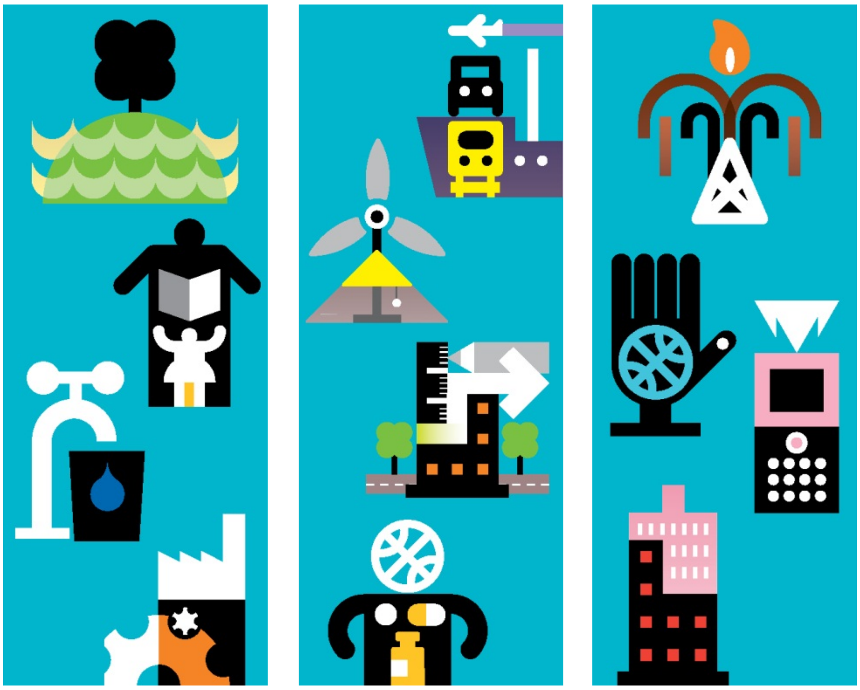

Headcorn, Maidstone

Technical Note: Junction capacity assessment results

July 2015

Maidstone Borough Council

Mott MacDonald

Headcorn, Maidstone

Technical Note: Junction capacity assessment results

July 2015

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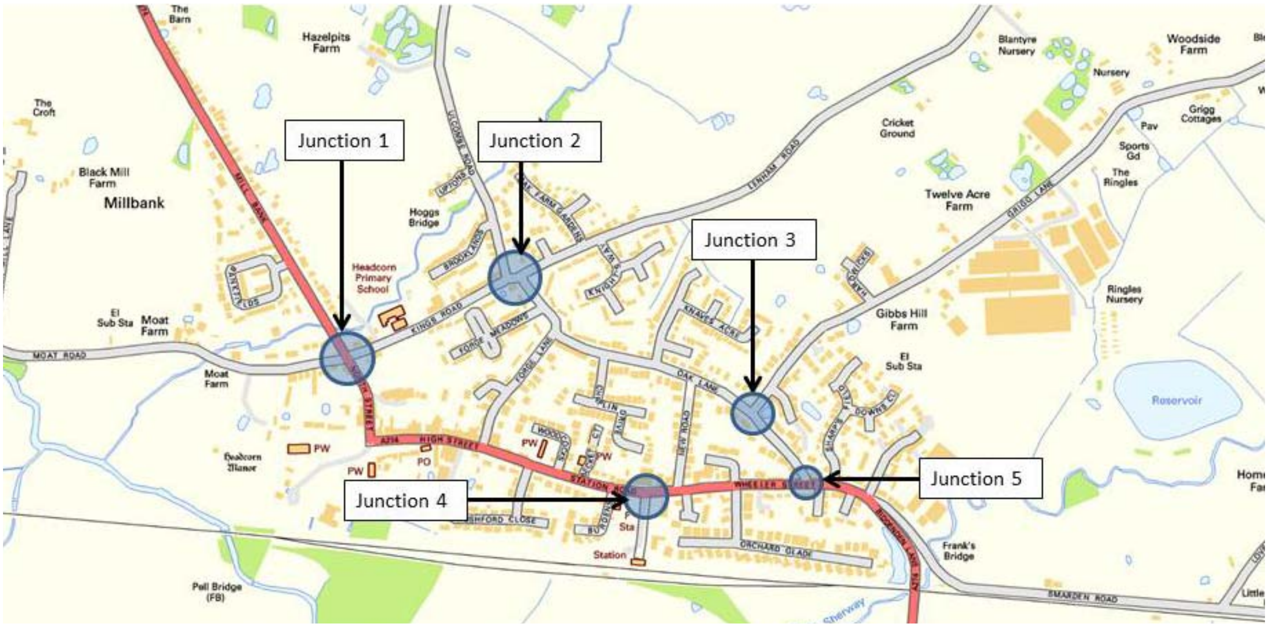
Revision	Date	Originator	Checker	Approver	Description
A	July 2015	S Almond	P Rapa	M Olley	First Issue

Contents

1 Introduction

Maidstone Borough Council (MBC) commissioned Mott MacDonald to undertake junction capacity assessments at five locations in Headcorn, Maidstone. The junctions to be modelled are highlighted in **Figure 1.1** and listed below.

Figure 1.1: Headcorn junction location



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- Junction 1 – Moat Road / North Street (A274) / Kings Road / Mill Bank (A274)
- Junction 2 – Kings Road / Ulcombe Road / Lenham Road / Forge Lane
- Junction3 – Station Road (A274) / Station Approach / Station Road (A274)
- Junction 4 – Oak Lane / Grigg Lane / Oak Lane
- Junction 5 – Wheeler Street (A274) / Oak Lane / Wheeler Street (A274)

All of the junctions are priority junctions, i.e. not roundabouts or signalised, and have been modelled for the existing year (2015) and future year (2031). The future year is defined as 2031, in order to fall in line with the timeframe MBC has anticipated the proposed developments to be completed. The future year has two scenarios; the first is 'Base', which includes forecasted background traffic for the year 2031, and the second is 'Design', which includes forecasted background traffic for the year 2031 plus development traffic.

This document, referred to as a Technical Note, sets out the methodology used to calculate traffic flows, determine traffic distribution and summarise the results of the assessments.

Following this introductory section, the remainder of the Technical Note will be structured as follows:

Section 2 describes the data and methodology used and input assumptions for calculating 2015 and 2031 traffic flows

Section 3 summarise the results of the junction capacity analysis

Section 4 summarises the key findings

2 Data

2.1 Background

MBC provided information in the form of Transport Assessments / Transport Statements and a definitive list to determine which developments were required in the junction capacity assessments. The Transport Assessments (and any associated appendices) which were supplied-are listed below.

- Proposed housing development Grigg Lane, Headcorn (outline planning application) - G.M Heard - Transport Statement (October 2012)
- Proposed Phase 2 housing development Grigg Lane (outline planning application) - G.M Heard – Transport Statement (September 2013)
- Proposed housing development former old school nursery site Headcorn – G.M Heard - Transport Statement (April 2014)
- Residential development of 24 units at Maidstone Road, Lenham, Kent – TPHS – Transport Statement (July 2014)
- Jones Homes Land at Ham Lane, Lenham, Kent – dha transport – Transport Statement (August 2014)
- Proposed residential development land between Mill bank, Ulcombe Road and Kings Road, Headcorn, Kent – Transport Assessment (October 2014)
- Proposed housing development Lenham Road, Headcorn – G.M Heard – Transport Statement (September 2014)
- Countryside properties Residential development Lenham, Headcorn – Transport Statement (October 2014)
- Proposed Phase 3 housing development land off Grigg Lane, Headcorn – G.M Heard – Transport Statement (February 2015)

Appendix A contains the list of developments which MBC confirmed as wanting included in the junction capacity models. Further detail of development traffic is described in Section 2.3.

2.2 Existing traffic

In order to establish the existing traffic flows at each of the five junctions, the supplied Transport Assessments / Transport Statements were reviewed to see if there was any survey data, or peak hour traffic information, at the five junctions detailed within this study. Previous traffic survey data was available for three of the junctions (1, 3 and 5), so an external traffic survey company was appointed to carry out fully classified turning counts at the remaining two junctions (2 and 4). The surveys at junctions 2 and 4 took place on Thursday 14th May 2015, on a neutral weekday during school term time, and outside of any public holidays. Collecting traffic flows on a neutral day should provide 'typical' traffic flow conditions.

The survey data was analysed to determine peak AM and PM peak hours at each junction, rather than using the general network peak hours, which are considered as being between 0800 and 0900 and between 1700 and 1800. Having specific peak hours for each individual junction will generate capacity results for a worst case scenario, i.e. junction performance during existing peak and therefore greatest demand.

The previous survey data contained in the supplied Transport Assessments / Transport Statements was used to determine the peak hours (as detailed above) for junctions 1, 3 and 5.

The survey results and information contained within the supplied Transport Assessments / Transport Statements were classified into vehicle type. To account for the differing vehicle type in the modelling, the data was converted to Passenger Car Units (PCUs) from vehicle units to standardise the data.

HGV proportions were calculated using all formats of the collected survey data, incorporating, OGV1, OGV2 (HGV) and bus vehicle types. This proportional percentage was then applied to all scenarios modelled, keeping the HGV% consistent throughout the existing and future years. This is significant when identifying delays and queuing on individual junction arms, and therefore the HGV% was calculated and applied to each turning movement for each junction.

2.3 Development traffic information

The MBC Local Plan is at its draft stage, with no confirmation over what sites are definitely allocated for development and what sites are still aspirational.

However, MBC require that the junctions in the future year are assessed based on the draft Local Plan, so the potential impact of the various sites on all the five junctions can be assessed. In the absence of confirmed data in the Local Plan, MBC issued a list of development sites which they required for thethe junction capacity assessments. This list was confirmed as the definitive list of sites to include in the modelling.

Appendix A contains the supplied list of development sites, which sets out location and development size. Where there was an associated Transport Assessment for a listed development, the number of arrivals and departures was contained within the document, which was isolated and used in this study. Where there was no Transport Assessment provided, the number of arrivals and departures was determined based on a worst case scenario trip rate from a supplied Transport Assessment for a different listed development within the Headcorn study area.

2.3.1 Trip distribution

In order to determine traffic distribution associated with all listed development sites, two approaches were adopted.

1. The supplied Transport Assessments focused on junctions which the development in question would affect. The Transport Assessments did not necessarily contain distribution information for the junctions that this Technical Note looks at. If it did, the information was directly applied to the junction(s). Where limited distribution information was provided for this study area in the Transport Assessments, continuing assumptions were made on likely movements subsequent from the initial development traffic split.

2. Where no Transport Assessment had been completed as the development is still speculative or aspirational, i.e. the scheme has not been through planning, the distribution from the most comparable site with a Transport Assessment was used.

A final list of each scheme and its associated trip generation and trip distribution at the five junctions in Headcorn was submitted to MBC for review and approval.

A list of the developments which MBC wanted accounting for in the junction capacity assessments and the agreed distribution can be found in **Appendix B**.

2.4 Growth

TEMPRO (version 6.2 with planning dataset 62 and NTM dataset AF09) has been interrogated with regards to forecast growth in background traffic. The growth rates for Maidstone (Rural) were then adjusted using the NTM for a rural minor or rural principal road.

The turning count data from the traffic surveys, carried out in May 2015, were uplifted to 2031, the agreed future year. **Table 2.1** and **Table 2.2** set out the growth rates used.

As shown in **Figure 1.1**, Junctions 1, 4, and 5 are located on the A274, a principal road, so a rural principal growth rate was used. Junctions 2 and 3 are - located on minor roads only, so rural minor growth rates were used.

Table 2.1: Tempro growth rates for rural principal – 2015-2031

Time period	Factor
Weekday AM peak	1.215732939
Weekday PM peak	1.229712149

Table 2.2: Tempro growth rates for rural minor –2015-2031

Time period	Factor
Weekday AM peak	1.213385000
Weekday PM peak	1.227337212

Survey data contained in the supplied documentation was used for three of the five junctions. The survey data was collected in 2013 and 2014. In order to calculate traffic flows for the existing scenario, the data was uplifted to 2015. **Table 2.3** and **Table 2.4** set out the growth rates used to uplift the supplied data to the year 2015, for rural principal roads.

Table 2.3: Tempro growth rates for rural principal – 2013-2015

Time period	Factor
Weekday AM peak	1.004667293
Weekday PM peak	1.005853791

Table 2.4: Tempro growth rates for rural principal – 2014-2015

Time period	Factor
Weekday AM peak	1.00231058
Weekday PM peak	1.002857503

Table 2.5 and **Table 2.6** set out the growth rates used to uplift the supplied data to the year 2015, for rural minor roads.

Table 2.5: Tempro growth rates for rural minor – 2013-2015

Time period	Factor
Weekday AM peak	1.006134389
Weekday PM peak	1.007322620

Table 2.6: Tempro growth rates for rural minor – 2014-2015

Time period	Factor
Weekday AM peak	1.003037862
Weekday PM peak	1.003585181

2.5 Models

MBC provided information, by way of Transport Assessments from their Planning Portal, confirming that the models contained in the supplied Transport Assessments can be used and replicated for this work.

No existing junction capacity assessments were contained within the supplied documents, so new models have been built based on geometric measurements from Ordnance Survey mapping. The model outputs are based on these features, which include major and minor road widths, right turn flares / lanes and visibility distances.

3 Junctions Capacity Assessments

3.1 Introduction

Junction capacity analysis has been carried out at five priority junctions. These are described in **Table 3.1**.

Table 3.1: Priority junctions to be assessed

Junction	Road	Junction description		Right turn lane from major road into minor
1	Moat Road / North Street (A274) / Kings Road / Mill Bank (A274)	Four arm crossroads	Principal	No right turn lanes on any move
2	Kings Road / Ulcombe Road / Lenham Road / Forge Lane	Four arm stagger	Minor	No right turn lanes on any move
3	Station Road (A274) / Station Approach / Station Road (A274)	Three arm priority	-Principal	No right turn lanes on any move
4	Oak Lane / Grigg Lane / Oak Lane	Four arm priority	-Minor	No right turn lanes on any move
5	Wheeler Street (A274) / Oak Lane / Wheeler Street (A274)	Three arm priority	Principal	No right turn lanes on any move

MBC agreed on the assessment years, which are 2015 and 2031, for both the AM and PM weekday peak hour.

PICADY (Junctions9) has been used to assess the capacity and operation performance of the junctions.

PICADY calculates a ratio of flow to capacity (RFC), estimated maximum queuing (in PCUs) and delay (in seconds). An RFC of 0.85 or below is the desirable threshold, but a junction would be considered to operate adequately between an RFC of 0.85 and 1.00. Any RFC values exceeding 1.00 indicates the junction would operate over maximum capacity and would become saturated with queuing and delay concerns.

If any modelling results exceed theoretical capacity; that being a RFC of 1.00, the junction capacity assessment has been re-run with proposed mitigation measures. Any improvements are model specific on the existing layout, and not based on engineering design standards, i.e. the mitigation has been applied within the model only. Appropriate technical layouts would have to take into consideration the model parameters and whether alternative layouts would be more suitable i.e. land availability and design and safety standards.

3.2 Moat Road / North Street (A274) / Kings Road / Mill Bank (A274)

Table 3.2 to **Table 3.4,** summarise the modelling results for junction 1 for the worst performing 15 minute time segments within the peak hour, i.e. the peak within the peak.

Table 3.2: Moat Road / North Street (A274) / Kings Road / Mill Bank (A274) – Existing 2015

	AM			PM		
	Queue (PCUs)	Delay (s)	RFC	Queue (PCUs)	Delay (s)	RFC
Kings Road (E) – North Street (S) and Moat Road (W)	0	9	0.09	0	8	0.10
Kings Road (E) - Mill Bank (N) and Moat Road (W)	0	13	0.16	0	12	0.13
Mill Bank (N) – Kings Road (E), North Street (S) and Moat Road (W)	0	5	0.05	0	5	0.04
Moat Road (W) – Mill Bank (A) and Kings Road (E)	0	11	0.10	0	10	0.09
Moat Road (W) – Kings Road (E) and North Street (S)	0	13	0.17	0	13	0.20
North Street (S) – Mill Bank (N), Kings Road (E) and Moat Road (W)	0	4	0.04	0	5	0.10

Table 3.3: Moat Road / North Street (A274) / Kings Road / Mill Bank (A274) – Base 2031

	AM			PM		
	Queue (PCUs)	Delay (s)	RFC	Queue (PCUs)	Delay (s)	RFC
Kings Road (E) – North Street (S) and Moat Road (W)	0	10	0.12	0	9	0.14
Kings Road (E) - Mill Bank (N) and Moat Road (W)	0	15	0.21	0	15	0.18
Mill Bank (N) – Kings Road (E), North Street (S) and Moat Road (W)	0	5	0.07	0	5	0.05
Moat Road (W) – Mill Bank (A) and Kings Road (E)	0	14	0.15	0	11	0.14
Moat Road (W) – Kings Road (E) and North Street (S)	0	17	0.23	0	16	0.27
North Street (S) – Mill Bank (N), Kings Road (E) and Moat Road (W)	0	4	0.06	0	5	0.13

Table 3.4: Moat Road / North Street (A274) / Kings Road / Mill Bank (A274) – Design 2031

	AM			PM		
	Queue (PCUs)	Delay (s)	RFC	Queue (PCUs)	Delay (s)	RFC
Kings Road (E) – North Street (S) and Moat Road (W)	1	19	0.35	0	12	0.26
Kings Road (E) - Mill Bank (N) and Moat Road (W)	2	35	0.63	1	25	0.45
Mill Bank (N) – Kings Road (E), North Street (S) and Moat Road (W)	0	5	0.07	0	5	0.06
Moat Road (W) – Mill Bank (A) and Kings Road (E)	0	15	0.17	0	13	0.18
Moat Road (W) – Kings Road (E) and North Street (S)	0	19	0.26	1	19	0.32
North Street (S) – Mill Bank (N), Kings Road (E) and Moat Road (W)	0	4	0.11	1	6	0.26

- The modelling indicates that the junction is currently operating within capacity.
- The modelling predicts that the junction would operate within capacity in Base 2031, with minimal queuing. The maximum RFC in the AM peak is modelled as 0.23 with no predicted queuing and delay of 17 seconds. This is on Moat Road, the western minor arm, turning right onto the main road, North Street (S), and ahead to the eastern minor arm, Kings Road (E). The same movements have the highest RFC in the PM peak, with a RFC of 0.27, no predicted queuing, and a delay of 16 seconds.
- The modelling predicts that the junction would operate within capacity in Base 2031, with minimal queuing and congestion, with the highest demand from the opposite movements as the Base 2031 scenario, travelling from the eastern minor arm (Kings Road) turning right to Mill Bank (N) and ahead to the western minor arm, Moat Road (W). The maximum RFC in the AM peak is modelled as 0.63with a queue of 2 PCUs and delay of 35 seconds. The same movements have the greatest level of delay in the PM peak, with a RFC of -0.45, queue of1 PCU, and a delay of 25 seconds.

3.3 Kings Road / Ulcombe Road / Lenham Road / Forge Lane

Table 3.5 to **Table 3.7** summarise the modelling results for junction 2 for the worst performing 15 minute time segments within the peak hour, i.e. the peak within the peak.

Table 3.5: Kings Road / Ulcombe Road / Lenham Road / Forge Lane – Existing 2015

	AM			PM		
	Queue (PCUs)	Delay (s)	RFC	Queue (PCUs)	Delay (s)	RFC
Forge Lane (S) – Kings Road (W) and Ulcombe Road (N)	0	7	0.18	0	7	0.17
Forge Lane (S) – Lenham Road (E)	0	9	0.08	0	9	0.11
Lenham Road (E) and Forge Lane (S) – Kings Road (W) and Ulcombe Road (N)	0	6	0.12	0	6	0.11
Ulcombe Road (N) – Lenham Road (E) and Forge Lane (S)	0	7	0.14	0	7	0.12
Ulcombe Road (N) – Kings Road (W)	0	12	0.05	0	11	0.08
Kings Road (W) and Ulcombe Road (N) – Lenham Road (E) and Forge Lane (S)	0	7	0.23	0	7	0.22

Table 3.6: Kings Road / Ulcombe Road / Lenham Road / Forge Lane – Base 2031

	AM			PM		
	Queue (PCUs)	Delay (s)	RFC	Queue (PCUs)	Delay (s)	RFC
Forge Lane (S) – Kings Road (W) and Ulcombe Road (N)	0	7	0.22	0	7	0.21
Forge Lane (S) – Lenham Road (E)	0	10	0.10	0	10	0.14
Lenham Road (E) and Forge Lane (S) – Kings Road (W) and Ulcombe Road (N)	0	6	0.15	0	6	0.14
Ulcombe Road (N) – Lenham Road (E) and Forge Lane (S)	0	7	0.17	0	7	0.15
Ulcombe Road (N) – Kings Road (W)	0	12	0.06	0	12	0.11
Kings Road (W) and Ulcombe Road (N) – Lenham Road (E) and Forge Lane (S)	0	6	0.28	0	7	0.27

Table 3.7: Kings Road / Ulcombe Road / Lenham Road / Forge Lane – Design 2031

	AM			PM		
	Queue (PCUs)	Delay (s)	RFC	Queue (PCUs)	Delay (s)	RFC
Forge Lane (S) – Kings Road (W) and Ulcombe Road (N)	1	9	0.36	0	8	0.27
Forge Lane (S) – Lenham Road (E)	0	10	0.11	0	11	0.15
Lenham Road (E) and Forge Lane (S) – Kings Road (W) and Ulcombe Road (N)	0	6	0.16	0	6	0.17
Ulcombe Road (N) – Lenham Road (E) and Forge Lane (S)	0	10	0.23	0	9	0.18

	AM			PM		
	Queue (PCUs)	Delay (s)	RFC	Queue (PCUs)	Delay (s)	RFC
Ulcombe Road (N) – Kings Road (W)	0	15	0.28	0	14	0.26
Kings Road (W) and Ulcombe Road (N) – Lenham Road (E) and Forge Lane (S)	1	8	0.35	1	8	0.39

- The junction currently operates without any queuing or delay concerns.
- The modelling predicts that the junction would operate within capacity in Base 2031, with minimal queuing and congestion. The maximum RFC in the AM peak is modelled as 0.28 with no predicted queueing and delays of 12 seconds. This is on the movement of the western major arm, Kings Road and the northern minor arm, Ulcombe Road, turning to the eastern major arm Lenham Road and the southern minor arm, Forge Lane, ,into Headcorn village. In the PM peak, the same movements are modelled as showing the greatest level of demand, with a maximum RFC of 0.27, no predicted queuing and delay of 12 seconds.
- The modelling predicts that the junction would operate within capacity in Design 2031, with minimal queuing and congestion. The maximum RFC in the AM peak is modelled as 0.36 with a queue of 1 PCU and delay of 15 seconds. Unlike the Base 2031 scenario, a different movement has the greatest level of demand in PM peak, with a RFC of 0. 39, a queue of 1 PCU, and a delay of 14 seconds. In the AM peak, the stream with highest demand is from the southern minor arm, Forge Lane, to Kings Road (W) and Ulcombe Road (N), travelling outbound from Headcorn.
The stream with the highest demand is reversed in the PM peak, travelling from Kings Road (W) and Ulcombe Road (N) inbound into Headcorn via Lenham Road (E) and Forge Lane (S).

3.4 Station Road (A274) / Station Approach / Station Road (A274)

Table 3.8 to **Table 3.10** summarise the modelling results for junction 3 for the worst performing 15 minute time segments within the peak hour, i.e. the peak within the peak.

Table 3.8: Station Road (A274) / Station Approach / Station Road (A274) – Existing 2015

	AM			PM		
	Queue (PCUs)	Delay (s)	RFC	Queue (PCUs)	Delay (s)	RFC
Station Approach (S) – Station Road (W)	0	7	0.08	0	8	0.09
Station Approach (S) – Station Road (E)	0	13	0.12	0	14	0.18
Station Road (W) – Station Road (E) and Station Approach (S)	0	5	0.17	0	5	0.06

Table 3.9: Station Road (A274) / Station Approach / Station Road (A274) – Base 2031

	AM			PM		
	Queue (PCUs)	Delay (s)	RFC	Queue (PCUs)	Delay (s)	RFC
Station Approach (S) – Station Road (W)	0	8	0.10	0	9	0.13
Station Approach (S) – Station Road (E)	0	15	0.17	0	17	0.25
Station Road (W) – Station Road (E) and Station Approach (S)	1	5	0.23	0	5	0.08

Table 3.10: Station Road (A274) / Station Approach / Station Road (A274) – Design 2031

	AM			PM		
	Queue (PCUs)	Delay (s)	RFC	Queue (PCUs)	Delay (s)	RFC
Station Approach (S) – Station Road (W)	0	8	0.11	0	9	0.13
Station Approach (S) – Station Road (E)	0	16	0.18	0	18	0.27
Station Road (W) – Station Road (E) and Station Approach (S)	1	5	0.24	0	5	0.08

- The junction currently operates without any queuing or delay concerns.

- The modelling predicts that the junction would operate within capacity in Base 2031, with no queuing and congestion concerns. The maximum RFC in the AM peak is from Station Road west, travelling ahead along the main road and right into the minor road, Station Approach. The results on this are showing a RFC of 0.23, with a predicted queue of 1 PCU. Maximum time delay is showing as a right turn from the minor road, from Station Approach turning right into Station Road E, with a delay of 15 seconds. The highest demand in the PM peak is a right turn from the minor road, from Station Approach turning right into Station Road E, with a RFC of 0.25, no predicted queuing, and a delay of 17 seconds.

- The modelling predicts that the junction would operate within capacity in Design 2031, with no / minimal queuing and congestion. The predicted highest demand is on the same movements as the Base 2031 scenario. The maximum RFC in the AM peak is modelled as 0.24 a queue of 1, and a delay of 16 seconds. In the PM peak, the highest RFC is 0.27, no queuing, and a delay of 18 seconds.

3.5 Oak Lane / Grigg Lane / Oak Lane

Table 3.11 to **Table 3.13** summarise the modelling results for junction 4 for the worst performing 15 minute time segments within the peak hour, i.e. the peak within the peak.

Table 3.11: Oak Lane / Grigg Lane / Oak Lane – Existing 2015

	AM			PM		
	Queue (PCUs)	Delay (s)	RFC	Queue (PCUs)	Delay (s)	RFC
Grigg Lane (N) – Oak Lane (E)	0	6	0.09	0	6	0.08
Grigg Lane (N) – Oak Lane (W)	0	9	0.06	0	8	0.07
Oak Lane (E) – Oak Lane (W) and Grigg Lane (N)	0	6	0.09	0	6	0.09

Table 3.12: Oak Lane / Grigg Lane / Oak Lane – Base 2031

	AM			PM		
	Queue (PCUs)	Delay (s)	RFC	Queue (PCUs)	Delay (s)	RFC
Grigg Lane (N) – Oak Lane (E)	0	7	0.11	0	6	0.10
Grigg Lane (N) – Oak Lane (W)	0	9	0.08	0	8	0.08
Oak Lane (E) – Oak Lane (W) and Grigg Lane (N)	0	6	0.11	0	6	0.12

Table 3.13: Oak Lane / Grigg Lane / Oak Lane – Design 2031

	AM			PM		
	Queue (PCUs)	Delay (s)	RFC	Queue (PCUs)	Delay (s)	RFC
Grigg Lane (N) – Oak Lane (E)	0	8	0.22	0	7	0.15
Grigg Lane (N) – Oak Lane (W)	0	11	0.25	0	9	0.17
Oak Lane (E) – Oak Lane (W) and Grigg Lane (N)	0	6	0.16	0	7	0.20

- The junction currently operates without any queuing or delay concerns.
- The modelling predicts that the junction would operate within capacity in Base 2031 and Design 2031, well within desirable capacity. For the Base scenario, the maximum RFC in the AM peak is 0.11 with no predicted queuing for left turners, and a delay of 9 PCUs for right turners from the minor road, Grigg Lane N. In the PM peak the reverse movements model the greatest level of demand, with a maximum RFC of 0.12 and no predicted queuing travelling from the eastern main arm ahead and right onto the minor arm, and a delay of 8 PCUs for right turners from the minor road, Grigg Lane N.
- For the Design scenario, the stream movements with greatest demand are alike those in the Base scenario. In the AM peak, the maximum RFC is 0.25 with no predicted queuing and a delay of 11 seconds for right turners from the minor road, Grigg Lane N. In the PM peak the maximum RFC is 0.20 with no predicted queuing from the eastern main arm ahead and right onto the minor arm and a delay of 9 PCUs for right turners from the minor road, Grigg Lane N.

- The increased demand from the Base to the Design scenario can be assumed to be a result of three new developments located along Grigg Lane, causing an increase in vehicle activity between the major and minor road. In the AM peak traffic appears to be travelling to the west, outbound from the minor road, and in the PM peak traffic appears to be travelling from the east inbound into the minor road.

3.6 Wheeler Street (A274) / Oak Lane / Wheeler Street (A274)

Table 3.14 to **Table 3.16** summarises the modelling results for junction 5 for the worst performing 15 minute time segments within the peak hour, i.e. the peak within the peak.

Table 3.14: Wheeler Street (A274) / Oak Lane / Wheeler Street (A274) – Existing 2015

	AM			PM		
	Queue (PCUs)	Delay (s)	RFC	Queue (PCUs)	Delay (s)	RFC
Oak Lane (N) – Wheeler Street (W) and Wheeler Street (E)	0	11	0.25	1	13	0.33
Wheeler Street (E) – Wheeler Street (W) and Oak Lane (N)	1	5	0.25	0	5	0.19

Table 3.15: Wheeler Street (A274) / Oak Lane / Wheeler Street (A274) – Base 2031

	AM			PM		
	Queue (PCUs)	Delay (s)	RFC	Queue (PCUs)	Delay (s)	RFC
Oak Lane (N) – Wheeler Street (W) and Wheeler Street (E)	1	14	0.35	1	17	0.46
Wheeler Street (E) – Wheeler Street (W) and Oak Lane (N)	1	6	0.36	1	6	0.27

Table 3.16: Wheeler Street (A274) / Oak Lane / Wheeler Street (A274) – Design 2031

	AM			PM		
	Queue (PCUs)	Delay (s)	RFC	Queue (PCUs)	Delay (s)	RFC
Oak Lane (N) – Wheeler Street (W) and Wheeler Street (E)	1	18	0.49	1	21	0.54
Wheeler Street (E) – Wheeler Street (W) and Oak Lane (N)	2	7	0.47	1	7	0.42

- The junction currently operates without any queuing or delay concerns.

- The modelling predicts that the junction would operate within capacity in Base 2031, with minimal queuing and congestion. The maximum RFC in the AM peak is modelled as 0.36 with 1 PCU queueing for traffic travelling west, ahead on the main road Wheeler Street, and turning right onto the minor road, Oak Lane N. The maximum delay is 14 seconds from Oak Lane turning left and right onto the main road, Wheeler Street. In the PM peak, the reverse movements have the highest demand, with an RFC of 0.46, 1 PCU queueing, and a delay of 17 seconds. This is travelling from Oak Lane turning left and right onto the main road, Wheeler Street E and W.

- The modelling predicts that the junction would operate within capacity in Design 2031, with minimal queuing and congestion. The maximum RFC in the AM peak is modelled as 0.49 with 2 PCUs queuing, and a delay of 18 seconds. In the PM peak, the highest RFC is 0.54, 1 PCU queuing, and a delay of 21 seconds. These streams with the highest demand in the Design scenario are the same for the AM and PM peak, with traffic travelling from the minor arm, Oak Lane, turning left and right onto the main road, Wheeler Street E and W.

- When comparing the Base and Design, there is a reduction in junction capacity, with increased time delay, although the results remain within the desired modelling thresholds. As previously mentioned under junction 4, three of the development sites are located along Grigg Lane, just off Oak Lane, suggesting the apparent increase in RFC from the Base to Design scenario around this junction.

3.7 Modelling summary

In summation, the modelling for existing 2015, Base 2031 and Design 2031 show that all –five junctions would operate within capacity.

The modelling is based on, and sensitive to the various inputs. These inputs are:

- Peak hour survey data for each junction;
- Development sites (number of and locations) and associated development traffic;
- Distribution of development across the road network; and
- Junction layout and geometric parameters

The developments to be accounted for, and associated traffic distribution was supplied and agreed by MBC. If there is an increase / decrease in allocated development, or a change in allocated development site locations, the modelling and subsequent capacity assessment will need amending to reflect the change in development trips across the network.

3.8 Safety

This study has been concerned with how the predicted growth in background traffic to 2031, plus the application of development traffic associated with the schemes stated by MBC, would affect junction capacity, i.e. would the junction operate within what the industry considers acceptable.

The agreed scope was to assess junction operation in the Existing 2015, Base 2031 and Design 2031 scenarios, and not to analyse and review other aspects of junction operation such as safety. However, junction layout and safety could be considered interdependent of one another. Visibility and priority are two elements of junction safety. It should be noted that although not unsafe, priority crossroads are considered less safe that other types of junctions because of the number of movements dependent on drivers waiting and giving way. TD42/95 Part 6 Section 2 Volume 6 states that various methods have been shown to improve major/minor priority junctions. Chapter 4, page 4/1 lists the improvements, which include replacement of rural crossroads with staggered junctions, installation of channelising islands on minor rural approaches at crossroads, improving visibility, provision of good skid resistant surfaces and conversion of urban major/minor priority junctions to traffic signal or roundabout control.

Based on the junction capacity assessments, all are predicted to operate within capacity in Design 2031. However, a possible recommendation in terms of improving safety would be to signalise the crossroads, as traffic flow on all arms would be controlled. Further studies into land availability and safety at the junctions would need to be undertaken to provide evidence of accident history and justification for improvement works.

Appendix C contains all of the modelling output files.

4 Summary

In summary:

- Traffic information was supplied by MBC by way of Transport Assessments and a definitive list of development sites;
- MBC confirmed that the Local Plan is still draft but the assessments are to account for development sites as currently stated, and how these sites would affect the five junctions. In the absence of confirmed allocated sites, MBC supplied a list of what developments to account for;
- The Transport Assessments were reviewed, and where possible, information was used to estimate traffic distribution. In the absence of information, assumptions were made based on the key destinations and trip attractors;
- MBC reviewed and agreed the development distribution for all developments, for both weekday AM and PM peak hours;
- Traffic surveys were carried out at two junctions to establish existing traffic flows. These were converted into PCUs. The peak hour for each individual junction has been modelled rather than what is considered typical network peaks (0800-0900 and 1700-1800);
- Traffic flow information from the supplied Transport Assessments / Transport Statements were used for three of the five junctions. The peak hours were determined from the survey data;
- Ordnance survey mapping was used to measure key geometric parameters for the PICADY models;
- The five priority junctions would operate in Design 2031 without any queuing or capacity concerns. The modelling results are based on the development sites provided, and the associated distribution through the junctions;
- The junctions operate within capacity, but possible mitigation would be to investigate accident history at the crossroads to determine whether signalising the crossroads or providing segregated right turn lanes would improve safety.

Appendices

Appendix A. List of developments from MBC

Appendix B. Development distribution

Appendix C. Junction assessment outputs