
Technical Note

Project No: ITL15734
Project Title: Land at Hindsland, Eastbourne Road, Willingdon
Title: Highways England / National Highways 3rd Response
Ref: NM/MD/ITL15734-009
Date: 29 September 2021

SECTION 1 Introduction

1.1 Overview

1.1.1 Danescroft (FREOF V Willingdon) LLP has appointed i-Transport LLP to provide highways and transport advice for a proposed development of up to 180 residential dwellings and a 2,170 sqm medical centre on land at Hindsland, to the east of the A2270 Eastbourne Road, Willingdon.

1.1.2 An outline application was submitted in March 2021 (*planning ref: WD/2021/0594/MEA*) for the following:

“Outline application with all matters reserved except for access (excluding internal estate roads beyond the access to serve the medical centre plot) for demolition of existing vacant dwelling and erection of up to 180 no. Dwellings and medical centre together with all parking, servicing and on-site open space”.

1.1.3 The application was supported by a Transport Assessment (i-Transport ref: ITL15734-004) and a Framework Travel Plan (i-Transport ref: ITL15734-005), both dated March 2021 and produced by i-Transport LLP.

1.1.4 National Highways (NH) (formerly Highways England) has been consulted and a suite of comments from NH were received on 28th April 2021, 16th June 2021, and finally 3rd August 2021. The first two were responded to by way of i-Transport Technical Notes (ITL15734-006a and ITL15734-007a).

1.1.5 Overall, the position of the applicant and their consultant team is that the application site is within the land on Eastbourne Road that has an historic allocation for new residential development, as well as wholly within the land that has previously been considered by the Planning Inspectorate for new housing for 700 dwellings (plus other land uses), for which no objection was made in relation to impacts on the Strategic Road Network (SRN) subject to an agreed set of mitigation measures.

- 1.1.6 However, this position is not agreed by NH, who has requested (ultimately in the correspondence of 3rd August 2021), that the impact of the 180 dwellings proposed be tested within the agreed models of the A27 network utilised at the previous Appeal scheme.
- 1.1.7 Without prejudice to the applicant's position that the site is part of the 700 dwellings considered at the Appeal, the modelling requested by NH on the A27 has been undertaken on the basis that the 180 dwellings is in addition to that assessed at the Appeal.
- 1.1.8 A meeting was held between the applicant team and NH on 24th September 2021 to discuss the results and agree the approach to presenting this information.
- 1.1.9 This Note is presented in the following sections:
- Section 2: the overall assessment parameters for the model are established;
 - Section 3: the model results for 180 dwellings at Hindsland plus 700 dwellings at Mornings Mill Farm (MMF) are summarised;
 - Section 4: the model results for 180 dwellings at Hindsland in isolation are summarised; and
 - Section 5: an overall summary and conclusion.

SECTION 2 **Modelling Parameters**

Overview

2.1.1 Atkins has been commissioned to rerun the model of the A27 Vissim that was utilised in support of the previous Appeal for MMF. This includes the following junctions:

- Cophall Roundabout – A22 / A27 Polegate Bypass / B2247 Hailsham Road / A27;
- A27 Polegate Signals – A27 / A2270 Eastbourne Road / A27 Lewes Road; and
- High Street Signals – A2270 Eastbourne Road / High Street / A2270 Eastbourne Road / Wannock Road.

Scenarios

2.1.2 The model has been run for a 2037 assessment year for the AM and PM peak hours.

2.1.3 The scenarios are based on a “Do Minimum” assessment, where the highway network has no improvements compared to that when the model was built, and a “Do Something” assessment, which includes the following highway works:

- Cophall Roundabout – widening on the eastern and southern approaches;
- A27 Signals improvements – these are currently being constructed and should be completed in the next year;
- High Street signals – Capacity enhancements works associated with the Hailsham Polegate Eastbourne Movement and Access Corridor (HPEMAC), including the introduction of a left-turn slip road from the High Street into Eastbourne Road, provision of an additional lane for vehicles travelling north along Eastbourne Road, provision of an additional lane on the northern side of the junction to accommodate northbound traffic as it passes through the signals, and pedestrian phases on all arms of the junction. This is fully funded and is to be delivered by ESCC (as the Local Highway Authority (LHA)) and should commence in 2022 for completion in 2023.

Development Flows

2.1.4 The MMF flows within the model are as provided to Atkins as part of the previous Appeal scheme for full build out of the site at 700 dwellings. The medical centre element is considered as a wider health centre, with new trips on the network.

- 2.1.5 The traffic flows provided to Atkins for the Hindsland application are provided on the figures provided in Appendix A to this report.
- 2.1.6 The residential traffic flow generation, distribution, and assignment from the site is as set out and agreed in the submitted Transport Assessment.
- 2.1.7 The medical centre also applies the agreed trip attraction rates, but with the distribution and assignment set out in the previous Technical Note (ITL15734-007a) to reflect that this will be a local facility to be occupied by local GP practices.
- 2.1.8 The Transport Assessment submitted with the planning application applied a 10% discount to all residential traffic flows to account for a modal shift associated with the committed HPEMAC scheme, which is funded by both national and regional public money. The Hindsland scheme will also be providing a financial contribution to enhanced bus services utilising the corridor to further promote sustainable travel patterns as part of the commitment within the Travel Plan.
- 2.1.9 The Transport Assessment also established a 20% reduction in flows associated with the medical centre to reflect a shift to online medical consultations, as agreed with ESCC.
- 2.1.10 Without prejudice to this position, the traffic flows provided to Atkins and included within the Vissim model for the Hindsland scheme have no discount applied to either the residential or medical centre traffic flows. Therefore, an extremely robust assessment methodology has been applied.

SECTION 3 **Model Results – MMF and Hindsland**

- 3.1.1 The Vissim Model Assessment results are provided by Atkins (provided at Appendix B to this note).
- 3.1.2 The assessment results are clear that in 2037, with the inclusion of both MMF and Hindsland, all three of the assessed junctions are over capacity without any of the identified mitigation measures (it should be noted that the A27 Polegate Signals and the High Street Signals improvements will be delivered by 2037, so the assessment is a false worst case) – this is Scenario C in the Atkins report.
- 3.1.3 As established at the Appeal, it is clear that with the inclusion of the 700 dwellings at Mornings Mill Farm, and the mitigation measures at all three junctions, the operation of the network significantly improves, to the stage that it will operate more efficiently with the development traffic and the highway mitigation measures (Scenario D in the Atkins report), than without delivery of the housing and mitigation (scenario “2037 DM” in the Atkins report).
- 3.1.4 Scenario E provides the assessment whereby all the mitigation is provided, and both MMF and Hindsland are fully built out and all the mitigation measures are introduced.
- 3.1.5 These demonstrate that under all performance measures, the local network will continue to operate more efficiently with all the mitigation measures in place with a total of 880 dwellings than if no development and mitigation were provided.
- 3.1.6 Therefore, it is concluded that should the 180 dwellings at Hindsland be considered as an additional development to the 700 dwellings in the area, then the improved network can accommodate the associated traffic flows and continue to perform at a satisfactory level.

SECTION 4 **Model Results – Hindsland Only**

4.1.1 Whilst NH has requested that the impact of the Hindsland development be considered in the context of the 700 dwellings application at MMF, there is no certainty that MMF would be approved planning in advance or at the same time as the Hindsland site. Therefore, it is important to determine the impact of the Hindsland site in isolation.

4.1.2 Subsequent conversations with NH have confirmed that NH considers that the delivery of 700 dwellings in the area should be considered committed, and therefore delivery of the mitigation schemes should also be considered to be committed. In planning policy terms, this is considered incorrect for the following reasons:

- The adopted Core Strategy (February 2013) is now well over 5 years old and much of its content, particularly in relation to housing delivery, is out-of-date. In fact, the Plan period only has 5 years left to run.
- Housing Policies in the Plan seek to meet an Objectively Assessed Need (OAN) of only 450 dpa whereas the Government's current Standard Method calculation (as at 2021) requires a minimum of 1,221 dpa.
- The Application Site forms part of a Strategic Development Area (Policy WCS4) – SD4: Land at South Polegate and East Willingdon – provision for around 700 no. dwellings. This is not a site-specific allocation and there is no 'redline' on a plan identifying the extent of the allocation area. Instead, the Core Strategy includes a Figure (Figure 8) that has a red shaded area for the urban extension.
- The Council's intention at the time of the production of the Core Strategy was to prepare a Site Allocations DPD, which it did undertake considerable work on. Unfortunately, the DPD had to be withdrawn and consequently no site-specific allocation policy was ever adopted.
- The Application Site and Mornings Mill Farm are both within the Strategic Development Area as shaded on Figure 8 but are not Allocated.
- The Council has an out-of-date Development Plan and an acute housing need. In fact, its own stated 5-year Housing Land Supply position is only 3.28 years. The Council therefore needs housing delivery now.

4.1.3 Therefore, to delay the delivery of much needed housing on the basis that it needs to await mitigation for a much larger development that may not proceed is clearly wrong. It may also enable speculative

applications in other areas where there are not identified and funded mitigation schemes (such as the A27 Polegate Signals and the HPEMAC).

4.1.4 This section therefore interrogates the model data presented by Atkins to determine the Hindsland's impact on the network, should it come forward in isolation, and therefore the Cophall Roundabout mitigation is not provided. This is a comparison of Scenario B of the Atkins assessment with the 2037 DM scenario.

4.1.5 Whilst there are many metrics to determine impact, the most straight forward is vehicle queueing and this is one of the main areas focused on within the NH consultation responses. The model gives vehicle queues in metres, as opposed to vehicles.

AM Peak Hour

4.1.6 In the AM peak hour assessment, on most arms of the three junctions, the impact of the Hindsland development traffic is negligible, at one vehicle or less – on the basis that one vehicle queueing equates to 5.75m.

4.1.7 The exception to this is:

- A27 Polegate signals - an increase of 5 vehicles queueing on the northern arm. This is an increase from 73 vehicles to 78 vehicles.
- High Street signals - an additional 3 vehicles queueing on the Wannock Road arm. This is an increase from 66 to 69 vehicles, and on the southern arm (Eastbourne Road) an increase in queues by 7 vehicles from 120 to 127 vehicles.
- Cophall roundabout - a reduction of 5 vehicles queueing on the southern (A27) arm from 20 to 16 vehicles.

4.1.8 Therefore, ignoring the minor increases of 1 vehicle in certain locations, where the impacts are larger, these are clearly nowhere near the realms of severe, and potentially not even significant.

4.1.9 Further, NH controls the A27 signals and the Cophall roundabout. The High Street signals are the responsibility of ESCC. However, NH is interested in any queueing back from the High Street signals towards the A27 signals and the Cophall roundabout. The results show there to be no significant queueing in that regard.

4.1.10 As noted previously, the 2037 Do Minimum scenario fails to account for the fact that the A27 Polegate Signals and the High Street signals will have been improved by that time. It is only the Cophall

roundabout that has no committed mitigation. As shown by the Do Something scenarios in Section 3, the mitigation measures at the two signal controlled junctions fully mitigate the impact from 880 dwellings, let alone the smaller 180 dwellings at Hindsland. Therefore, the minor impacts shown in the Scenario B results will not arise.

- 4.1.11 The model results actually show the performance to improve at the Cophall roundabout. Whilst this may not actually be the case in reality, this is clearly a case of nil detriment in the AM peak hour

PM Peak Hour

- 4.1.12 For the PM peak hour, the results show a slightly more congested network. However, a similar pattern to the AM peak hour is shown, whereby:

- A27 Polegate signals - an increase of 5 vehicles queuing on the western arm (an increase from 120 to 125 vehicles), and an increase on the northern arm of 20 vehicles from 97 vehicles to 117 vehicles.
- High Street signals - an additional 11 vehicles queuing on the southern arm (Eastbourne Road) from 89 to 100 vehicles.
- Cophall roundabout - a reduction of 5 vehicles queuing on the southern (A27) arm from 25 to 20 vehicles, and an increase of 4 vehicles queueing on the east (A27) and north (A22) arms.

- 4.1.13 As with the AM peak hour model, it is considered that the impacts at the A27 Polegate and the High Street signals will be mitigated by the committed improvements at these junctions, that will be in situ by the time of occupation. The Do Something model results demonstrate that these provide more than sufficient capacity to mitigate the impact of the development.

- 4.1.14 The Cophall roundabout has no mitigation in this scenario. However, similar to the AM peak hour scenario, the overall impact on the junction is negligible, with a small decrease in queuing on one arm and a slight increase on two arms (so a net increase of queuing of only four vehicles on one arm).

SECTION 5 Summary and Conclusion

- 5.1.1 This Technical Note considers the impact of the proposed development at Hindsland at the A2290 Eastbourne Road, Willingdon for 180 dwelling and a medical centre, on the SRN of the A27 at Polegate.
- 5.1.2 An assessment of the impact of the development on the SRN for a 2037 assessment year has been undertaken by Atkins using part of NH's Vissim model for the A27 East of Lewes.
- 5.1.3 A first test is based on the impact of the Hindsland development on the SRN during the AM and PM peak hours, on the assumption that the neighbouring Mornings Mill Farm application for 700 dwellings is consented and delivers the mitigation at the Cophall roundabout (a Do Something scenario). The other mitigation measures (at the A27 Polegate signals and the High Street signals) are being delivered by NH and ESCC respectively and will be in situ by 2037.
- 5.1.4 The results of this demonstrate that the impact of the Hindsland development in the Do Something Scenario is negligible, and the SRN will continue to perform more efficiently than it will in the Do Minimum scenario where no mitigation is provided (albeit no such scenario will exist in reality as the committed improvements to the A27 Polegate signals and the High Street signals will be completed by this date).
- 5.1.5 However, there is no certainty that the MMF application will be approved and delivered, and therefore the 700 dwellings associated with it (and its funded mitigation at the Cophall roundabout) should not be considered as a committed development.
- 5.1.6 It therefore important to determine the impact of the 180 dwellings from Hindsland on the performance of the local highway network in isolation, without the wider 700 dwellings and Cophall roundabout improvement. This has been modelled for 2037 in the AM and PM peak hours as a Do Minimum Scenario B in the Atkins model.
- 5.1.7 Again, it should be noted that this also assumes that the improvements at the A27 Polegate signals and the High Street signals will not be delivered in that timeframe – this is incorrect as the A27 Polegate signal improvements are currently being improved, and the High Street signals are funded for works to commence by ESCC in 2022.
- 5.1.8 As the 2037 Do Something models clearly show that the improvements at the A27 Polegate signals and the High Street signals will fully mitigate development (with the junctions operating more efficiently with the inclusion of development traffic than the current operation), the impact on the Cophall roundabout is the sole location where the Hindsland development impact requires analysis.

- 5.1.9 The results show that in the AM peak hour, the Cophall roundabout will actually operate more efficiently with the introduction of the Hindsland development traffic in the Do Minimum scenario. In the PM peak hour, the roundabout will experience an increase of just 4 vehicles on two arms, but will also experience a reduction of queuing by 5 vehicles on a third arm.

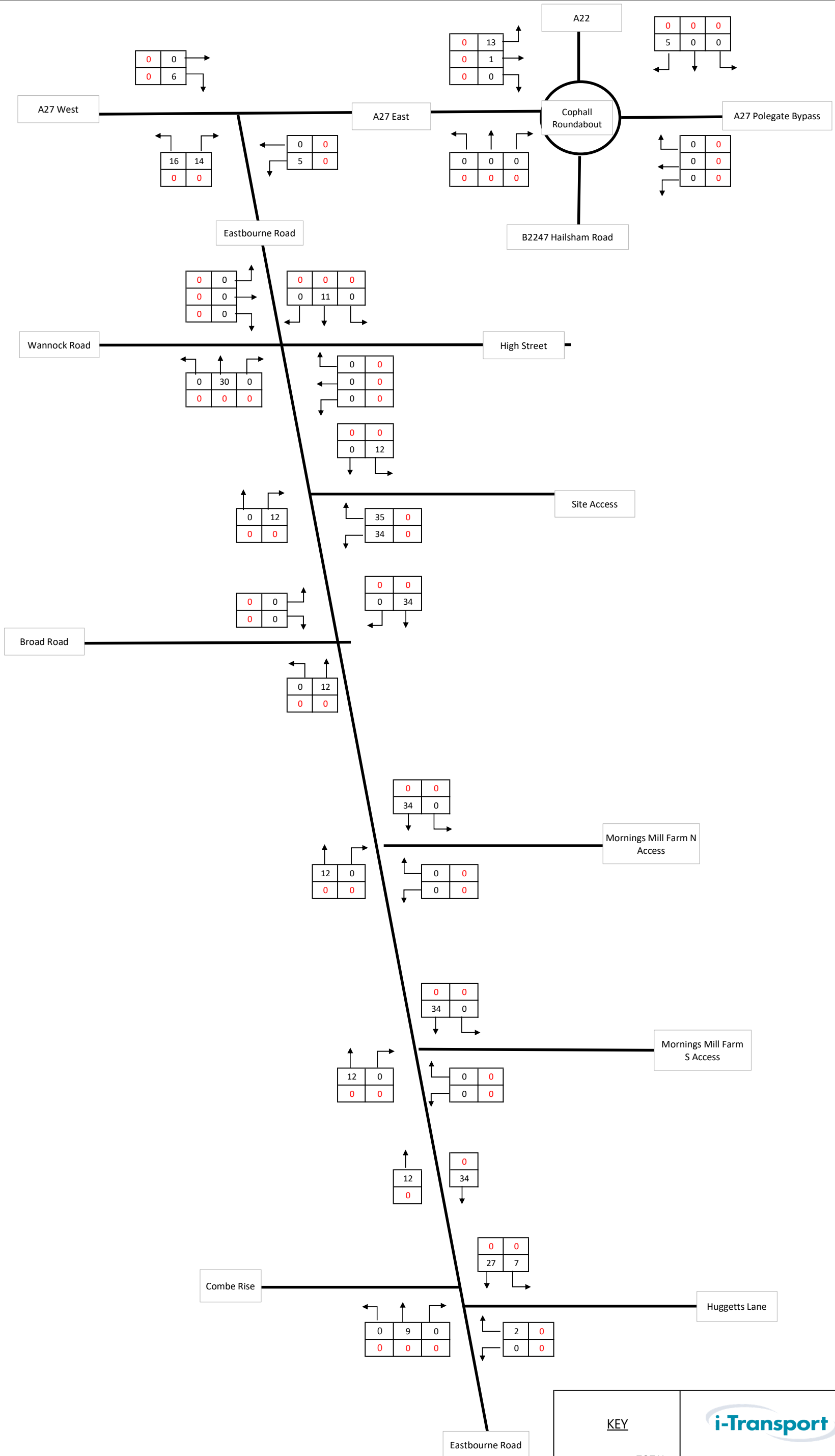
Conclusion

- 5.1.10 Clearly the results demonstrate that there is no material, let alone severe (in NPPF terms) impact on the NH network in either of the peak hours in either the Do Minimum or Do Something scenarios from the development proposal at Hindsland. Therefore, in accordance with paragraph 56 of the NPPF, as well as Regulation 122(2) of the Community Infrastructure Levy Regulations (2010), no improvements at the junction are necessary as such as a request would not meet **all** (or in fact any) of the following tests:

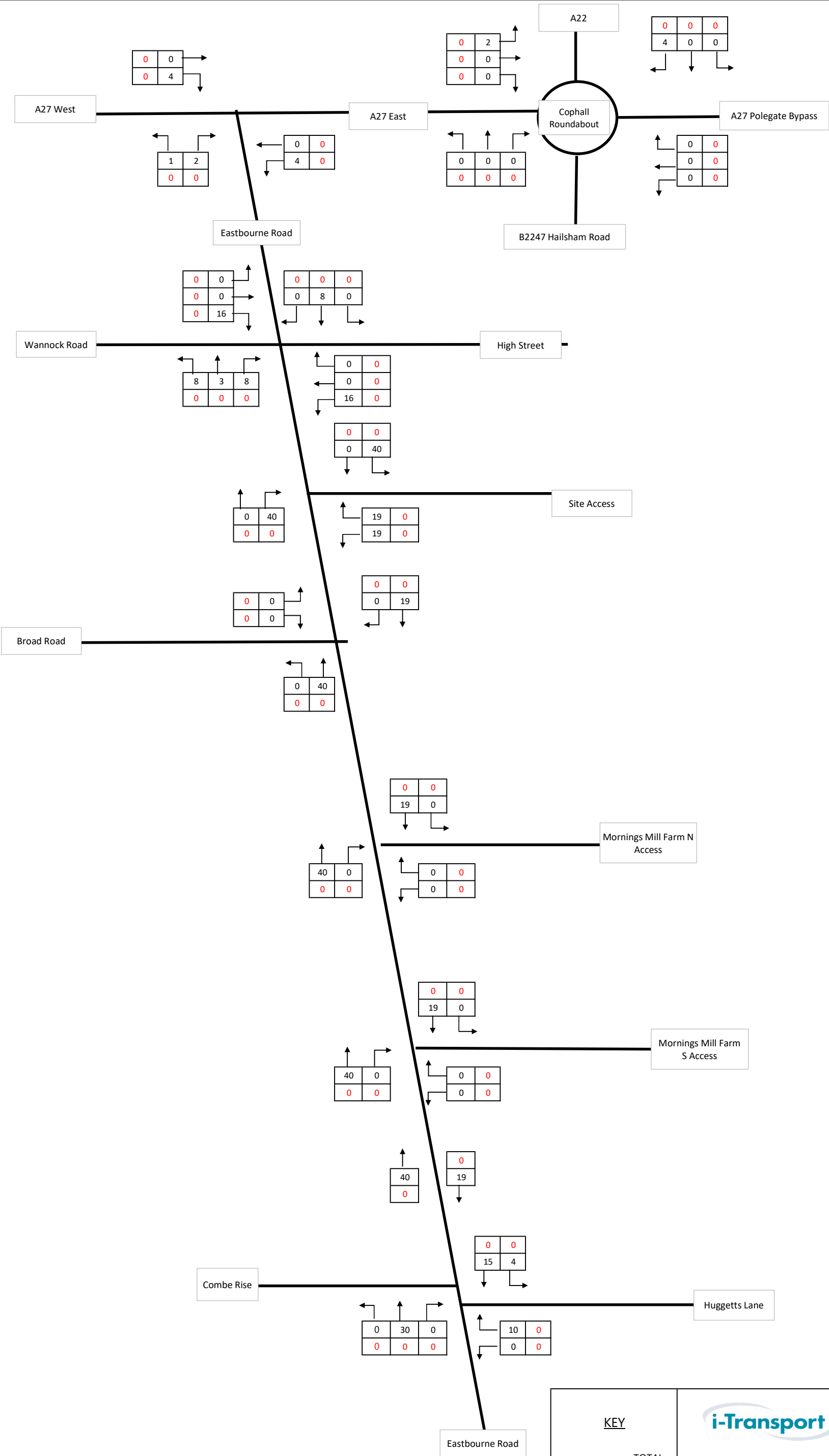
- necessary to make the development acceptable in planning terms;
- directly related to the development; and
- fairly and reasonably related in scale and kind to the development.

- 5.1.11 The inputs to the model for the Hindsland development also make no allowance for the modal shift reduction in traffic flows to the new bus corridor, or the increase in on-line medical appointments, both of which have been agreed with ESCC as the LHA. They are therefore a worst case scenario, and result in greater traffic volumes from the site being assessed than is considered likely to be experienced in reality.

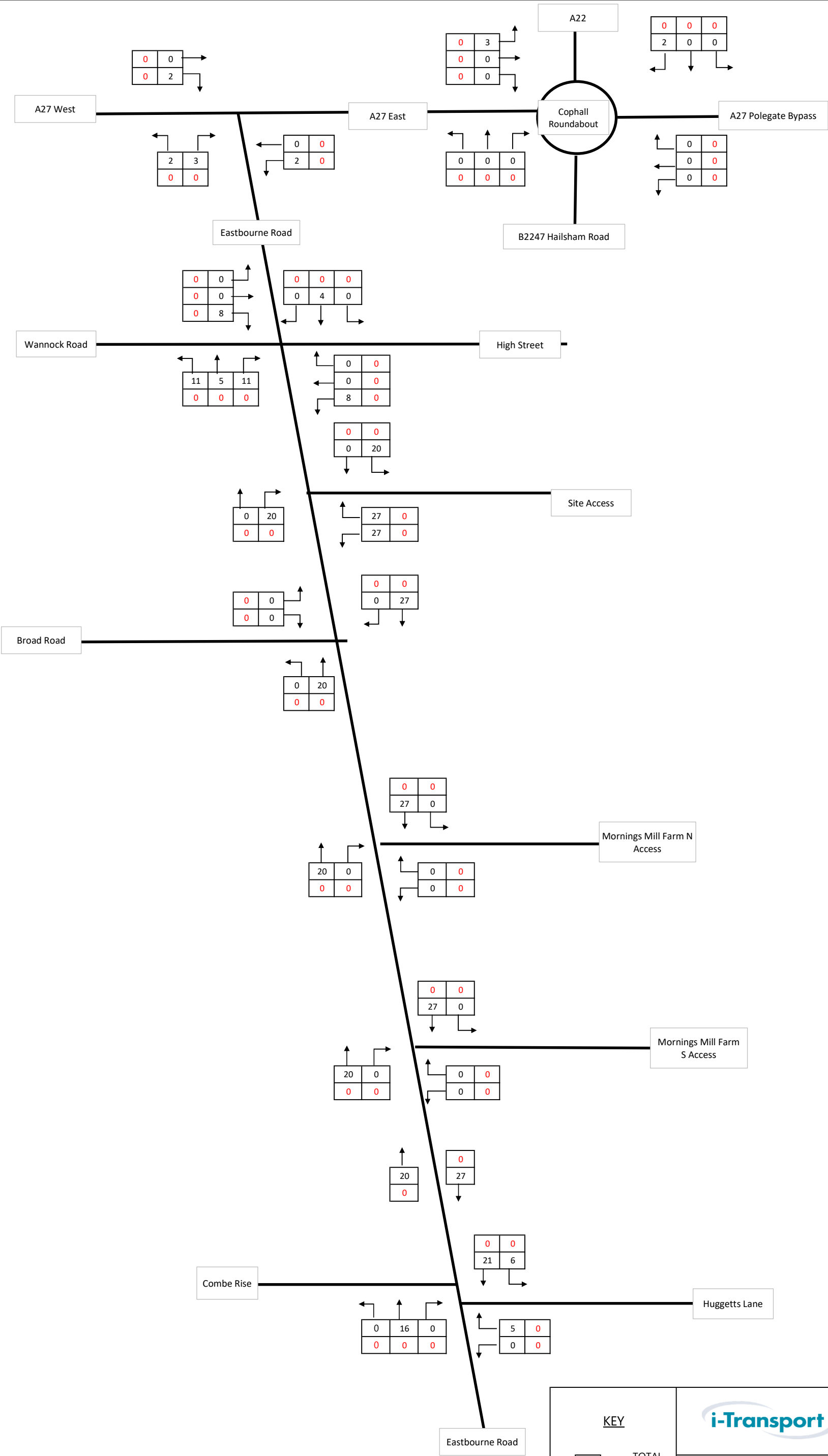
APPENDIX A. DEVELOPMENT TRAFFIC FLOWS ON A27



KEY 500 = TOTAL VEHICLES 25 = HGVs	 85 Gresham Street, London, EC2V 7NQ Tel: 020 3705 9215 www.i-transport.co.uk
	Eastbourne Road, Willingdon
	Figure 6.11
	Development Assignment Resi TOTAL (AM Peak Hour)



KEY 500 = TOTAL VEHICLES 25 = HGVs		85 Gresham Street, London, EC2V 7NQ Tel: 020 3705 9215 www.i-transport.co.uk
	Eastbourne Road, Willingdon	
	Figure 6.13	
	Development Assignment Medical Centre TOTAL (AM Peak Hour)	



KEY

500 = TOTAL VEHICLES

25 = HGVs

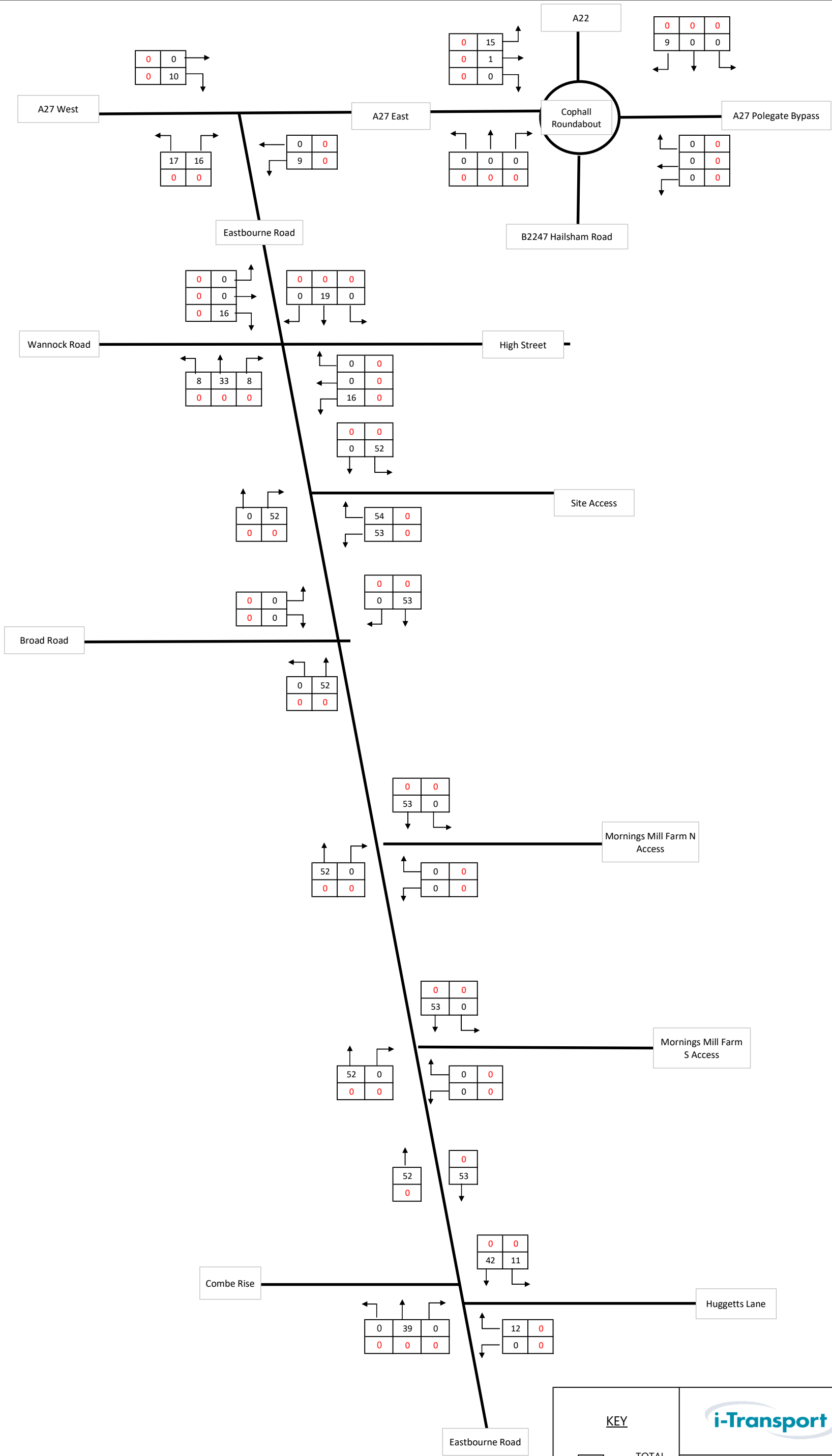


85 Gresham Street, London, EC2V 7NQ
Tel: 020 3705 9215
www.i-transport.co.uk

Eastbourne Road, Willingdon

Figure 6.14

Development Assignment Medical Centre TOTAL (PM Peak Hour)

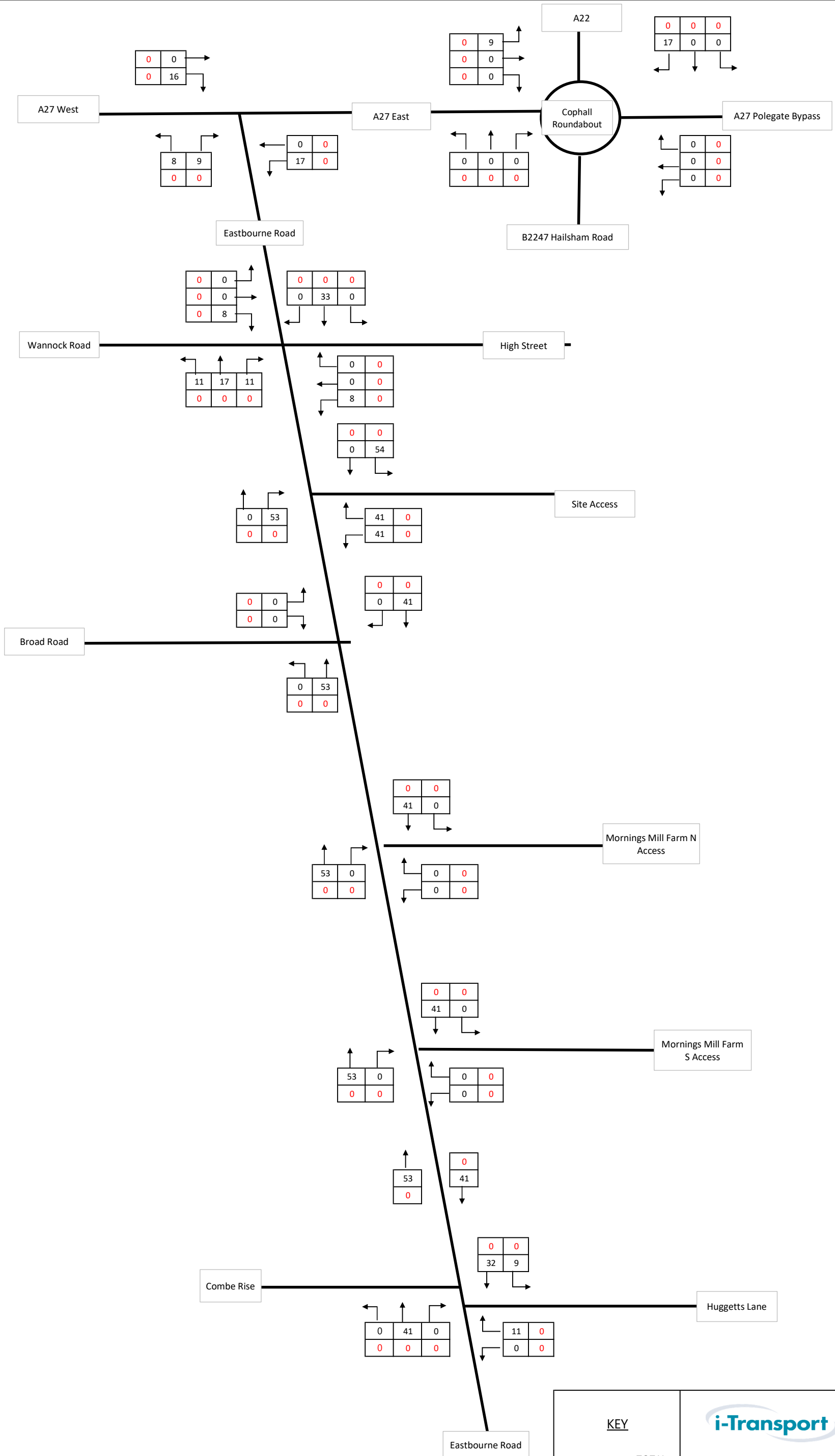


85 Gresham Street, London, EC2V
7NQ
Tel: 020 3705 9215
www.i-transport.co.uk

Eastbourne Road, Willingdon

Figure 5

Total Development - AM Peak Hour



KEY 500 = TOTAL VEHICLES 25 = HGVs		85 Gresham Street, London, EC2V 7NQ Tel: 020 3705 9215 www.i-transport.co.uk
	Eastbourne Road, Willingdon	
	Figure 6	
	Total Development - PM Peak Hour	

APPENDIX B. ATKINS MODEL ASSESSMENT REPORT

Technical Note

Project:	Hindsland Development Impact Assessment				
Subject:	VISSIM Model Assessment				
Author:	Raunak Dixit				
Date:	16/09/2021	Project No.:	5164522		
Distribution:		Representing:	Atkins		

Document history

Revision	Purpose description	Originated	Checked	Reviewed	Authorised	Date
1.0	For issue	RD	SK	HM	YP	20/09/2021

1. Introduction

In August 2021, Atkins was commissioned by i- Transport LLP (referred to as 'i-Transport') to undertake an assessment of the Hindsland development, Eastbourne Road, Lower Willingdon, BN20 9NU. The proposed assessment is required to evaluate the impact of the 2037 future year from the committed development on Morning Mill Farm (MMF) at 700 dwellings, which was undertaken in May 2018, and the additional build out from Hindsland development.

Previously, Atkins had completed VISSIM modelling using the A27 East of Lewes (EoL) 2037 Do-Minimum (DM) VISSIM model for both the AM and PM peak hours that includes the assessment of all committed development for Mornings Mill Farm at 700 dwellings and associated mitigation scenarios.

The A27 EoL VISSIM model was developed as per the National Highways, (formerly Highways England) Guidelines. The A27 EoL Stage 2 VISSIM model and associated model validation and forecast reports had already gone through the approval process with National Highway's Transport Planning Group Therefore, it can be assumed that i-Transport is content with this level of model assurance.

The purpose of this technical note is to provide an overview of the traffic modelling assessment undertaken for the Hindsland improvement 'with' and 'without' highways improvement (such as; A27 EoL improvement scheme, High Street improvement, Signal link between Polegate and High Street, Cop Hall Roundabout improvements). Hindsland development consist of 180 household (HH) units and medical centre facility.

The scenario proposed for the Hindsland development assessment are:

1. 2037 DM with Mornings Mill (700HH)
2. 2037 DM with the Hindsland development (180HH)
3. 2037 DM with Mornings Mill (700HH) & with the Hindsland development (180HH)
4. 2037 Do-Something (DS) includes Polegate Option 13 improvements, High St improvements, Signal link & Cop Hall roundabout improvements with Mornings Mill (700HH)
5. 2037 DS includes Polegate Option 13 improvements, High St improvements, Signal link & Cop Hall roundabout improvements with Mornings Mill (700HH) & the Hindsland development (180HH)

2. VISSIM Model

The A27 EoL VISSIM model was developed for the Base (2016) and two forecast years (2022 and 2037). As agreed, the 2037 Do-Minimum (DM) model has been used for the assessment of the Hindsland development.

2.1. Network

The model has been cordoned from the A27 EoL VISSIM model to include the key junctions which are most appropriate for the Hindsland development impact assessment. All the driving behaviour parameters have been retained in the cordoned model.

The A27 EoL VISSIM model has been developed in accordance with the National Highways' 'Use of the Microsimulation' Guidelines. The VISSIM model extent includes following junctions:

- A27 Polegate Junction;
- A27 Cop Hall Roundabout;
- A2270 Eastbourne Road/High Street junction; and
- A27/Gainsborough Lane junction.

For reference, the location of the key study junctions is shown in Figure 2.1

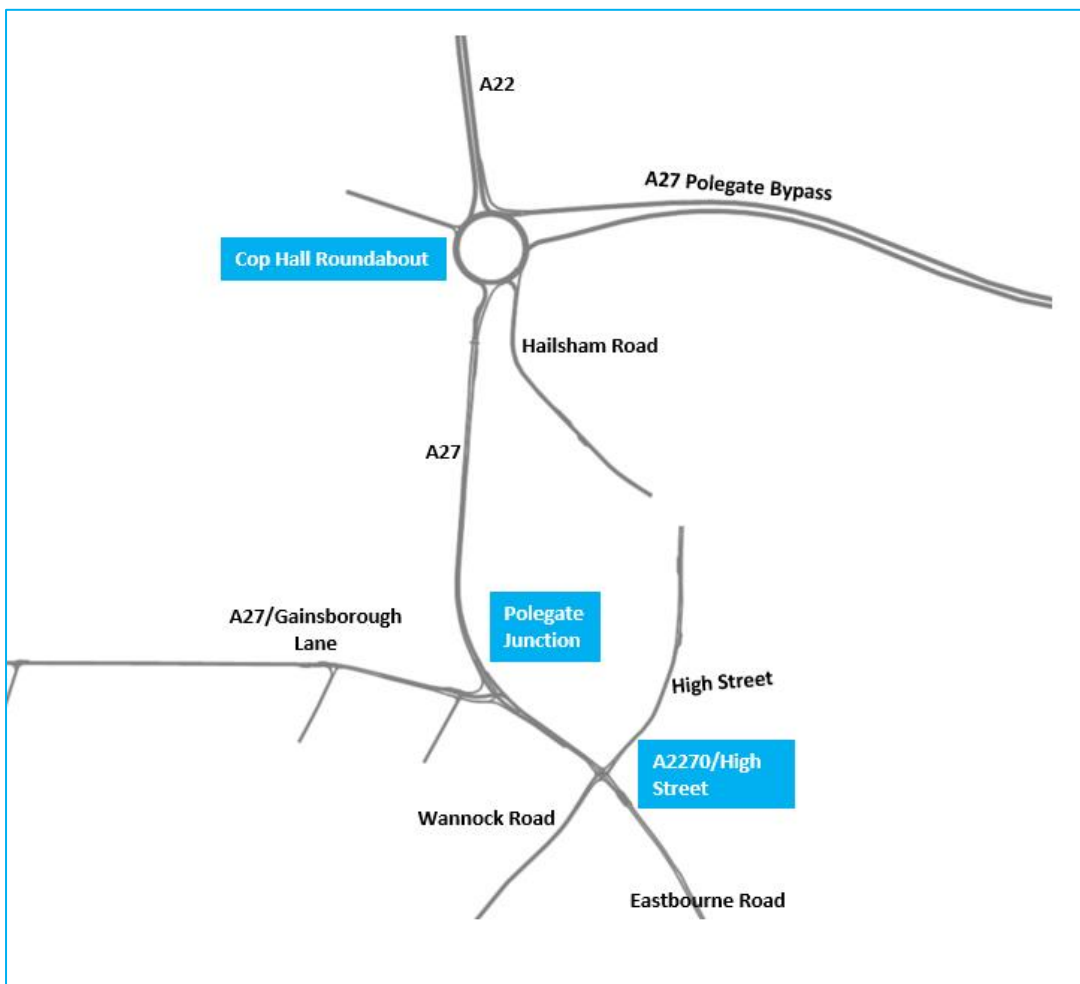


Figure 2.1 - VISSIM Model extent

2.2. Model Specification

The 2037 VISSIM model as used in the assessment has been developed to the following specification mentioned in Table 2.1

Table 2.1 - 2037 VISSIM Model specifications

Year	2037
Peak Hour Evaluation	AM (07:45 – 08:45) and PM (16:45 – 17:45)
Warm Up Period	15 min before peak hour, AM (07:30 – 07:45), PM (16:30 – 16:45)
Modelled Simulation Period	AM (07:30 – 09:00) and PM (16:30 – 18:00)
Vehicle Type	Car, LGV, HGV
VISSIM Version	9.00 - 11

2.3. Proposed Scenario

VISSIM model has been developed for each scenario mentioned in the Section 1. The corresponding signal timings have been obtained from the LinSig model for the respective peak hours.

Since VISSIM is a stochastic model¹ whose results vary depending on the random seed number used in the assessment. For consistency, in randomness on vehicle arrival pattern, five VISSIM simulation runs were undertaken for the current Hindsland development assessment. This is similar to the Mornings Mill development impact assessment.

During the evaluation of the Hindsland development assessment, the model has encountered some eccentric network performance results for a particular random seed when compared against the average results. Therefore, a new sets of random seeds value were considered for the Hindsland development assessment. Each of the following scenario has been simulated for 10 random seeds, starting with random seed value of 7 and incremented by 5 for the subsequent runs, to achieve consistency across all the scenarios. The evaluation results presented in the subsequent section of this note are based on an average of these 10 random seeds.

The following scenarios have been compared to evaluate the impact of the Hindsland development:

1. **2037 DM** - 2037 Do-Minimum (DM)
2. **Scenario A** - 2037 DM with Mornings Mill (700 HH)
3. **Scenario B** - 2037 DM with the Hindsland development (180HH)
4. **Scenario C** - 2037 DM with Mornings Mill (700HH) & with the Hindsland development (180HH)
5. **Scenario D** - 2037 Do-Something (DS) includes Polegate Option 13 improvements, High St improvements, Signal link & Cop Hall roundabout improvements with Mornings Mill (700HH)
6. **Scenario E** - 2037 DS includes Polegate Option 13 improvements, High St improvements, Signal link & Cop Hall roundabout improvements with Mornings Mill (700HH) & the Hindsland development (180HH)

¹ A stochastic model is a tool for estimating the probability of various outcomes while allowing for randomness in one or more inputs over time.

3. Model Evaluation

3.1. Journey Times Route

Figure 3.1 below identifies the start and end points of four travel time sections that have been evaluated to extract the journey times over a critical part of the network. The placement of these sections has been undertaken to demonstrate how each scenario affects movements through this localised cordon.

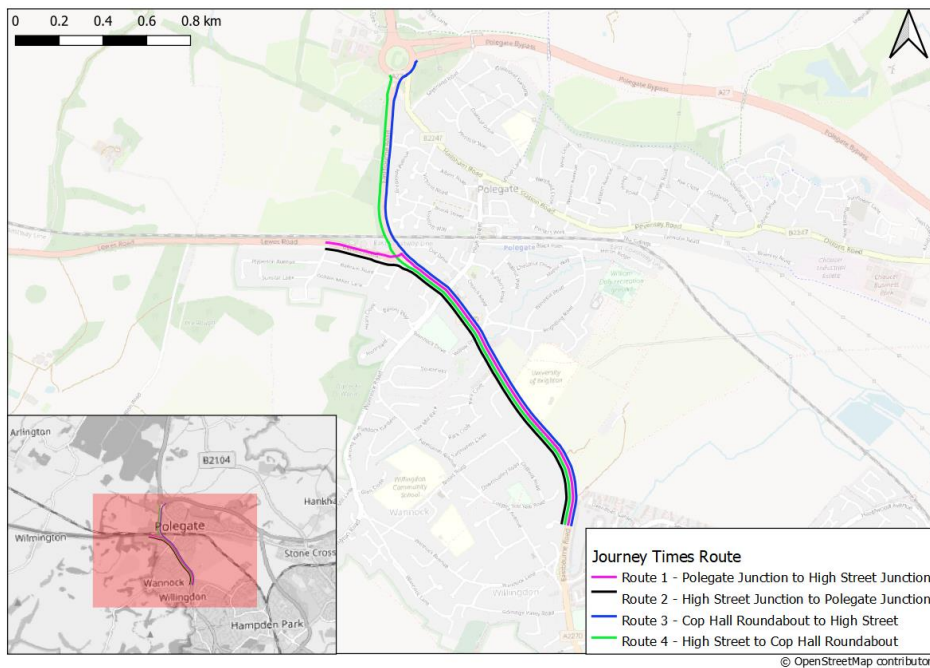


Figure 3.1 – Journey Times section

3.1.1. AM Peak

Table 3.1 below provide an overview of the modelled travel time analysis through the local study area for each proposed scenario. The timings are representative of an average travel time across the peak hour.

Table 3.1 – Journey times summary AM Peak

AM Peak	2037 DM (s)	Scenario A (s)	Scenario B(s)	Scenario C(s)	Scenario D(s)	% Diff ²	Scenario E(s)	% Diff ³
Route 1 – Polegate to High Street	516	658	530	687	260	-60%	307	-55%
Route 2 – High St to Polegate	367	471	383	461	199	-58%	225	-51%
Route 3 – Cop Hall to High St	329	400	343	407	229	-43%	235	-42%
Route 4 – High St to Cop Hall	469	575	482	560	236	-59%	264	-53%

² This column shows the % difference of Scenario D when compared against Scenario A

³ This column shows the % difference of Scenario E when compared against Scenario C

From Table 3.1, the following can be observed:

- The overall journey times for Scenario D and Scenario E shows a significant reduction in travel time for all the key movements when compared against Scenario A and Scenario C, respectively.
- The above table demonstrates that the to & from movement along Polegate and High street has predicted travel times saving of more than 50% in both the Scenario D and Scenario E when compared against Scenario A and Scenario C, respectively. A similar trend could also be noted for the movements between High street and the Cop Hall roundabout.
- As expected from the evaluation, Scenario B and Scenario C have marginally higher travel times and are consistent with all the marked routes when compared against 2037 DM and Scenario A, respectively.

3.1.2. PM Peak

Table 3.2 delineates the overall summary of journey time comparison for each of the Scenario during the PM Peak. The timings are representative of an average travel time across the peak hour

Table 3.2 – Journey times summary PM Peak Hour

PM Peak	2037 DM (s)	Scenario A(s)	Scenario B(s)	Scenario C(s)	Scenario D(s)	% Diff ⁴	Scenario E(s)	% Diff ⁵
Route 1 – Polegate to High St	414	498	432	493	374	-25%	403	-18%
Route 2 – High St to Polegate	371	589	398	603	180	-69%	185	-69%
Route 3 – Cop Hall to High St	374	449	408	445	221	-51%	227	-49%
Route 4 – High St to Cop Hall	511	717	533	732	219	-69%	224	-69%

From Table 3.2, the following can be observed:

- The overall journey times for Scenario D and Scenario E shows a significant reduction in travel time for all the key movements when compared against Scenario A and Scenario C, respectively.
- The above table demonstrates that the to & from movement along the Cop Hall Roundabout and High street has predicted travel times saving of approx. 70% in both the Scenario D and Scenario E when compared against Scenario A and Scenario C, respectively. A similar trend can also be noted for the movements between Polegate and the High Street.
- As expected from the evaluation, Scenario B and Scenario C have marginally higher travel times and are consistent with all the marked routes when compared against 2037 DM and Scenario A, respectively.

The individual journey time sections' comparison is delineated in Appendix A.

⁴ This column shows the % difference of Scenario D when compared against Scenario A

⁵ This column shows the % difference of Scenario E when compared against Scenario C

3.2. Queue Lengths comparison

3.2.1. AM Peak

A comparison of the maximum modelled queue lengths at key locations for all the scenario during the AM Peak is summarised in Table 3.3.

Table 3.3 – Queue length comparisons (metre) AM Peak Hour

Location	Arm	2037 DM	Scenario A	Scenario B	Scenario C	Scenario D	Scenario E
Polegate Junction	A2270 NB	219	250	220	241	129	159
	A27 EB	756	870	762	889	142	220
	A27 SB Right Turn	418	636	451	655	185	177
High Street Junction	Wannock Road Ahead & Left	377	437	393	441	134	136
	Wannock Road Right	13	19	17	40	22	32
	A2270 SB Right Turn	251	269	258	269	202	217
	High St Ahead & Left	84	99	87	107	525	529
	A2270 NB	693	884	731	896	256	433
Cop Hall Roundabout	South	117	90	90	70	85	89
	East	996	1,005	1,003	1,007	1,001	1,001
	North	44	79	47	101	196	228
	West	17	15	18	16	21	21
	Hailsham Road	42	154	51	155	36	45

From Table 3.3, the following can be observed:

- During the AM peak, the queue length is predicted to decrease in Scenario D and Scenario E at Polegate junction and Cop Hall roundabout for all the approaches except the North approach at Cop Hall roundabout, when compared against Scenario A and Scenario C. This is due to the improvements at the South approach of Cop Hall roundabout which resulted in more traffic discharge from the South and thus conflicting with the North approach at this location.
- There is a significant increase in queue length at High Street ahead and left movement for Scenario D & Scenario E when compared against Scenario A & Scenario C, respectively. This is because of the more traffic discharge associated with the improvements at the Cop Hall roundabout. However, queue lengths for all the other approaches at the High Street junction is predicted to improve in the Scenario E compared to the Scenario C.
- As expected, the queue results for Scenario E demonstrates notable reduction in queue length for all the key movements due to the committed improvements in the Scenario E compared to the Scenario C (which includes no committed improvements).

The overall junction queue length is presented in Table 3.4

Table 3.4 – Overall Junction queue length (metre) AM Peak Hour

Junction	2037 DM	Scenario A	Scenario B	Scenario C	Scenario D	Scenario E
Polegate Junction	1,393	1,757	1,434	1,785	457	556
High Street Junction	1,417	1,709	1,486	1,752	1,138	1,346
Cop Hall Roundabout	1,217	1,343	1,209	1,349	1,339	1,384
Total	4,028	4,808	4,128	4,887	2,934	3,287

3.2.2. PM Peak

A comparison of the maximum modelled queue lengths at all the key locations for all the proposed scenario during the PM Peak is summarised in Table 3.5.

Table 3.5 – Queue length comparisons (metre) PM Peak Hour

Location	Arm	2037 DM	Scenario A	Scenario B	Scenario C	Scenario D	Scenario E
Polegate Junction	A2270 NB	249	270	253	271	90	114
	A27 EB	691	914	722	950	638	657
	A27 SB Right Turn	555	703	673	768	116	125
High Street Junction	Wannock Rd Ahead & Left	802	860	852	869	361	390
	Wannock Rd Right	13	15	15	16	36	50
	A2270 SB Right Turn	266	271	268	270	198	193
	High St Ahead & Left	76	86	79	91	201	247
	A2270 NB	512	961	574	974	210	265
Cop Hall Roundabout	South	147	64	117	59	89	84
	East	901	944	924	948	890	900
	North	539	504	565	524	724	743
	West	10	9	10	8	11	11
	Hailsham Road	50	124	59	124	24	23

From Table 3.5, the following can be observed:

- During the PM peak, the queue length of the North approach of Cop Hall roundabout is predicted to increase in the Scenario D and Scenario E while the other approaches show similar queue as compared against Scenario A and Scenario C respectively. This is due to the improvement at Cop Hall roundabout.
- There is an increase in queue length at High Street ahead and left movement for Scenario D & Scenario E when compared against Scenario A & Scenario C, respectively. This is because of the more traffic discharge associated with the improvements at the Cop Hall roundabout.
- Queue length results for Scenario E delineates a reduction in the queues at all the critical movements due to committed improvements when compared to the Scenario C.

Overall junction queue length is presented in Table 3.6.

Table 3.6 – Overall Junction queue length (metre) PM Peak Hour

Junction	2037 DM	Scenario A	Scenario B	Scenario C	Scenario D	Scenario E
Polegate Junction	1,496	1,887	1,648	1,988	845	897
High Street Junction	1,668	2,192	1,787	2,219	1,007	1,145
Cop Hall Roundabout	1,647	1,645	1,675	1,664	1,737	1,760
Total	4,811	5,724	5,109	5,871	3,590	3,802

The queue lengths comparison graphs for each location are presented in Appendix B for AM peak and PM peak hour, respectively.

3.3. Network performance

3.3.1. AM Peak

Table 3.7 presents the overall vehicle network performance for each of the scenario during the AM Peak.

Table 3.7 – Network performance summary AM Peak Hour

Parameter	DM 2037	Scenario A	Scenario B	Scenario C	Scenario D	Scenario E
Average Delay (s)	339	455	352	459	289	297
Average Stops	5	7	6	7	5	5
Average Speed (mph)	15	12	15	12	17	17
Average Delay Stopped (s)	105	172	112	175	94	97
Total Travel Time (hr)	1,112	1,331	1,143	1,346	1,102	1,132
Total Delay (hr)	745	986	775	1,001	673	699
Total Stops	41,128	55,798	43,841	57,337	40,397	41,333
Vehicles (Active)	1,409	1,628	1,406	1,647	1,205	1,248
Vehicles (Arrived)	6,501	6,171	6,524	6,200	7,179	7,221
Latent Delay (hr)	74	300	98	342	163	175
Latent Demand	383	1,104	488	1,179	512	544

The network performance comparison for the key indicator during the AM peak shows that:

- Overall network performance result delineates that an average delay is predicted to improve by more than 2 minutes, and the total delay is reduced by 302 hours in Scenario E when compared against Scenario C.
- There is a positive impact on the operation of the overall network as the average network speed increased from 12 mph in Scenario C to 17 mph in Scenario E. The anticipated change in average speed supports the improvements of the other network parameters like average delay, total delay etc.
- The above table also demonstrates that similar improvement trends of all the network parameters can also be seen for Scenario D when compared against Scenario A.
- The overall network performance is predicted to be the optimum in Scenario D and Scenario E with Cop Hall improvements and due to the signal link considered between the A27 Polegate and A2270 High Street signal junctions.

3.3.2. PM Peak

Table 3.8 presents the overall vehicle network performance for each of the scenario during the PM Peak.

Table 3.8 – Network performance summary PM Peak Hour

Parameter	DM 2037	Scenario A	Scenario B	Scenario C	Scenario D	Scenario E
Average Delay (s)	364	492	400	507	267	287
Average Stops	6	8	6	8	4	4
Average Speed (mph)	14	11	13	11	18	17
Average Delay Stopped (s)	124	197	143	203	83	91
Total Travel Time (hr)	1,200	1,439	1,270	1,468	1,077	1,123
Total Delay (hr)	829	1,090	906	1,124	640	690
Total Stops	47,546	61,775	52,491	64,395	35,099	38,521
Vehicles (Active)	1,654	1,741	1,703	1,820	1,394	1,454
Vehicles (Arrived)	6,549	6,244	6,452	6,161	7,243	7,217
Latent Delay (hr)	99	293	129	347	241	264
Latent Demand	430	1,140	587	1,244	460	531

The network performance comparison for the key indicator during PM peak shows that:

- Overall network performance result delineates that an average delay is predicted to improve by 220 seconds (around 4 min), and the total delay is reduced by 434 hours in Scenario E when compared against Scenario C.
- There is a positive impact on the operation of the overall network as the average network speed increased from 11 mph in Scenario C to 17 mph in Scenario E. The anticipated change in average speed supports the improvements of the other network parameters like average delay, total delay etc.
- The above table also demonstrates that similar improvement trends of all the network parameters can also be seen for Scenario D when compared against Scenario A.
- The overall network performance is predicted to be the optimum in Scenario D and Scenario E with Cop Hall improvements and the signal link considered between the A27 Polegate and A2270 High Street signal junctions.

The graphical summary of the network performance parameters for both the AM and PM peak hours are presented in Appendix C.

4. Summary and Conclusions

Atkins has undertaken a traffic modelling assessment for the Hindsland development, Eastbourne Road, Lower Willingdon, BN20 9NU. The proposed scenario has been undertaken to evaluate the impact of the 2037 future year from the committed development at the Morning Mill Farm (700 dwellings) and an additional build-out from Hindsland development.

The assessment has been undertaken for the AM and PM peaks and is representative of the 2037 forecast year. A total of six scenarios comprising of the Do-Minimum (without any improvements) and Do-Something (with improvements) have been assessed.

Atkins has also undertaken a comparative modelling assessment. The key model outputs such as journey time, queue lengths, and overall network performance have been evaluated and compared between the proposed scenarios.

The modelling results as presented within this Technical Note have demonstrated that:

- The overall journey times for Scenario D and Scenario E shows a significant reduction in travel time for all the four key movements when compared against Scenario A and Scenario C, respectively, for both AM and the PM peak.
- The Queue results summary shows a reduction in queue length at the Polegate Junction and the High Street Junction. The queue length at the north approach (southbound) of Cop Hall Roundabout is predicted to increase by around 127m in the AM peak and 219m in the PM peak hours. This is due to the improvements at the south approach (northbound) resulted in more traffic discharge and thus conflicting with the north approach at this location. However, the queue results for Scenario E (with Hindsland development) demonstrates notable reduction in queue length for all the key movements due to the committed improvements in the Scenario E compared to the Scenario C (which includes no committed improvements)
- The overall network performance result delineates that an average delay is predicted to improve by more than 2 minutes in the AM peak and around 4 minutes in the PM peak in the Scenario E when compared against Scenario C. The total delay in the network is reduced by 302 hours and 434 hours for AM and PM peaks, respectively.
- There is a positive impact on the operation of the overall network as the average network speed has increased in Scenario D and Scenario E when compared against Scenario A and Scenario C, respectively. The anticipated change in average speed supports the improvements of the other network parameters like average delay, total delay, etc.

The overall network performance is predicted to be the optimum in Scenario D and Scenario E with Cop Hall improvements and due to the other improvements at the Polegate and High Street junction.

Based on the journey time, queue length, and network performance evaluations, this study proposes that Scenario E (2037 Do-Something with Polegate Option 13 improvements, High St improvements, Signal link & Cop Hall roundabout improvements with Mornings Mill and the Hindsland developments) works within the expectation.

Appendices



Appendix A. Individual travel time comparisons (AM & PM peak hours)

A.1. Journey times comparisons – AM Peak Hour

Route 1 - Polegate Jn to High St Jn	Distance (m)	AM							
		2037 DM	Scenario A	Scenario B	Scenario C	Scenario D	% Diff	Scenario E	% Diff
Gainsborough In to Polegate Jn	327	332	443	341	468	115	-74%	156	-67%
Polegate Jn to Wannock	271	105	135	109	139	58	-57%	62	-55%
Wannock to Willow drive	257	28	28	28	28	31	13%	32	14%
Willow drive to Thurrock Close	902	52	52	52	52	56	8%	57	9%
Total	1756	516	658	530	687	260	-60%	307	-55%

Route 2 - High St Jn to Polegate Jn	Distance (m)	AM							
		2037 DM	Scenario A	Scenario B	Scenario C	Scenario D	% Diff	Scenario E	% Diff
Thurrock close to Willow Drive	899	199	278	214	273	70	-75%	88	-68%
Willow Drive to Wannock	221	78	95	80	94	39	-59%	43	-54%
Wannock to Polegate Jn	955	40	49	39	46	21	-57%	24	-49%
Polegate South to Polegate West	956	31	30	30	30	45	49%	47	58%
Polegate West to Brown Jack Av	957	5	5	5	5	3	-27%	3	-27%
Brown Jack Av to Gainsborough Ln	958	15	15	15	15	21	43%	21	42%
Total	4947	367	471	383	461	199	-58%	225	-51%

Route 3 - Cop Hall Rd to High St	Distance (m)	AM							
		2037 DM	Scenario A	Scenario B	Scenario C	Scenario D	% Diff	Scenario E	% Diff
Cop Hall Rbt to Polegate Jn	954	146	199	156	206	76	-62%	76	-63%
Polegate to Wannock	249	104	121	107	121	64	-47%	70	-42%
Wannock to Willow drive	257	28	28	28	28	31	13%	32	14%
Willow drive to Thurrock Close	902	52	52	52	52	56	8%	57	9%
Total	2361	329	400	343	407	229	-43%	235	-42%

Route 4 - High St to Cop Hall Rdbt	Distance (m)	AM							
		2037 DM	Scenario A	Scenario B	Scenario C	Scenario D	% Diff	Scenario E	% Diff
Thurrock close to Willow Drive	899	199	278	214	273	70	-75%	88	-68%
Willow Drive to Wannock	221	78	95	80	94	39	-59%	43	-54%
Wannock to Polegate	266	112	127	111	122	64	-49%	70	-43%
Polegate to Cop Hall Rb	861	80	75	77	72	62	-16%	63	-12%
Total	2248	469	575	482	560	236	-59%	264	-53%

A.2. Journey times comparisons – PM Peak Hour

Route 1 - Polegate Jn to High St Jn	Distance (m)	PM							
		2037 DM	Scenario A	Scenario B	Scenario C	Scenario D	% Diff	Scenario E	% Diff
Gainsborough In to Polegate Jn	327	224	290	234	286	236	-18%	262	-8%
Polegate Jn to Wannock	271	109	127	117	125	45	-64%	49	-61%
Wannock to Willow drive	257	29	29	29	29	32	10%	32	10%
Willow drive to Thurrock Close	902	52	52	52	52	60	15%	60	16%
Total	1756	414	498	432	493	374	-25%	403	-18%

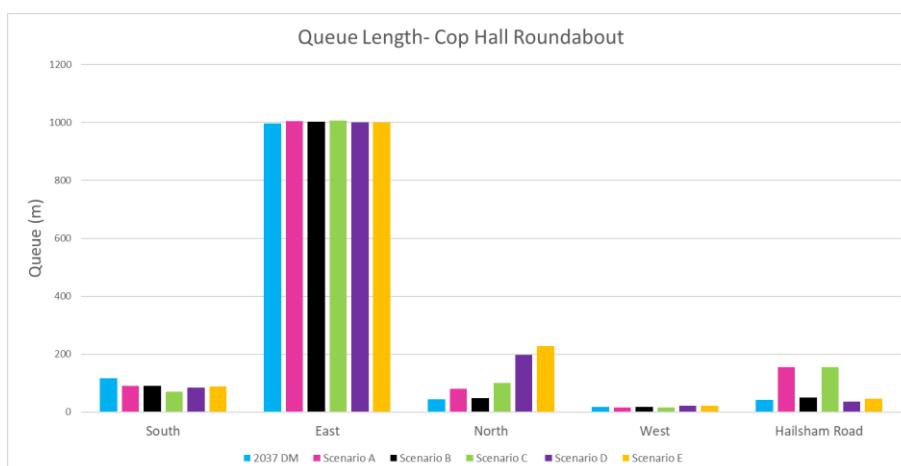
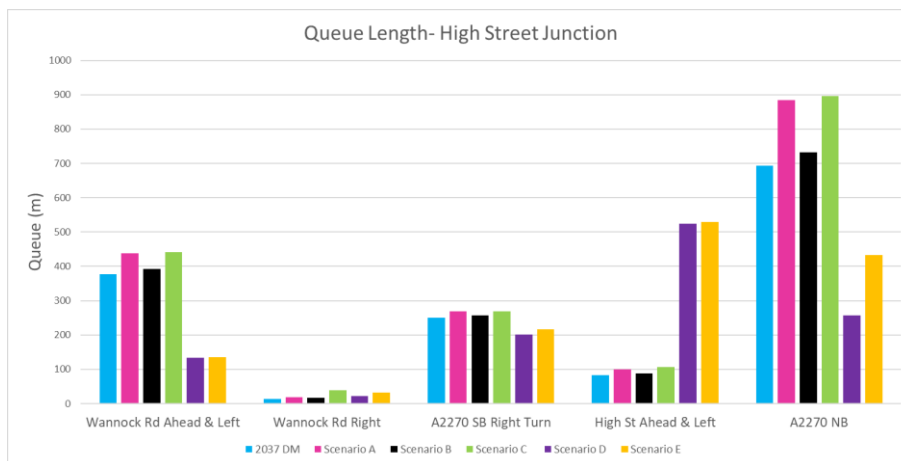
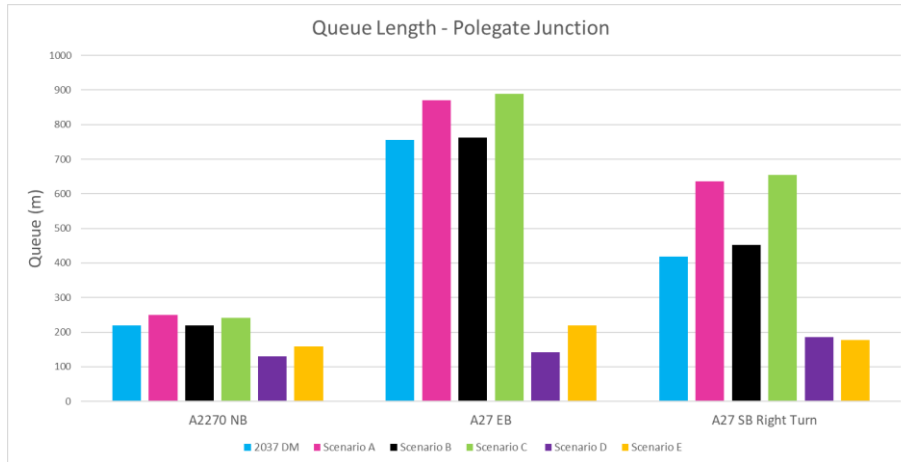
Route 2 - High St Jn to Polegate Jn	Distance (m)	PM							
		2037 DM	Scenario A	Scenario B	Scenario C	Scenario D	% Diff	Scenario E	% Diff
Thurrock close to Willow Drive	899	171	351	188	362	68	-81%	71	-80%
Willow Drive to Wannock	221	89	117	95	118	36	-69%	38	-68%
Wannock to Polegate Jn	955	64	74	67	75	18	-76%	18	-76%
Polegate South to Polegate West	956	29	27	28	28	35	29%	36	28%
Polegate West to Brown Jack Av	957	5	5	5	5	3	-30%	3	-32%
Brown Jack Av to Gainsborough Ln	958	15	15	15	15	19	30%	19	29%
Total	4947	371	589	398	603	180	-69%	185	-69%

Route 3 - Cop Hall Rd to High St	Distance (m)	PM							
		2037 DM	Scenario A	Scenario B	Scenario C	Scenario D	% Diff	Scenario E	% Diff
Cop Hall Rbt to Polegate Jn	954	185	251	215	249	69	-72%	73	-71%
Polegate to Wannock	249	107	117	113	115	60	-49%	62	-46%
Wannock to Willow drive	257	29	29	29	29	32	10%	32	10%
Willow drive to Thurrock Close	902	52	52	52	52	60	15%	60	16%
Total	2361	374	449	408	445	221	-51%	227	-49%

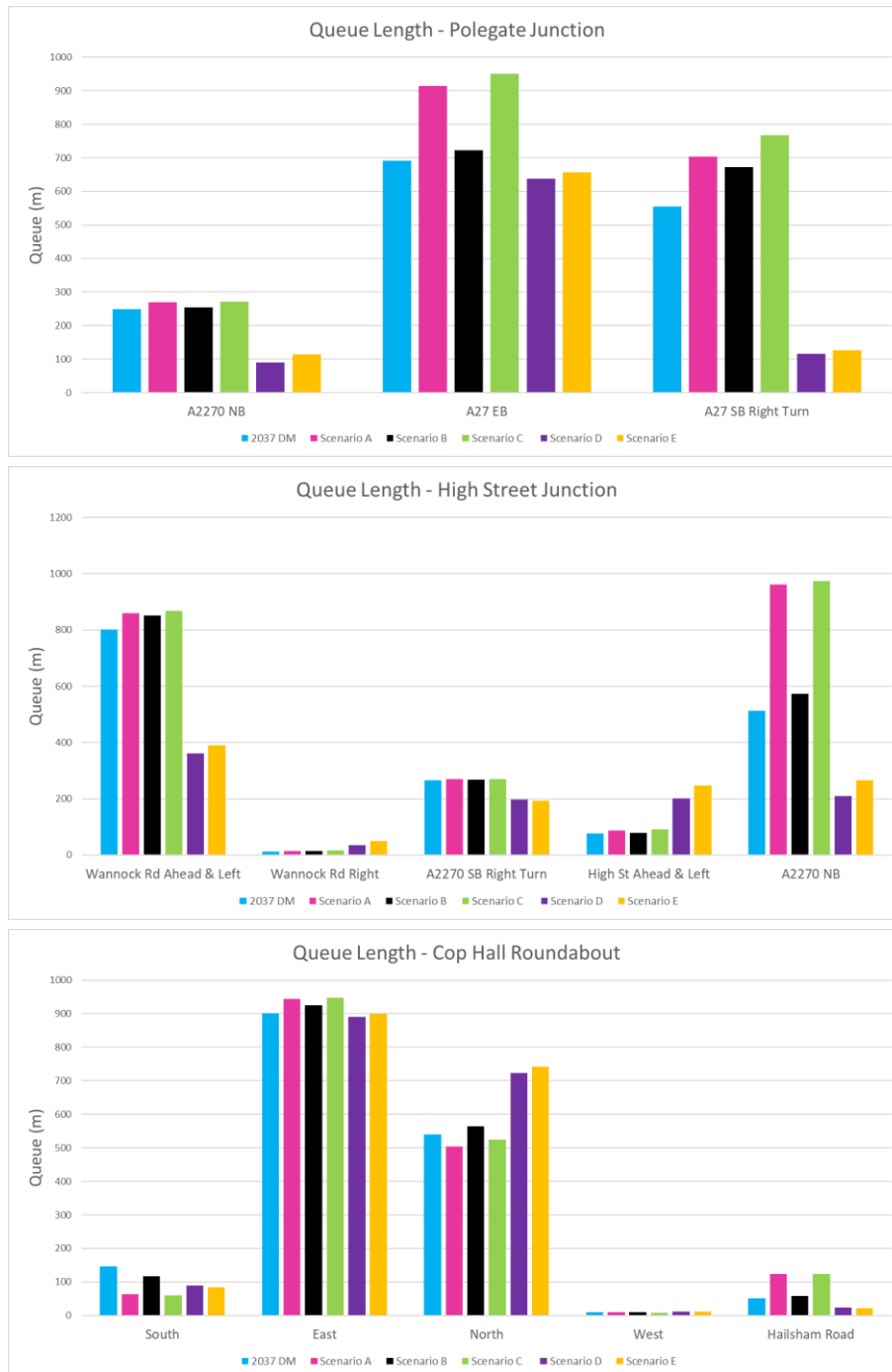
Route 4 - High St to Cop Hall Rd	Distance (m)	PM							
		2037 DM	Scenario A	Scenario B	Scenario C	Scenario D	% Diff	Scenario E	% Diff
Thurrock close to Willow Drive	899	171	351	188	362	68	-81%	71	-80%
Willow Drive to Wannock	221	89	117	95	118	36	-69%	38	-68%
Wannock to Polegate	266	164	179	170	182	50	-72%	52	-72%
Polegate to Cop Hall Rb	861	87	70	80	69	64	-8%	64	-7%
Total	2248	511	717	533	732	219	-69%	224	-69%

Appendix B. Queue Length Comparison

B.1. Queue length comparisons AM Peak Hour



B.2. Queue length comparisons PM Peak Hour



Appendix C. Network Performance Summary

C.1. Network performance summary AM & PM Peak Hours



