Sefton Council Aintree Traffic Forecasts:
Assessment of A59 Ormskirk Road / Aintree Lane Junction.

Introduction

This assessment has been produced to assess the impact that further housing development in the Aintree area would have on the capacity of the A59 Ormskirk Road/ Aintree Lane junction.

Background

A number of sites in the Aintree area were discounted for Green Belt release at the Preferred Options Stage of the Local Plan preparation. These were discounted partially due to the anticipated impacts of traffic. Of particular concern was the cumulative impact of the sites on the junction of the A59 Ormskirk Road/ Aintree Lane, which operates over capacity during peak periods. These initial assessments were informed by the views of the Urban Traffic Control team and LINSIG assessments of the junction provided by developers as part of transport assessments in connection with planning applications. This very busy junction, shown in the plan below is constrained by a railway bridge to the west and a canal bridge to the south. On the eastern side, the junction is accessed by Altway and Aintree Lane, which merge very close to the junction and serve the wider Aintree area.

Representations to Sefton Council in September 2013 on behalf of C &P S Limited promoting Omission Site AS18, included an initial modelling exercise of the A59 Ormskirk Road/ Copy Lane/ Aintree Lane/ Altway junction undertaken by AECOM. This piece of work acknowledged that the junction is congested in the peak periods. The assessment presented a review of a traffic count undertaken at the junction and assessed the likely increase in traffic through the junction based upon the construction of 350 homes on the site north of Oriel Drive. This assessment did not use a LINSIG assessment and did not model the overall impact on the junction or its degree of saturation and concentrated upon the impact of one arm of the junction, (Aintree Road) and the interaction of its junction with Altway on which the majority of the development traffic would be distributed.

A number of assumptions were made in the assessment, including that the junction operated on a 96 second cycle time, which would allow 37.5 cycles of the traffic signals per hour. Much of the subsequent assessment looks at the interaction of the junctions of Altway and Aintree Lane and is based upon the potential 'theoretical' capacity of one arm of the junction operating in optimal conditions, based upon the maximum number of PCU's could be accommodated per cycle. This fails to assess the overall impact of increasing traffic on the junction as a whole or the impact of inbound trips to the development site in either the AM or PM peak periods. The actual operating cycle time of the junction is 120 seconds, which allows only 30 cycles per hour, as the junction is optimised to cater for the high volumes of traffic on the A59. This invalidates the assumptions made in the assessment of the capacity of this arm of the junction. This AECOM assessment is appended to this note for reference and the traffic flows and predicted trip rates proposed by AECOM have been used in undertaking an assessment of the overall junction capacity.

A59 Ormskirk Road / Aintree Lane Junction Capacity Assessment.

The A59 Ormskirk Road / Aintree Lane/ Copy Lane junction is a very busy junction on the dual carriageway section of the A59, which forms a principal route between the motorway network and Liverpool City centre. In addition to providing a principal route, in the immediate vicinity of the junction it also provides access to a number of retail parks, trade warehouses and a major supermarket, which are all major trip attractors/ generators.

Two recent Transport Assessments for developments at the retail parks were undertaken in 2012 and 2013, which included LINSIG modelling of the A59 Ormskirk Road / Aintree Lane junction in the network assessments.

These demonstrated that the Aintree Lane arm of the junction is currently operating at or near capacity in both the am and pm peak hours.

Subsequent analysis of this model revealed a number of flaws in the modelling, principally that the model shows Aintree Lane with three infinitely long lanes, whereas on site the junction operates with Aintree Lane / Altway lanes feeding into three short lanes of approx. 4/5pcus in length.

A revised LINSIG model has been built by Sefton which provides a better representation of the Aintree Lane arm of the junction, which replicates the site layout as two long lanes, with one shorter lane, and has been run using the traffic flows from the earlier TA model. The results are outlined below:

Base Model: AECOM flows

Revised Model Arm of Junction (2013 assessment flows)	AM Peak (0800 to 0900)		PM Peak (1645 to 1745)	
	Deg of Sat	MMQ pcu's	Deg of Sat	MMQ pcu's
Aintree Lane - Left Turn & Straight On	102.1%	22.1	107.9%	30.8
Aintree Lane - Right Turn	92.7%	9.3	178.8%	16.7

Cycle time: 120 sec
Overall PRC -44.2% (am); -107.9% (pm)

This modelling of the existing situation demonstrates that the junction is currently operating beyond capacity with degrees of saturation beyond 100% and negative Practical Reserve Capacity (PRC).

In order to provide a more robust assessment of the junction a further traffic count was undertaken in September 2015 by Sefton Council. This was undertaken in order to ascertain any changes in vehicle movements on the approaches to the junction following the opening of the A5758 Thornton to Switch Island Link Road in August 2015, which may impact flows arriving at the junction from Copy Lane and the A59 Ormskirk Road (N). However, comparing the new flows with the previous traffic flows, the validity of the new traffic count is in question, following a 'reality check' using the UTC camera located at that junction. This has been taken up with the traffic count company and a further assessment of the junction will be undertaken once the count is verified. Therefore for this assessment, the original count provided as part of the AECOM assessment has been used to assess junction capacity. Analysis of CCTV footage of the junction during peak periods indicates that the opening of the new link road does not appear to have impacted traffic flows at the junction.

Impact of Development traffic

The impact of development traffic has been modelled under two scenarios.

1 Using the trip generation calculated by AECOM in their technical note of September 2015 to represent the direct impact on the junction of this site
2 A further sensitivity test forecasting twice this increase in traffic at this junction, to analyse the potential impact of additional discounted Green Belt sites in the Aintree area on the A59 Ormskirk Rd/ Aintree Lane junction.

The analysis undertaken by AECOM predicted that the trips generated by a development of 350 dwellings on the site based upon trip rates generated using TRICS were calculated as set out below.

	AM Peak		PM Peak	
	Arrivals	Departures	Arrivals	Departures
Private Vehicles	49	138	128	79

The AECOM assessment assumed that 70% of the total trip generation would access the wider highway network via Altway and Aintree Lane leading to the junction, predicting a trip distribution summarised below with 40% of the development traffic arriving and departing along the A59 south, 20% along the A59 north and 10% distributed along Copy Lane.

	AM Peak		PM Peak	
	Inbound to Aintree Lane	Outbound from Aintree Lane	Inbound to Aintree Lane	Outbound from Aintree Lane
TO/ From A59 Ormskirk Rd (S)	20	56	51	32
To/ From Copy Lane	5	14	13	8
TO/ From A59 Ormskirk Rd (N)	10	28	26	16
	35	98	89	55

These figures have been used to calculate the impact of the additional traffic at the junction under the scenarios outlined above and the results are outlined below.

Scenario 1 Impact of Development site north of Oriel Drive
– added in calculated flows – into Aintree Lane = 35 pcu's (am) and 90 pcu's (pm);
out of Aintree Lane = 98 pcu's (am) and 56 pcu's (pm)

Revised Model Arm of Junction (2015 DEV assessment flows)	AM Peak (0800 to 0900)		PM Peak (1645 to 1745)	
	Deg of Sat	MMQ pcu's	Deg of Sat	MMQ pcu's
Aintree Lane - Left Turn & Straight On	110.2%	42.2	121.9%	59.9
Aintree Lane - Right Turn	89.1%	9.0	116.6%	24.1

Cycle time: 120 sec
Overall PRC -68.9% (am); -116.4% (pm)

Scenario 2 – Sensitivity Test to assess impact of additional development within the Aintree Area additional flows doubled from Scenario 1

Revised Model Arm of Junction (2015 DEV assessment flows)	AM Peak (0800 to 0900)		PM Peak (1645 to 1745)	
	Deg of Sat	MMQ pcu's	Deg of Sat	MMQ pcu's
Aintree Lane - Left Turn & Straight On	129.7%	90.8	135.9%	88.8
Aintree Lane - Right Turn	99.8%	14.4	125.4%	32.2

Cycle time: 120 sec
Overall PRC -71.8% (am); -124.9% (pm)

Summary

Sefton Council has undertaken a LINSIG assessment of the A59 Ormskirk Road/ Aintree Lane/ Copy Lane junction to provide evidence for the Council's decision for discounting development sites in the Aintree area, on the basis of the lack of capacity at this junction.

The junction is operating beyond its practical reserve capacity during both peak periods at present and this would be exacerbated by additional traffic generated from housing development on the Land north of Oriel Drive in the Aintree area. The analysis demonstrates that traffic conditions during the PM peak are worse than the AM peak and that the previous analysis of the impact of development traffic undertaken by AECOM does not present a true representation of the impacts of development.

This analysis, demonstrates that the junction is operating over capacity at present, demonstrates that the impact of housing development in the Aintree area would have a detrimental impact on this busy junction and traffic flows in the A59 corridor.

Technical Note

Project:	**Land at Oriel Drive, Aintree**	Job No:	**60282336**
Subject:	**Initial Modelling of the A59 Ormskirk Road / Copy Lane / Aintree Lane / Altway Junction**		
Prepared by:	**Duncan Carter**	Date:	**23.09.13**
Checked by:	**Phil Tilby**	Date:	**25.09.13**

Introduction

AECOM has been commissioned by GVA to undertake initial junction modelling of the A59 Ormskirk Road / Copy Lane / Aintree Lane / Altway signal junction as part of an accessibility appraisal for the proposed residential development on land at Oriel Drive in Aintree.

Background

In December 2012, AECOM prepared an Access Review for the Oriel Drive site.

Since the preparation of the Access Review report, Sefton Metropolitan Borough Council (SMBC) has released its Preferred Options Core Strategy, which has discounted the site for Green Belt release, partly it seems on the basis of traffic issues. A review of the evidence from SMBC with regard to the transport issues referred to for not releasing the site (S157) for development included access via residential roads, congestion and safety issues due to increased traffic. The initial junction modelling of the Ormskirk Road / Copy Lane / Aintree Lane / Altway junction is in response to SMBC discounting the site for congestion reasons, as the majority of development trips are likely to past through this junction in order to access the wider highway network.

The AECOM Access Review work indicated that the junction is congested in the peak periods, particularly in the morning peak on the Aintree Lane arm, which would also be the peak period for outbound residential traffic from the site. This technical note is intended to summarise the results of the junction modelling. It reviews the existing operation of the signalised junction and provides a preliminary assessment of the likely impact of development traffic on the operation of the junction.

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Site Location

The location of the development site can be seen in **Figure 1** below, with the location of the Ormskirk Road / Copy Lane / Aintree Lane / Altway junction in relation to the site indicated by the blue circle. A general arrangement drawing of the existing junction layout has been provided by Capital Symonds and is shown overleaf in **Figure 2**.

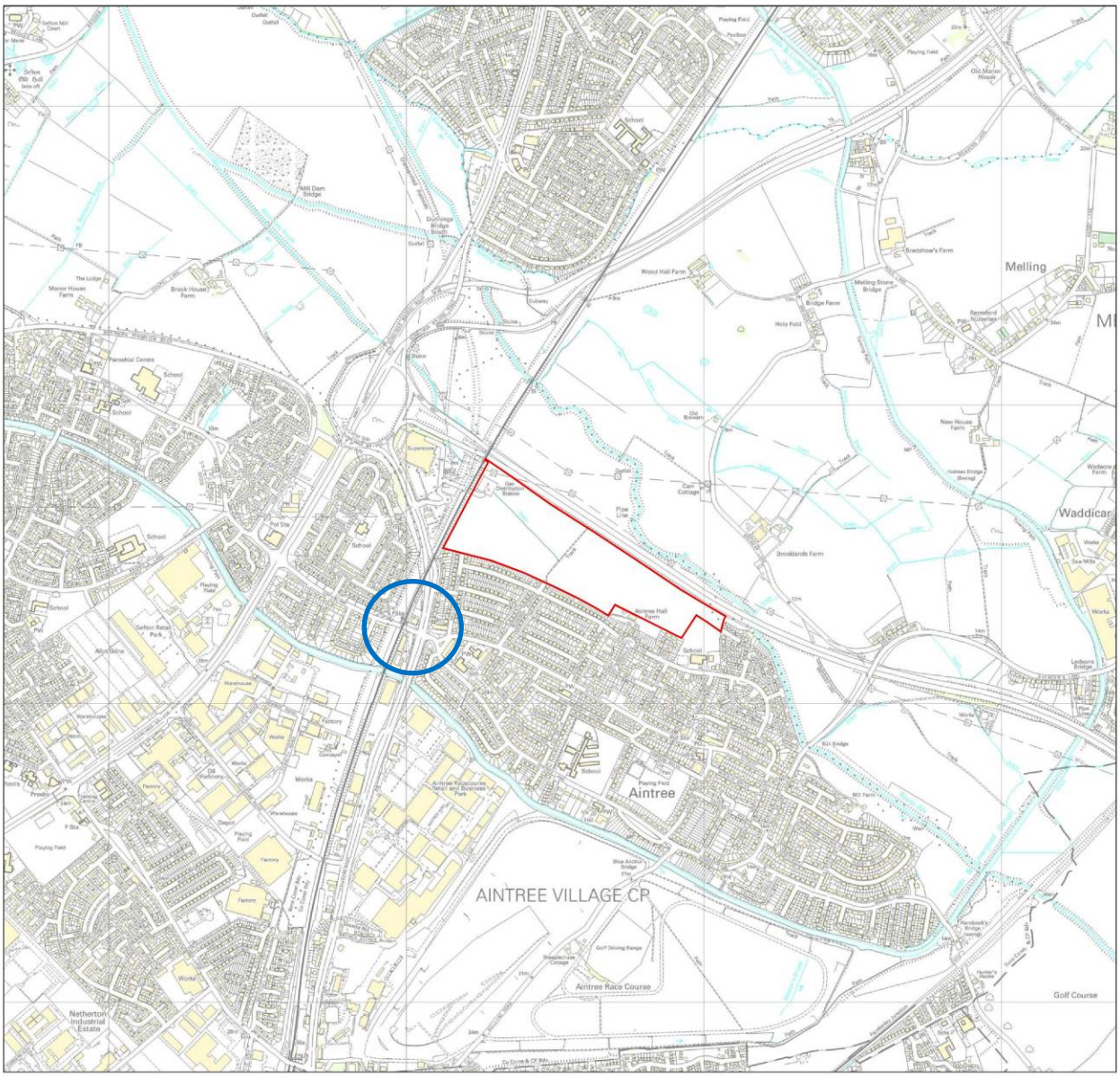

Figure 1: Location Plan

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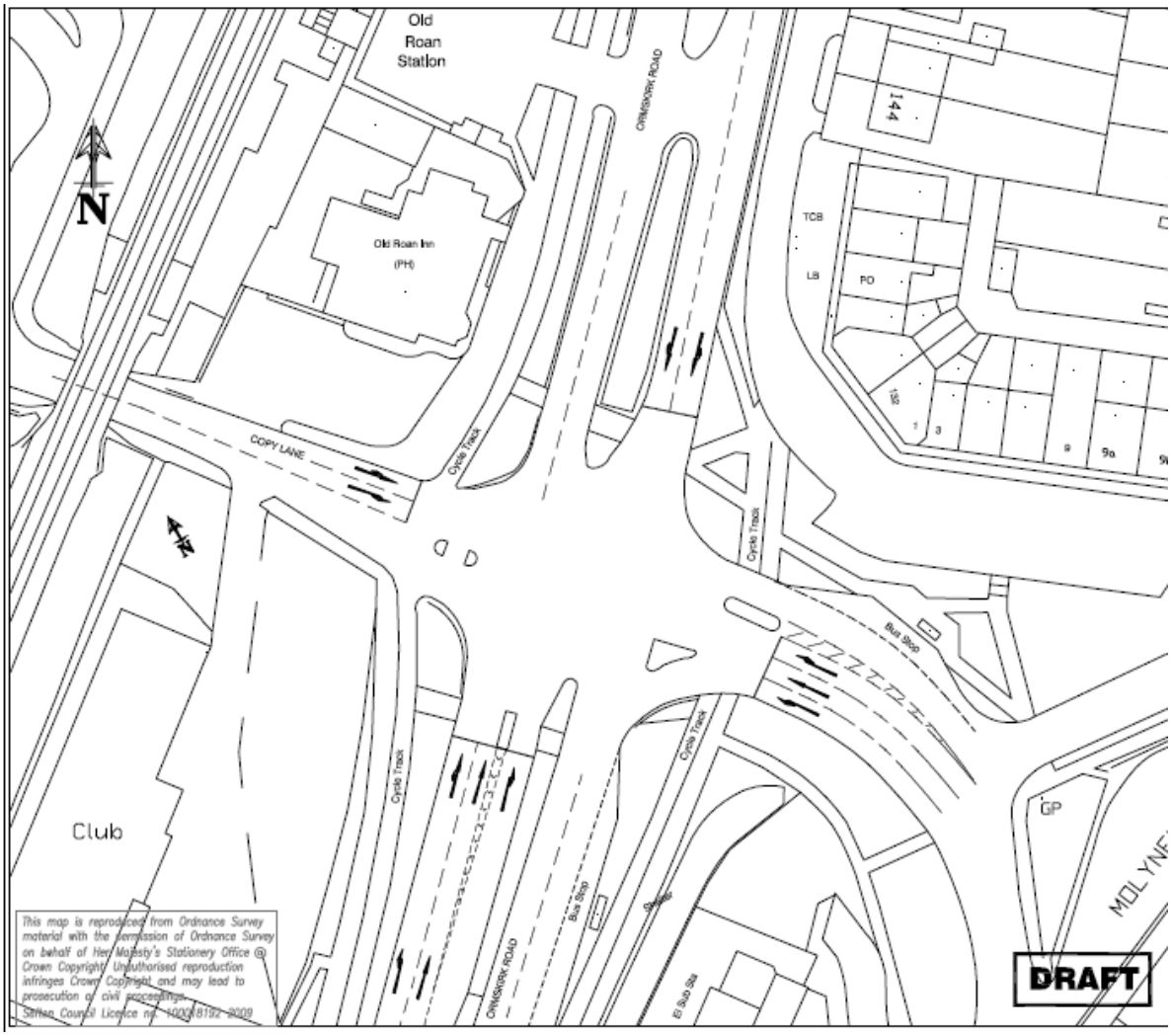

Figure 2: Ormskirk Road / Copy Lane / Aintree Lane / Altway Junction Layout

Existing Junction Operation

In order to assess the operation of the signal controlled junction, a copy of the signal control specification for the junction was obtained from SMBC through their consultants Capita Symonds. This provided information on the phasing and staging of the junction, as well as the intergreen times and any phase delay periods between each signal stage. However, the specification does not provide information on the average cycle time at the junction, or the frequency at which the demand dependant pedestrian crossing phases are called during the peak hours. For this assessment, the average cycle time has been estimated based on best practice for this type of signal arrangement with pedestrian crossings, as well as peak hour turning count and queue length surveys. Referring to **Figure 3** below, the signal cycle time can be explained as the time it takes from the beginning of Stage 1 for every stage to activate once before Stage 1 begins again.

Based on experience with similar signalised junctions incorporating demand-dependant pedestrian phases, an average cycle time of 96 seconds has been used in the assessment. This gives a total of 37.5 cycles in each peak hour.

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The Ormskirk Road / Copy Lane / Aintree Lane junction is a four-arm signal crossroads, with Altway connecting to the Aintree Lane arm approximately 45 metres east of Ormskirk Road. The Altway arm is not signal controlled, with traffic required to exit the junction in the gaps in the flow of traffic along Aintree Lane that are provided by the operation of the traffic signals. To facilitate sufficient gaps in the westbound flow on Aintree Lane, an advance stop line is provided on Aintree Lane at the Altway junction in order to hold back traffic and provide a reservoir to accommodate vehicles exiting Altway. The signal specification indicates that there is a phase delay of 6 seconds on the Aintree Lane advance stop line. This means that the advance stop line changes to red 6 seconds earlier than the main Aintree Lane stop line at Ormskirk Road, thus providing a gap in the flow to allow vehicles to exit the Altway arm.

A stage diagram illustrating the operation of the junction is shown in **Figure 3** below.

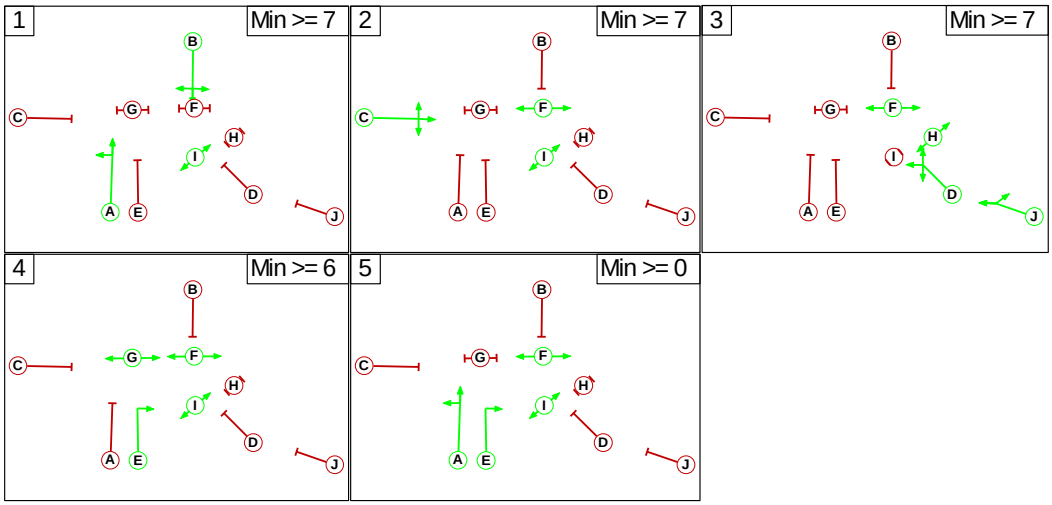

Figure 3: A59 Ormskirk Road / Copy Lane / Aintree Lane Junction Stage Diagram

Where:

- Phase A = A59 northbound ahead and left.
- Phase B = A59 southbound right, left and ahead.
- Phase C = Copy Lane.
- Phase D = Aintree Lane second stop line.
- Phase E = A59 northbound right turn lane.
- Phase F = Pedestrian crossing across A59 southbound carriageway.
- Phase G = Pedestrian crossing across A59 northbound carriageway.
- Phase H = Pedestrian crossing across Aintree Lane eastbound.
- Phase I = Pedestrian crossing across Aintree Lane westbound.
- Phase J = Aintree Lane first stop line.

There are also pedestrian crossing movements across the Copy Lane and Ormskirk Road south arms of the junction, but these are not push button controlled and operate as walk with traffic movements i.e. they do not require dedicated phases within the junction staging arrangement.

Traffic Surveys

In order to establish the existing traffic movements through the junction, classified turning count and queue length surveys were undertaken at the junction on Thursday 12th September 2013. The surveys were undertaken between 07:00 and 09:00 and 16:30 and 18:30. By studying the number of vehicle

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movements throughout these periods, the peak hours were calculated to be 08:00 – 09:00 in the AM, and 16:45 – 17:45 in the PM. The 2013 peak hour vehicle flows and queue lengths are shown in **Figure 4**.

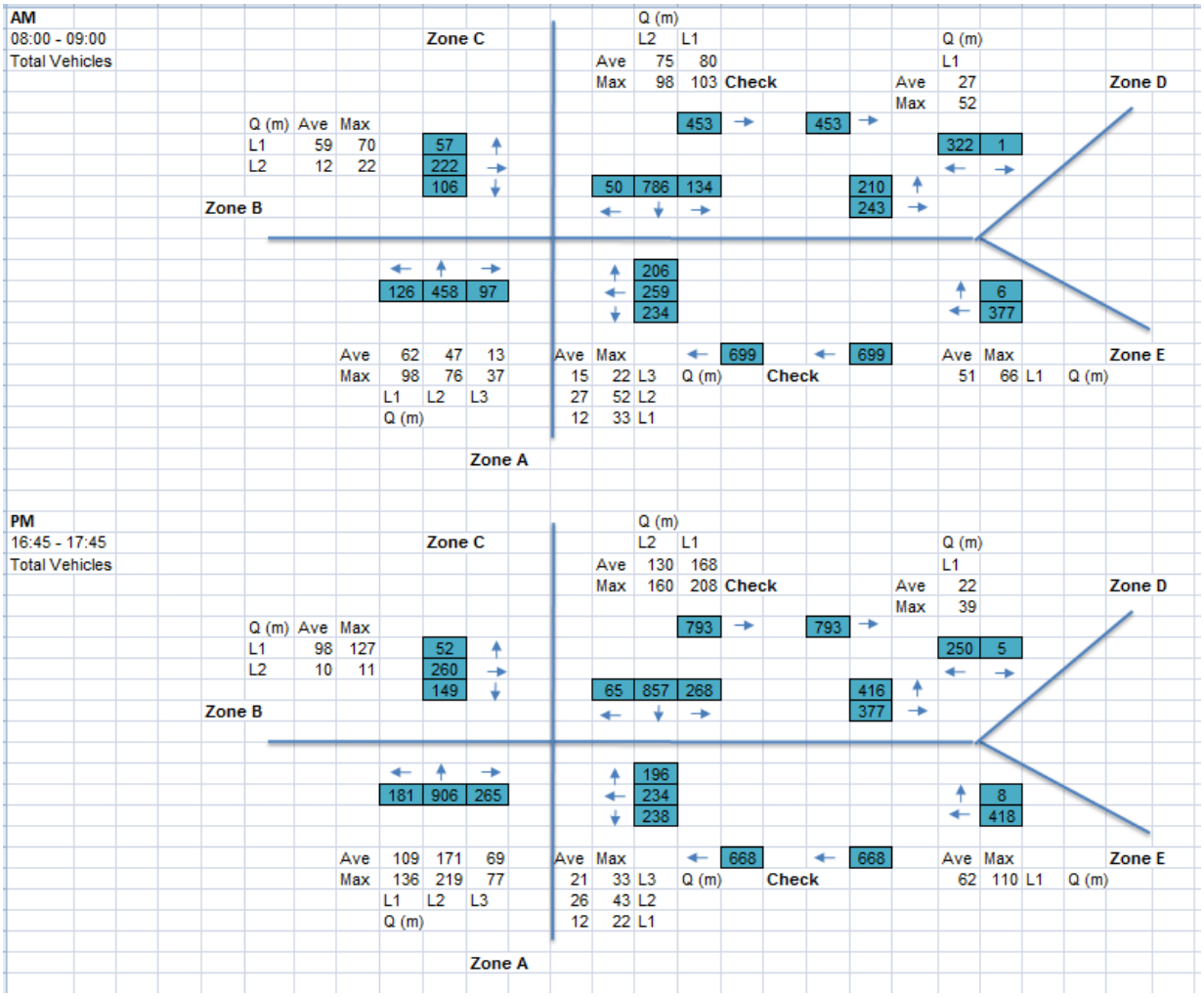

Figure 4: 2013 Peak Hour Vehicle Flows and Queue Lengths

A survey of queue lengths on each arm of the junction was also undertaken during the same time periods as the turning count survey. This recorded the number of light and heavy vehicles queuing on each lane of each arm at five-minute intervals, converting this to an overall queue length using unit lengths of 5.5 metres for light vehicles and 15 metres for heavy vehicles.

For the purposes of this exercise, no growth factors have been applied to the base traffic flows in order to establish a future year base traffic flow, such as National Traffic Model (NTM) with locally adjusted TEMPRO forecasts, as the residential area served by the Aintree Lane arm is considered to effectively operate as an enclosed network with additional vehicle trips limited to those that would be generated by the proposed development site, with the potential for additional background traffic growth minimal. Accordingly, for the localised modelling exercise focused on the capacity of the Aintree Lane / Altway arms of the junction, it has been assumed that the development trip generation described below represents the future year increase in traffic flow.

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Development Trip Generation and Distribution

The predicted number of vehicle trips that will be generated by the proposed development was reviewed using TRICS as part of the December 2012 Access Review report, and the trip rates and trip generation are repeated below.

The following trip rates (per dwelling) have been calculated for this development.

Table 1: Vehicle Trip Rates per Dwelling

Mode	AM Peak		PM Peak	
	Arrivals	Departures	Arrivals	Departures
Private vehicles	0.141	0.393	0.365	0.225

Based on a development of 350 properties this would equate to the following trips being generated.

Table 2: Proposed Vehicle Trip Generation for 350 Dwellings

Mode	AM Peak		PM Peak	
	Arrivals	Departures	Arrivals	Departures
Private vehicles	49	138	128	79

For this exercise, the likely distribution of development trips was also taken from the Access Review report. This assumed a distribution of trips based on the key major locations surrounding the site that are accessible via the main roads in the local highway network.

This methodology assumed that 70% of the total development trip generation would access the wider highway network via Altway leading onto the Aintree Lane arm of the Ormskirk Road / Copy Lane / Aintree Lane junction. From there, 40% of the development trips would arrive and depart along the A59 south of Aintree Lane, 20% to / from the A59 north of Aintree Lane and 10% distribute along Copy Lane.

Impact of Development Traffic

From the trip distributions above, it is clear that the single biggest impact of the development traffic on the highway network under review will be from vehicles leaving the site via Altway and Aintree Lane westbound in the AM peak when there is the greatest number of vehicle departures concentrated on this one approach. Therefore it is considered that the key factor in this assessment is the potential impact of development traffic on Altway, and whether there is sufficient storage capacity within the reservoir on Aintree Lane to accommodate the extra trips without creating an unacceptable level of additional queuing. A preliminary assessment of the likely impact of development traffic on the A59 and Copy Lane has also been undertaken.

It should be noted that there is a yellow box junction on Aintree Lane at the Altway junction, which is not shown on the general arrangement drawing shown in Figure 2. This is to prevent traffic turning right out of Altway from blocking traffic travelling east on Aintree Lane. The effective capacity of the storage reservoir on Aintree Lane is therefore determined by the length of each lane between the Phase D stop line and the edge of the box junction. The maximum capacity of the reservoir is then equal to the number of Passenger Car Units (PCUs) that can be accommodated in each lane per cycle multiplied by the number of cycles in each peak hour.

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Each of the three lanes can store a maximum of 4 PCUs, meaning the reservoir can potentially store a maximum of 12 PCUs in every signal cycle. Assuming 37.5 cycles per hour, as discussed above, this means that the reservoir can store a maximum of 450 PCUs per hour, assuming an equal distribution of traffic in each lane.

The queue length surveys indicate that in each peak hour at present the average queue length is 3 PCUs in the right-turn lane, and only 2 PCUs in the left-turn lane. This indicates that not all the available storage capacity is currently being used, which means that there is potential for greater usage if more traffic was exiting Altway. In particular, the development trip distribution predicts that the majority of development traffic will be turning left out of Aintree Lane, and it is this lane which has the most unused storage capacity. This demonstrates that there could be some storage capacity within the reservoir to accommodate development traffic.

An estimate of the overall demand on each arm can be calculated by converting the flows and queues to PCU values. The turning counts were converted to PCU values using the conversion factors shown in **Table 3** below. The queue lengths were converted to PCU values using a unit length of 6 metres = 1 PCU. The 2013 peak hour PCU flows and queue lengths are shown in **Figure 5**. The proposed development flows and the base with development flows are shown in **Figures 6 and 7.**

Table 3: PCU Conversion Factors

Vehicle Type	Pedal Cycle	Motorcycle	Car/Taxi	LGV	HGV	Bus
PCU factor	0.2	0.4	1	1.5	2.3	2

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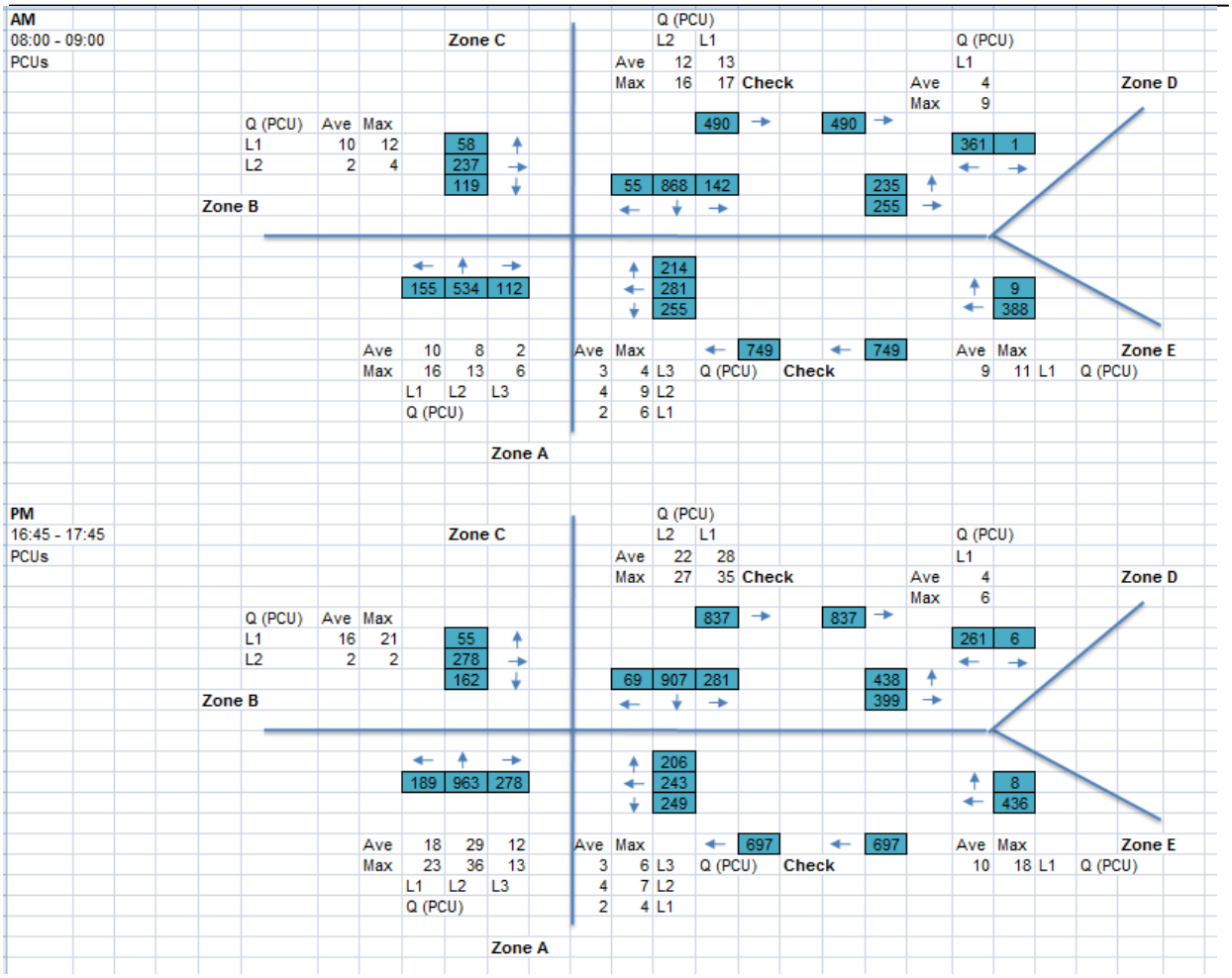

Figure 5: 2013 Peak Hour PCU Flows and Queue Lengths

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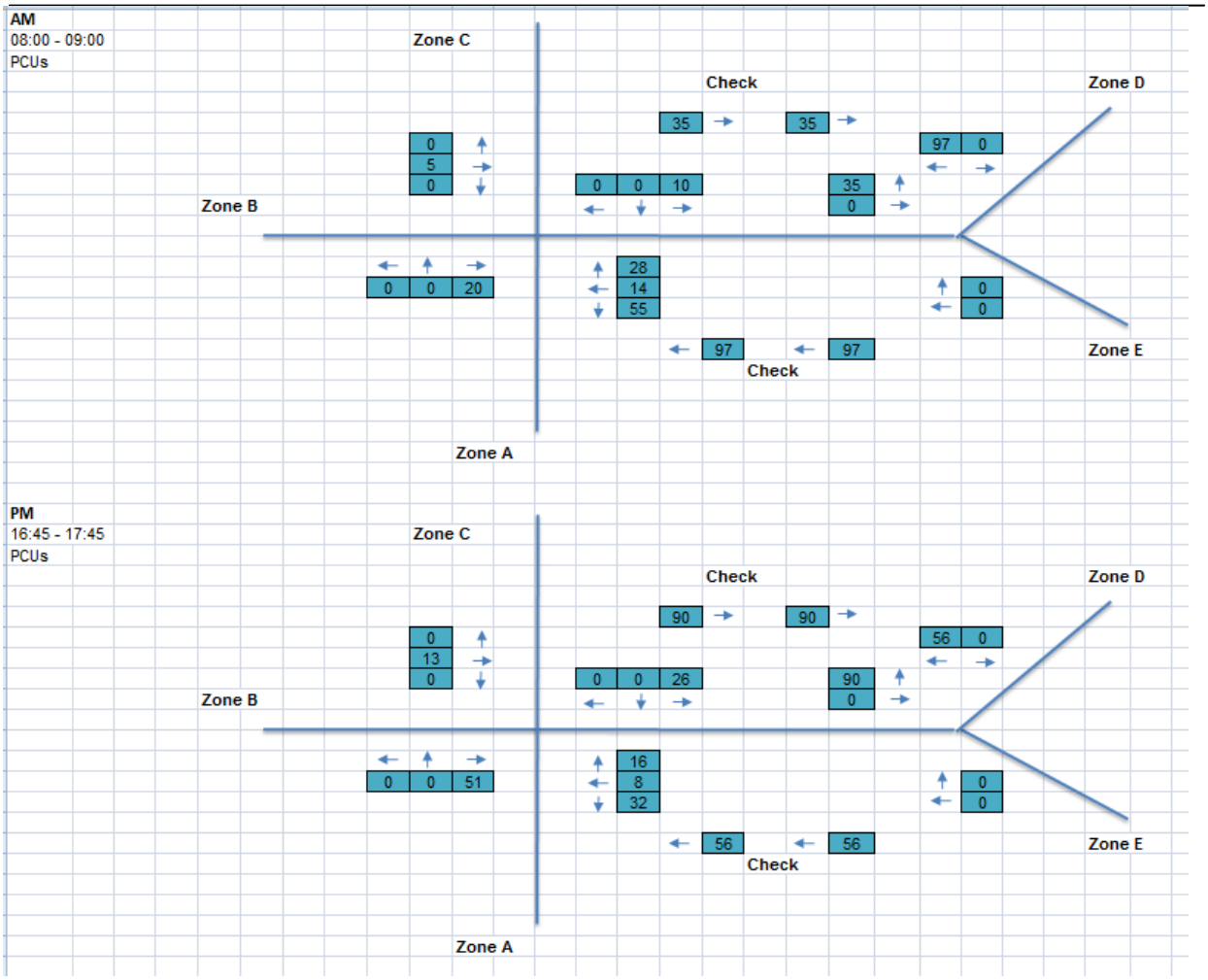

Figure 6: Proposed Development Flows (PCU Values)

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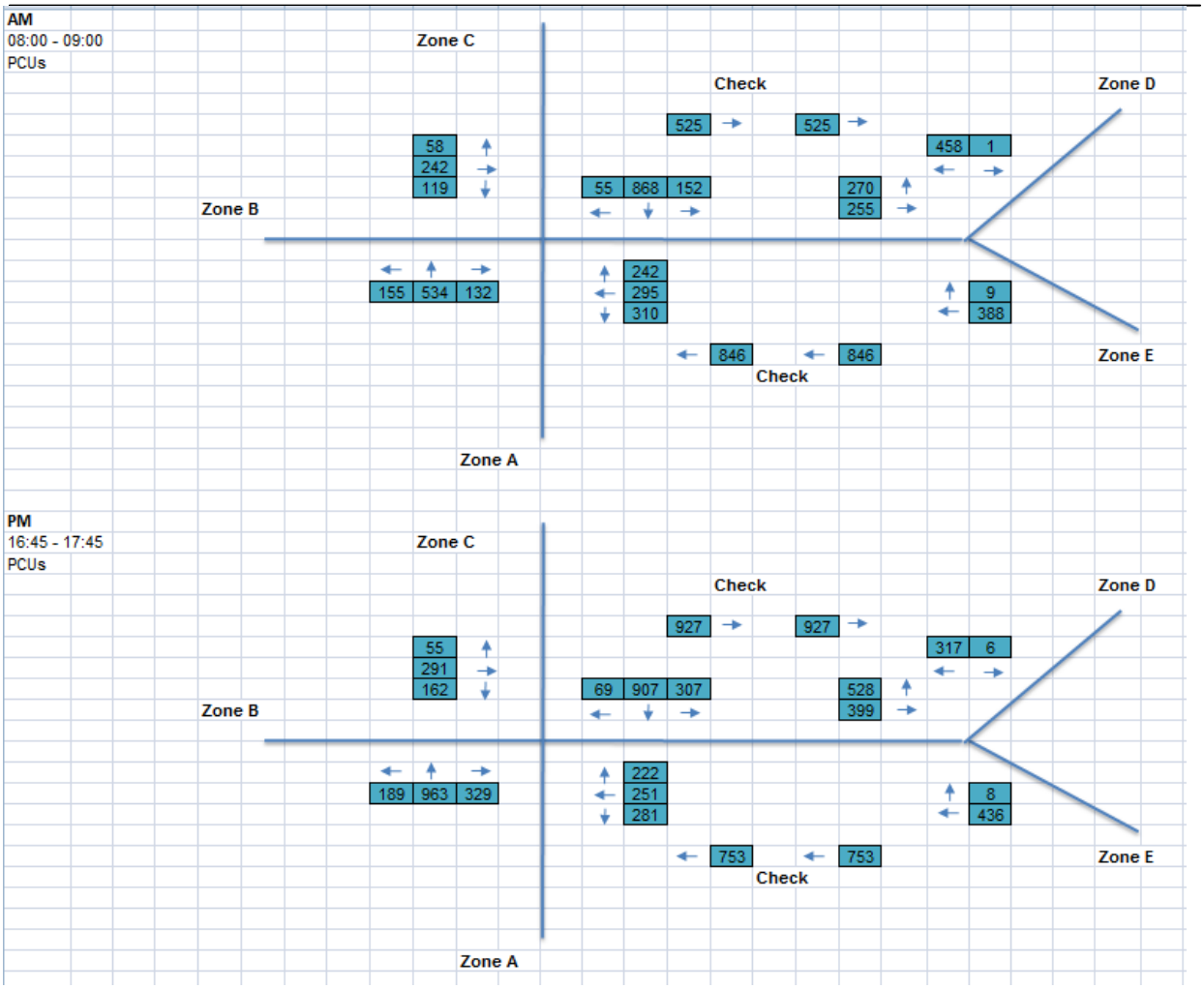

Figure 7: Base Flows Plus Development Trips (PCU Values)

Impact of Development Traffic on Altway/Aintree Lane

The first stage of assessing the potential impact of development traffic is to determine the available storage space on Aintree Lane for vehicles turning right out of Altway. It is reasonable to assume that in every cycle the full length of the reservoir is available. This is because the 6 seconds phase delay on Phase D provides an additional 6 seconds of green time to allow for the last car passing the Phase J stop line to also clear the Phase D stop line unopposed. Since the distance between the stop lines is approximately 42 metres, this means that assuming vehicle speeds of around 20 mph (8.3 m/s) are achievable, 6 seconds is more than sufficient to allow the last car to clear the Phase D stop line. Hence, it is reasonable to assume that the observed queues on Aintree Lane at the Phase D stop line are likely to be from traffic that has turned right out of Altway.

The layout of the junction and the staging arrangement of the traffic signal operation mean that vehicles tuning right out of Altway can only do so when there is an adequate gap in the traffic along Aintree Lane. During each peak hour, these gaps occur when westbound traffic is held by the advance stop line and eastbound traffic is delayed by an intergreen period between signal stages. Based on a review of the signal staging information as presented in Figure 3, this indicates that there are gaps present in the intergreen periods between Stage 5 and Stage 1, and between Stage 1 and Stage 2.

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The average observed queue on Altway was 4 PCU in both the AM and PM peak hours. Since the average queue is the same in both peaks but demand flow on Altway is lower in the PM peak, this implies that there are fewer gaps available during this period. Assuming there is no change in gap acceptance behaviour of drivers that would increase or decrease the effective capacity of Altway in the 'with development' scenario, the impact of development traffic can be expressed as the total additional development traffic divided by 12 (the number of times each queue was recorded in the survey period), to calculate the number of development trips arriving at Altway in each five minute period, and this assumes an even distribution of development trips over the peak hours.

The development is estimated to increase the demand flow on Altway by 97 PCU in the AM peak and 56 PCU in the PM peak. This indicates that based on the current operation of the junction, the development traffic is likely to increase the length of queue on Altway by approximately 8 PCU in the AM peak, and 5 PCU in the PM peak. However, as suggested earlier, it is expected that there is some unused storage capacity within the reservoir on Aintree Lane which could accommodate some of the additional development trips, thereby reducing the potential queue lengths on Altway.

Impact of Development Traffic on A59 Ormskirk Road / Copy Lane / Aintree Lane
Using the same methodology, the impact of development traffic on each arm of the main signalised junction can also be estimated.

The impact of development traffic on the Ormskirk Road northbound approach will be on the right turn lane. This experienced an average queue of 2 PCU in the AM peak, and 12 PCU in the PM peak. The addition of development traffic represents an increase in demand of 20 PCU in the AM peak and 51 PCU in the PM peak. Based on the current operation of the junction, the development traffic is estimated to increase the length of queue on the Ormskirk Road northbound right turn lane by approximately 2 PCU in the AM peak, and 4 PCU in the PM peak.

On the Ormskirk Road southbound approach, the impact of development traffic will be on the left hand (inside) lane. This lane experienced an average queue of 13 PCU in the AM peak, and 28 PCU in the PM peak. The addition of development traffic represents an increase in demand of 10 PCU in the AM peak and 26 PCU in the PM peak. Based on the current operation of the junction, the development traffic is estimated to increase the length of queue on the inside lane of Ormskirk Road southbound by approximately 1 PCU in the AM peak, and 2 PCU in the PM peak.

On Copy Lane, since the approach is a single lane with a short flared section, the addition of development traffic will represent an increase in the longest observed average queue length, which was 10 PCU in the AM peak and 16 PCU in the PM peak. The addition of development traffic represents an increase in demand of 5 PCU in the AM peak and 13 PCU in the PM peak. Based on the current operation of the junction, the development traffic is estimated to increase the length of queue on Copy Lane by less than 1 PCU in the AM peak, and by approximately 1 PCU in the PM peak.

Analysis
The calculations above show that the impact of the development traffic on the main signalised junction with Ormskirk Road will be spread across three arms rather than concentrated on one approach. The main impact in terms of additional trips will be on Altway, particularly in the AM peak. However, analysis of the green time utilisation of traffic on Altway suggests that there is additional spare capacity on this arm which is not currently being realised.

There is one main period during each cycle when traffic can turn right out of Altway, that being during the 6 second phase delay period between Phase J and Phase D changing to red, as well as the 5

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second intergreen period between Phase D and Phase E at the end of Stage 3. This provides a period of around 11 seconds in each cycle when traffic should be able turn right out of Altway unopposed.

However, as well as this 11 second period, traffic can also potentially exit Altway in the intergreen periods between Phase E to Phase B at the end of Stage 5 (6 seconds) and Phase B to Phase C at the end of Stage 1 (5 seconds), although in these instances the actual gap available will be between the last vehicle from one phase clearing the Altway junction and the first vehicle from the next phase arriving at Altway. Hence a manual correction must be made to the intergreen periods to account for the various cruise times. The cruise time is the length of time it takes a vehicle to travel from a stop line to the point at which it clears the junction.

Assuming an average speed of approximately 25 mph (11 m/s, representing the fact that traffic is accelerating away from standstill), this gives cruise times from each stop line to Altway as follows:

- Phase B = 7 seconds.
- Phase C = 9 seconds.
- Phase E = 8 seconds.

This gives a total potential gap between:

- Phase E and Phase B of 5 seconds.
- Phase B and Phase C of 7 seconds.

In total, this represents a potential 'green time' for Altway traffic of approximately 23 seconds per cycle.

The saturation flow of a lane at a junction is the maximum flow of PCUs that can pass the stop line during the green period assuming there is a continuous queue during that period, in other words the maximum number of PCUs that can be discharged from a lane. The discharge rate is the time it takes for a PCU to pass the stop line, and is calculated from the time period divided by the saturation flow. The standard saturation flow for a give-way right-turn lane at a signalised junction, as used as the default setting in the LinSig junction modelling software, is 1,439 PCU/hr. If this saturation flow is assumed for Altway, this gives a discharge rate of 2.5 seconds per PCU. If there is a potential 'green time' of 23 seconds per cycle, and 37.5 cycles per hour, this gives a total potential 'green time' of 862.5 seconds per hour. With a discharge rate of 2.5s/PCU, this means a potential maximum of 345 PCU/hr can discharge from Altway before a queue is formed. Since this is roughly equivalent to the current demand flow in the AM peak, and greater than the current demand flow in the PM peak, and yet there is currently queuing on Altway, this indicates that there are potentially more gaps available for traffic to exit Altway than are currently being utilised. As such, it is considered that there is potential to ease the impacts of development traffic at the existing junction on the Altway approach if this spare capacity can be utilised.

The first improvement to try to utilise this spare capacity should be to look at a minor alteration of signal timings to allow more green time to Altway. However, care should be taken with this approach not to adjust the timings such that it detrimentally impacts on the other arms of the junction.

Another suggested way to regulate and increase the usage of gaps would be to signalise Altway and link it to the main signalised junction. This would require a new signal head on Altway and one on Aintree Lane eastbound. If the Altway signal was phased to turn green when the existing Phase J turned to red, and then run to Stage 5, this could provide around 20 seconds of green time. A short secondary green period could also be linked to Phase C, which could conceivably provide an additional 5 seconds of green time, for a total of 25 seconds per cycle.

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One possible drawback of formally signalising Altway is that the amount of queuing could increase as a result of traffic being stationary when the traffic light is on red, although it should be noted that the overall amount of green time that would be potentially available with this mitigation is greater than the amount currently being used. In addition, by stopping traffic travelling eastbound on Aintree Lane this could result in traffic queuing back into the main junction. However, there is sufficient storage on Aintree Lane for around 7 PCUs, and the traffic survey suggests that even with the addition of development traffic there will only be around 4 PCUs per cycle turning right from Ormskirk Road into Aintree Lane in the AM peak, hence there is unlikely to be an issue with vehicles blocking back into Ormskirk Road. In the PM peak there will be around 9 PCUs per cycle turning right, however in this period the demand flow on Altway is lower, therefore the green period for Altway could be shorter in order to mitigate against the likelihood of vehicles queuing back onto Ormskirk Road.

It should be noted that the above assessment represents a modelling assessment of the A59 Ormskirk Road / Copy Lane / Aintree Lane / Altway junction operation based on queuing observations and signal data, which provides a good indication of the development impacts in terms of additional queuing but is not based on validated base junction modelling using empirical software.

Summary

AECOM has undertaken initial junction modelling of the A59 Ormskirk Road / Copy Lane / Aintree Lane / Altway signal junction as part of the accessibility appraisal for the proposed residential development on land at Oriel Drive in Aintree, and in conjunction with the evidence from SMBC with regard to the transport issues referred to for not releasing the site (S157) for development.

This technical note has set out an initial junction modelling assessment of the A59 Ormskirk Road / Copy Lane / Aintree Lane / Altway junction, with the objective of providing an indication of the potential impact of a proposed development of approximately 350 residential dwellings on the operation of the junction.

The assessment showed that based the on average queue observations at five minute intervals on the approaches to the main Ormskirk Road / Copy Lane / Aintree lane junction in the peak hours, the effects of development traffic when distributed evenly across the periods would not significantly increase the lengths of these queues. The main impact is likely to be on Altway in the AM peak, when there is the greatest concentration of traffic departing from the development site.

The Altway arm of the Aintree Lane / Altway junction is currently priority controlled, with gaps in the westbound traffic on Aintree Lane provided by a signalised stop line that holds traffic back to allow vehicles to turn right out of Altway. The preliminary assessment and calculations indicate that there is potentially more capacity in the junction to allow this movement than is currently being utilised, and as such it is considered that this could ease the impacts of development traffic at the existing junction on the Altway approach if this spare capacity can be utilised, to minimise additional queuing. One way of achieving this could be by signalising Altway, as the analysis of the junction operation suggests that this could facilitate the realisation of some of the theoretical green time that exists within the existing staging and phasing plan for vehicles using the Altway arm.

The other limiting factor in accommodating any additional traffic on Altway is the capacity of the storage reservoir on Aintree Lane. The reservoir can store a maximum of 450 PCUs per hour, assuming an equal distribution of traffic in each lane, however the observed queue lengths indicate that not all the available storage capacity is currently being used. Therefore there is potential for greater usage if more traffic was exiting Altway, particularly because the development trip distribution shows that the majority of development traffic is likely to use the left-turn lane, which currently has the most unused storage

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capacity based on the observed queues This also demonstrates that there could be some storage capacity within the reservoir to accommodate development traffic.

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