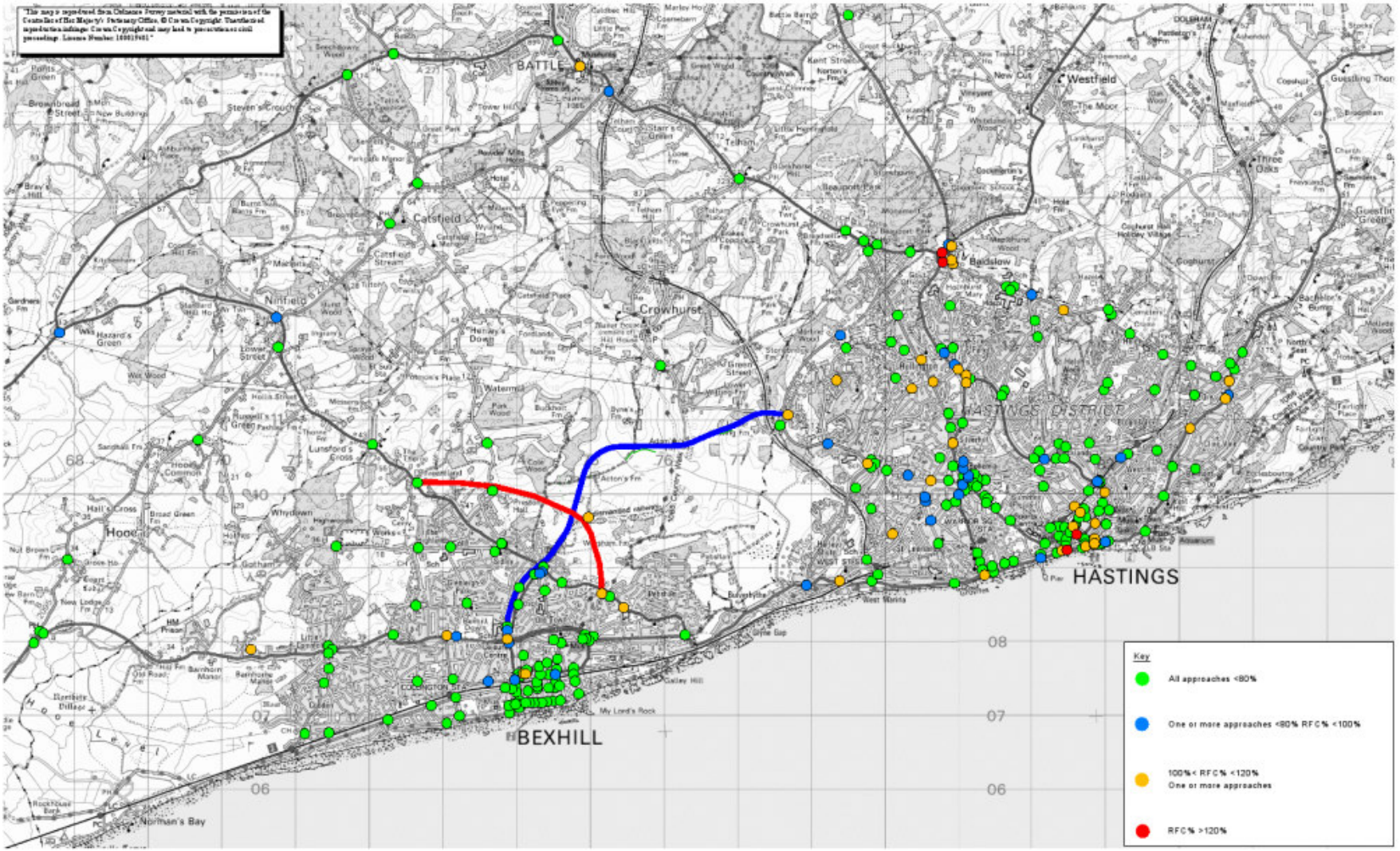
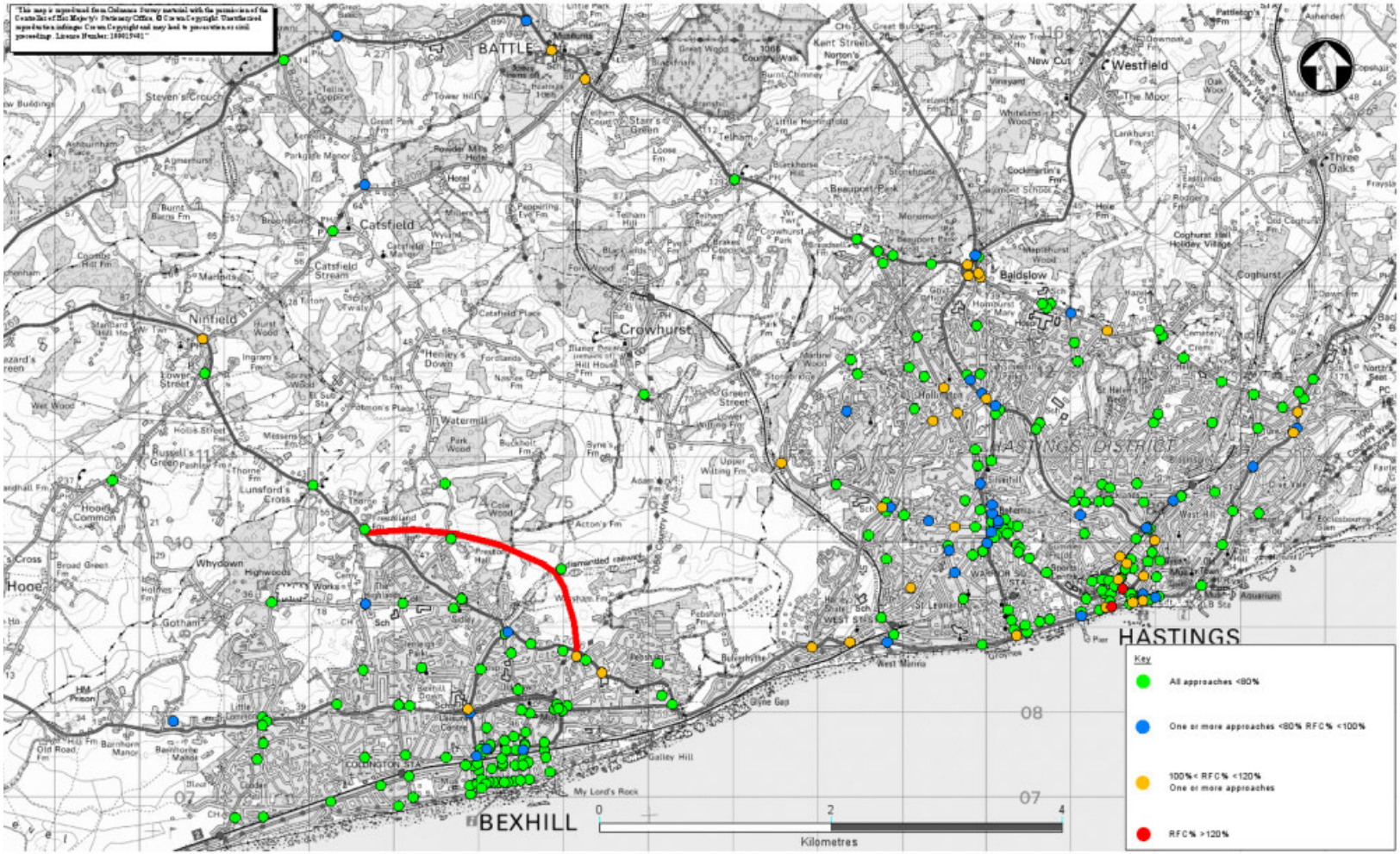


Figure 3.6: 2028 PM Peak Scenario 3



4. Summary and Conclusions

This report assesses the impact of various combinations of developments and new infrastructure in the Bexhill Hastings area of East Sussex to assist with the preparation of the LDF Core Strategies for Hastings Borough Council and Rother District Council.

This report follows on from the December 2011 Glyne Gap Capacity Assessment Report (rev G) and the January 2012 Glyne Gap Development Assessment Report (rev B) which assessed the impact of additional traffic as a result of development in Bexhill and Hastings on the critical part of the network linking the two towns, i.e. A259 Glyne Gap, in isolation. The Glyne Gap Capacity Assessment report used existing traffic count, journey time, and queue length survey data to quantify existing levels of delay through Glyne Gap and to validate junction models for either end of Glyne Gap, namely the junctions of A259/Harley Shute Road in Hastings and Ravenside roundabout in Bexhill. The increase in delays through Glyne Gap as a result of background traffic growth, without any additional development, was calculated. The Glyne Gap Development Assessment Report calculated the further increase in delay which would occur with additional new development in Bexhill and Hastings. The calculated delays in both reports assumed that the routes followed by traffic would not change as a result of increased congestion.

This report used a traffic model of Bexhill and Hastings to estimate the re-routeing of traffic which could occur as a result of increased congestion at Glyne Gap, and hence the traffic impact of new development over a wider area. Three scenarios have been tested, representing a range of network and development assumptions.

Assessments have been produced for three scenarios for the AM and PM peak periods in 2028. Specific levels of congestion at individual junctions may vary in reality from that presented, however the modelling work undertaken does indicate the pressure points across the network. The potential solutions identified for congested locations are based on the modelling output alone and no feasibility or design work has been undertaken.

The assessments were carried out using the traffic model of Bexhill and Hastings developed previously by Mott MacDonald for ESCC and updated most recently in August 2011 for the Bexhill Hastings Link Road Best and Final Funding Bid (BAFFB) submitted to the Department for Transport by ESCC. It has been used as a highway only model, and does not use variable demand modelling. Trip re-distribution and mode choice are therefore not considered. The trip matrices were built using consistent trip rates used for the BHLR modelling and the distributions assumed for the main development sites in Bexhill were retained from the BHLR Public Inquiry.

Earlier work carried out by Mott MacDonald for ESCC identified that the main capacity constraint in the local Glyne Gap area is the A259 Glyne Gap link. Capacity constraints on Glyne Gap link result in significant proportions of traffic that would wish to route along Glyne Gap transferring on to other less suitable east-west routes through Crowhurst and Battle in Scenarios 1 and 3 which do not include the BHLR. Scenario 2, which includes BHLR, results in about 40% less traffic on these other less suitable routes than Scenario 3 which does not include BHLR. Flows on A259 Glyne Gap itself are also significantly lower, by a minimum of about 20%.

For each of the scenarios assessed, congestion is most visible at junctions along the major routes through the urban areas. Congestion in Hastings is centred along the A259, around Baldslow and junctions along the B2159 and A21 through Hollington. Congestion in Bexhill occurs at junctions along the A259 and A269.

Overall it should be remembered that the traffic forecast results are only intended to identify the key areas which could be under pressure as a result of forecast traffic. Variable demand re-distribution effects are likely to reduce forecast congestion, and further more detailed capacity assessments are required to determine if the identified areas of congestion can be mitigated by signal timing changes or minor physical improvements.

Appendices

Appendix A. TEMPRO6.2 growth factors

Table A.1: TEMPRO6.2 Growth Factors AM Peak 2011-2028

Area	Commute		Employers Business		Other	
	Origin	Destination	Origin	Destination	Origin	Destination
East Sussex	1.110	1.113	1.110	1.117	1.146	1.144
Eastbourne	1.121	1.080	1.106	1.089	1.159	1.127
Lewes	1.072	1.102	1.079	1.103	1.137	1.143
Hastings[1]	0.998	1.026	1.006	1.044	1.040	1.046
rural (Rother) [1]	0.962	1.024	0.975	1.036	1.021	1.063
Bexhill[1]	0.988	1.026	1.001	1.042	1.080	1.075
Battle[1]	0.974	1.026	0.984	1.035	1.052	1.069
Rye[1]	0.983	1.026	0.990	1.044	1.064	1.076
Wealden	1.054	1.123	1.072	1.132	1.136	1.185

Source: TEMPRO6.2

Notes: 1 TEMPRO growth factors excluding any growth due to increases in households or employment.

Table A.2: TEMPRO6.2 Growth Factors PM Peak 2011-2028

Area	Commute		Employers Business		Other	
	Origin	Destination	Origin	Destination	Origin	Destination
East Sussex	1.107	1.105	1.116	1.115	1.148	1.147
Eastbourne	1.077	1.115	1.088	1.114	1.138	1.147
Lewes	1.097	1.068	1.103	1.082	1.146	1.148
Hastings[1]	1.020	0.992	1.033	1.016	1.050	1.045
rural (Rother) [1]	1.019	0.959	1.027	0.982	1.054	1.044
Bexhill[1]	1.023	0.985	1.034	1.011	1.075	1.082
Battle[1]	1.023	0.972	1.036	1.000	1.068	1.063
Rye[1]	1.020	0.976	1.035	1.020	1.074	1.074
Wealden	1.119	1.051	1.125	1.078	1.174	1.163

Source: TEMPRO6.2

Notes: 1 TEMPRO growth factors excluding any growth due to increases in households or employment.

Appendix B. Trip Rates

Table B.1: TRICS Trip Generation Rates

TRICS Land Use Category	Rate	AM Peak		PM Peak	
		In	Out	In	Out
Mixed Private Housing	per dwelling	0.12	0.44	0.37	0.18
Business Parks (B1)	per 100sqm	1.4	0.11	0.12	1.09
Industrial Estates (B2)	per 100sqm	1.11	0.28	0.25	1.15
Commercial Warehousing (B8)	per 100sqm	0.12	0.06	0.07	0.13
Retail	per 100sqm	1.30	0.67	1.63	2.20
University	per 100sqm	1.31	0.32	0.41	0.80
Cinema	per 100sqm	0.00	0.00	2.19	2.02
Mixed Leisure	per 100sqm	0.00	0.00	0.08	0.39

Source: TRICS (2006a)