


Traffic and Highways Report

Land off Foxlydiate Lane, Webheath, Redditch

Heyford Developments Ltd

26 October 2010



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1 Introduction

Halcrow Group Ltd has been commissioned by Heyford Developments Ltd to produce a report to present the opportunities associated with development of land off Foxlydiate Lane in Redditch.

This report considers how local public transport, the sustainable transport network and highway network is able to support this development.

1.1 Background

The proposed development site is located approximately three kilometres to the west of Redditch town centre, on the administrative boundary between Redditch Borough and Bromsgrove District.

The site is bounded by the A448 Bromsgrove Highway to the north, Foxlydiate Lane to the east and Curr Lane to the south. The site extends to provide 41 hectares of developable land. The site could provide up to 1,400 residential units and associated land uses.

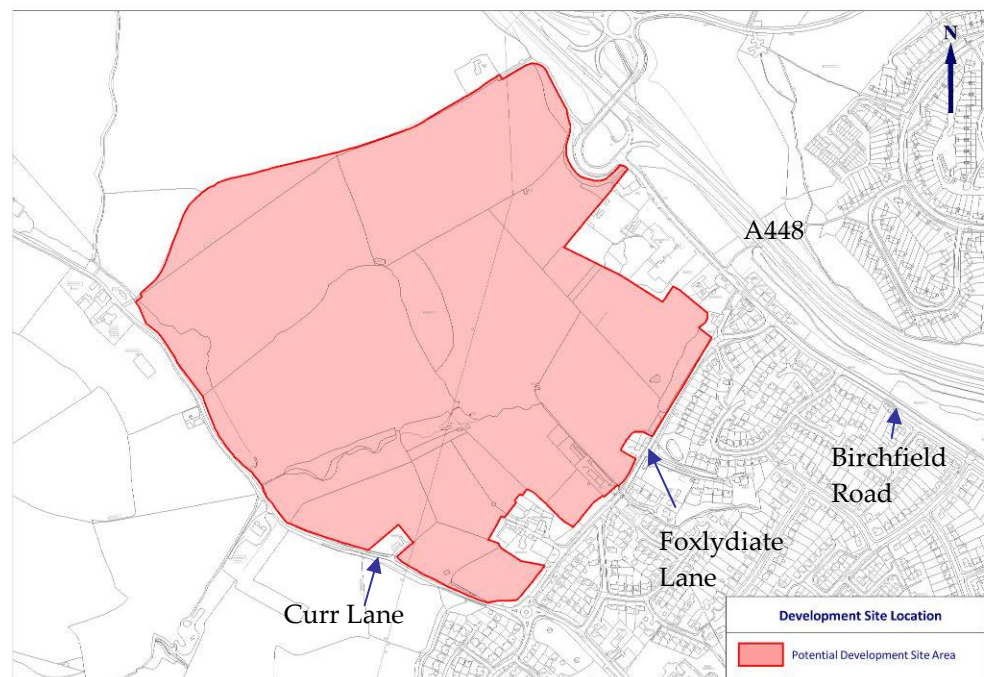


Figure 1.1 – Site Location

2 Sustainable Transport Network

2.1 Introduction

The development site is located to the south of the A448 Bromsgrove Highway, on the west side of the Redditch urban area. The A448 provides access into Redditch town centre and North Redditch to the east and Bromsgrove, the M42 and the M5 to the west. The site is fully accessible to local amenities and the town centre, which is within an acceptable travel distance by sustainable and 'private car' modes.

This section of the report outlines the sustainable transport network that serves the site.

2.2 Pedestrian Access

The site has a good level of access to the local footpath network, with bridges and subways providing links across the A448 Bromsgrove Highway. The local roads are relatively lightly trafficked, which makes for pleasant and safe passage to local amenities.

The local nursery is 1.2km from the site, adjacent to the local shop. The local dentist is only a 5 minute walk from the site.

Two local primary schools on the Webheath estate are only a 12 minute walk (850m) from the edge of the site, and crossing wardens are present to aid parents and children. Schools to the north of the A448 are only a 1.3km walk from the site, via subways or bridges.

2.3 Cycle Access

The WCC Local Transport Plan 2 indicates that the standard length of cycle journey is 5km. Furthermore PPG 13 states that cycling has the potential to substitute short car trips, particularly those less than 5km and forming part of a longer journey by public transport.

The site is less than 500m from National Cycle Network Route 5, which connects the site to the local primary schools, the doctor's surgery, the Pitcheroak Secondary School, North East Worcestershire College, and Trinity High School.

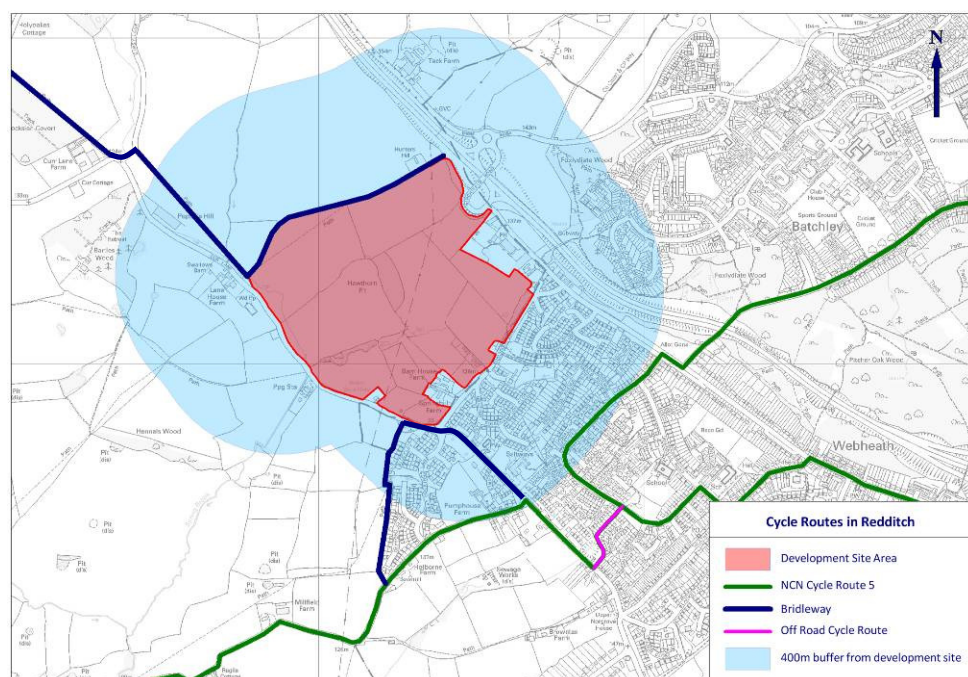


Figure 2.1: Existing cycle access

Church Road has been identified as a Redditch area cycle route; this provides a direct connection from the development site to the National Cycle Network. A bridleway also crosses the site from the A448 junction with Birchfield Road to Curr Lane.



The Colleges and sixth form centres are located in, or on the way to, Redditch town centre, as is the Railway Station. This is only a 10 minute (2.4km) cycle ride, which means that all retail, education, primary health amenities and most employment in Redditch is within standard cycle distance of the site.

Census (2001) Journey to Work data suggests that around 2% of people who live to the west of the town cycle to work. Only 5km from the site is a large employment area in Redditch including Alexandra Hospital. It is therefore considered that both healthcare and employment is accessible from the site by bicycle.

It can be concluded that the site is within a reasonable cycle journey of healthcare, retail, education and employment uses within Redditch, and, in accordance with PPG13, is within a viable multi-modal journey of Redditch Railway Station.

2.4 Public Transport

The site is directly served by 13 buses per hour providing a 20 minute bus journey to Redditch. Buses connect the site with Redditch Railway Station (a 2.5km walk), which provides two services an hour into Birmingham New Street, on the Cross City line.

The site is located directly adjacent to Foxlydiat Lane and Birchfield Road, which are served by the 68, 143 and 343, and Foxlydiat Crescent, served by the 50 and 51. Within 800m walk of the site there are at least 13 buses an hour providing a 10 minute journey time into the centre of Redditch, and the Railway Station.

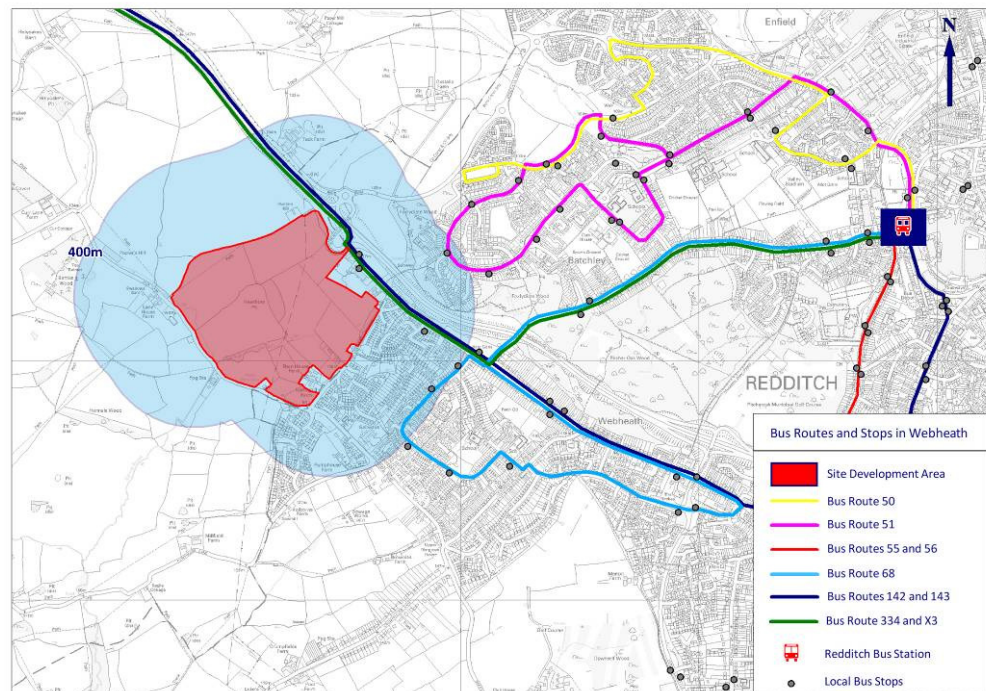


Figure 2.2: Existing bus access

The 50 and 51 run from Foxlydiat Crescent, seven minutes (600m) walk away, to provide ten buses per hour into Redditch, with an on-bus journey time of ten minutes. The 68 provides three buses per hour from Tynsall Avenue (500m) providing less than a ten minute journey time into Redditch.

The S69 service provides a 20 minute journey on a school bus from the site to Ridgeway Middle School. There are also less frequent services that connect the site to Bromsgrove and Birmingham – 143 and 334 hourly (250m away).

A number of services connect the bus station to Alexandra Hospital, with a ten minute journey time. It is anticipated that the journey time to the hospital from Foxlydiat could be as little at 20 minutes and at the most, 60 minutes.

The site is within a short bus journey of schools, colleges, GP surgeries, shops, the Railway Station, jobs and the hospital. Census reports that 7% of local people choose to catch the bus to work.

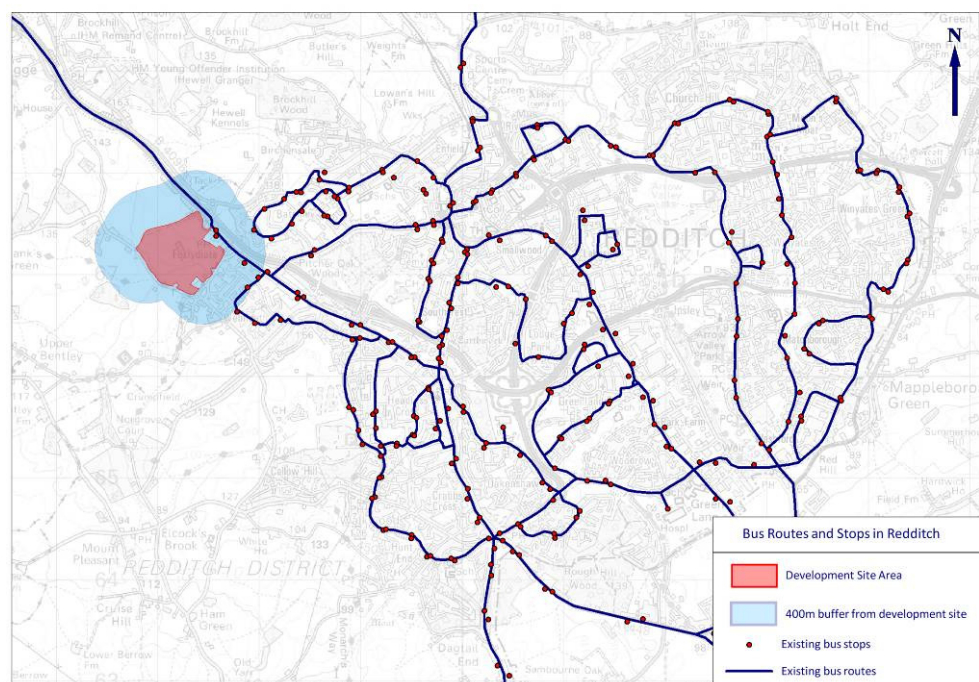


Figure 2.3: Existing bus services within Redditch

There are half hourly train services from Redditch Railway Station into Longbridge, University (Queen Elizabeth Hospital), Birmingham New Street and beyond. The station is located close to the town centre and bus station and provides over 150 car parking spaces.

The Railway Station is a ten minute cycle or bus ride away from the site (2.5km), which is within the acceptable catchment area of the station. This is further reinforced by PPG 13, which states that cycling has the potential to substitute short car trips, particularly those under 5km and form part of a longer journey by public transport. Census 2001 reports only 1% of local people use the railway to travel to work.

2.5 Opportunities

The proposed site will be designed to be permeable, and safe crossings of local roads will be provided where appropriate to remove severance to local facilities. The walk routes to local schools, which are already convenient and mostly along lightly trafficked routes, can be improved to deliver safer journeys for children and parents.

The development site could provide a local centre, accommodating shops, nurseries and healthcare, which would reduce the need to travel outside of the site, and encourage more sustainable short journeys.

Signed cycle routes can be provided within the site and the connection to National Cycle Network Route 5 could be improved, providing safer routes to schools, college, Redditch town centre and the Railway Station.

A new bus service (or an enhancement of an existing service) could be provided, to penetrate the Foxlydiate site, serving the Webheath estate, and the Webheath ADR land, connecting to Redditch town centre and all the schools on the north side of the A448. Gold and Silver standard bus shelters will be provided in the locality to

improve the waiting environment for passengers. This could potentially bring enhanced accessibility for future and existing residents of the area.

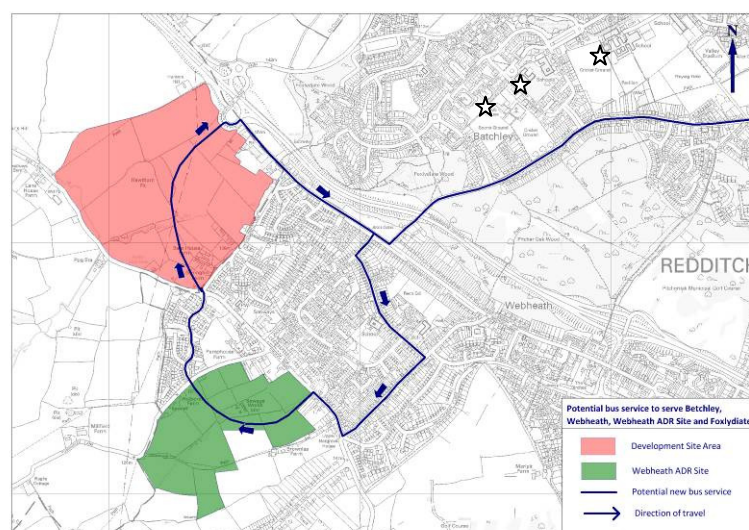


Figure 2.4: Proposed new service (linking new developments in Webheath)

Access to the Railway Station will also be improved by the new bus service and connection to NCN Route 5.

2.6 Summary

The site is ideally located for walk journeys to schools and shops. Walk routes are generally pleasant, safe and lightly trafficked. The site will be designed to be permeable and will provide amenities on site to encourage shorter and more sustainable journeys, whilst also reducing the need to travel.

The site is ideally located for journeys to local schools, jobs, healthcare, colleges, Redditch town centre and the Railway Station. The existing facilities will be significantly enhanced by providing connections into the important National Cycle Network, which passes the site and by having a site layout that is sustainable by design.

The site provides access to healthcare, employment, retail, educational and leisure facilities within 30-60 minutes using a conventional bus. The site is within reach, but not ideally located in relation to the local high frequency bus services. Therefore a bus can be provided to complement these services and permeate the site to ensure that occupiers will be within 250m of a stop. Stops will be provided to a high standard.

The site benefits from its good connections to the Railway Station, which is only ten minutes away by cycle or by bus.

Opportunities to improve the sustainable access of the site include: a new (or enhanced) bus service linking new developments within Webheath to Redditch Town Centre and Railway Station; signed cycle routes to NCN 5 and potentially providing a local centre within the development to improve access to amenities by foot and cycle, as well as reducing the need to travel.

3 Local Highway Network

3.1 Introduction

Redditch is well served by a network of high quality strategic roads including the A435, A441 and A448. These roads are free flowing and are rarely subject to significant delays or congestion. This means that roads off the A448, such as Birchfield Road adjacent to the site, do not suffer the effects of through traffic like other towns in the county. The observed traffic conditions confirm the LTP2 (Worcestershire Local Transport Plan 2, 2006-2011) assertion that there are relatively few problems relating to traffic congestion.

The A448 Bromsgrove Highway provides the site with excellent connections to Redditch, Bromsgrove, Stratford, Evesham and the Strategic Road Network. There are no congestion problems on this de-restricted dual carriageway road, and it is observed that the junction to this development has the capacity to cater for development in the area. The development is therefore ideally located on the periphery of Redditch in order to benefit from the existing highway network.

Foxlydiate Road, Church Road and Heathfield Road provide distributor network for this development at Foxlydiate. These routes are between 5.5m and 6.5m, with driveway access, and parking along their length.

Access to the town centre and beyond is good with free flowing routes via the A441 Alvechurch Highway, Bromsgrove Road, and the B4184 Brockhill Drive.

3.2 Existing Highway Network

The current highway network adjacent to the site is shown in Halcrow drawing no: CTB-AOE-0001 (**Appendix C**). The site is bounded to the north-west by the elevated A448/Birchfield Road overbridge and to the east by Foxlydiate Lane. The configuration of the over-bridge and the proximity of the A448/Birchfield Road priority junction are constraints to providing access to the site in this location without modification of the layout.

3.3 Traffic Surveys

Traffic surveys were undertaken at three junctions adjacent to the site (September 2010) in order to establish current traffic flows on the network. This data forms the background for future development traffic flow calculations and modelling. Figure 3.1 overleaf illustrates the location of the surveyed junctions.

Table 3.1 summarises the traffic flows for the morning peak period (08:00 – 09:00; these flows have been reported as they are higher than the PM peak flows. Full disaggregated traffic flows (for AM and PM periods) are available in **Appendix A**.

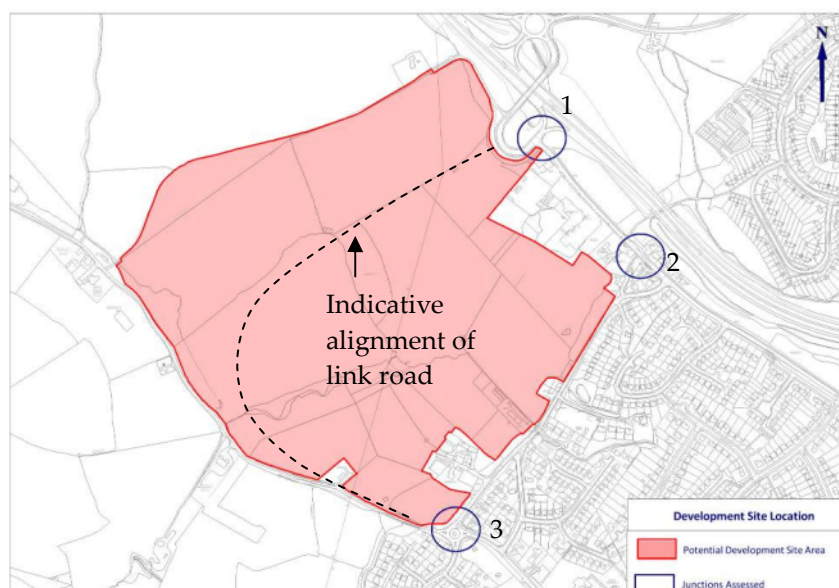


Figure 3.1: Junction locations for traffic surveys

It has been observed that there are currently no congestion issues regarding the three junctions surrounding the development site, and all junctions operate within capacity.

Road	Survey Flow
Junction One	
Birchfield Road (to A448 W/bound)	167
Birchfield Road	364
Birchfield Road (to A448 E/bound)	581
Total	1112
Junction Two	
Birchfield Road (East)	272
Foxlydiat Lane	147
Birchfield Road (West)	284
Total	703
Junction Three	
Foxlydiat Lane	86
Church Road	101
Great Hockings Lane	81
Curr Lane	32
Total	300

Road	Survey Flow
Junction Four (new junction – for comparison)	
Birchfield Road (to A448 E/bound)	581
Birchfield Road (to A448 W/bound)	383
Development Link Road	0
Development Access	0
Total	964

Table 3.1: Background traffic flows (AM peak – 08:00 – 09:00)

3.4 Accident Analysis

An accident analysis has been undertaken for the key links and junctions adjacent to the site using data obtained from Worcestershire County Council for the past five years (2005 – 2010). The data shows that twelve reported accidents have taken place during the review period. Full details of the accident data can be found in **Appendix B**.

Ten of these accidents were slight, one serious and one was fatal. Figure 3.2 illustrates the location and severity of these accidents. When investigating the causation factors of these accidents, no accidents were caused by the same factor.

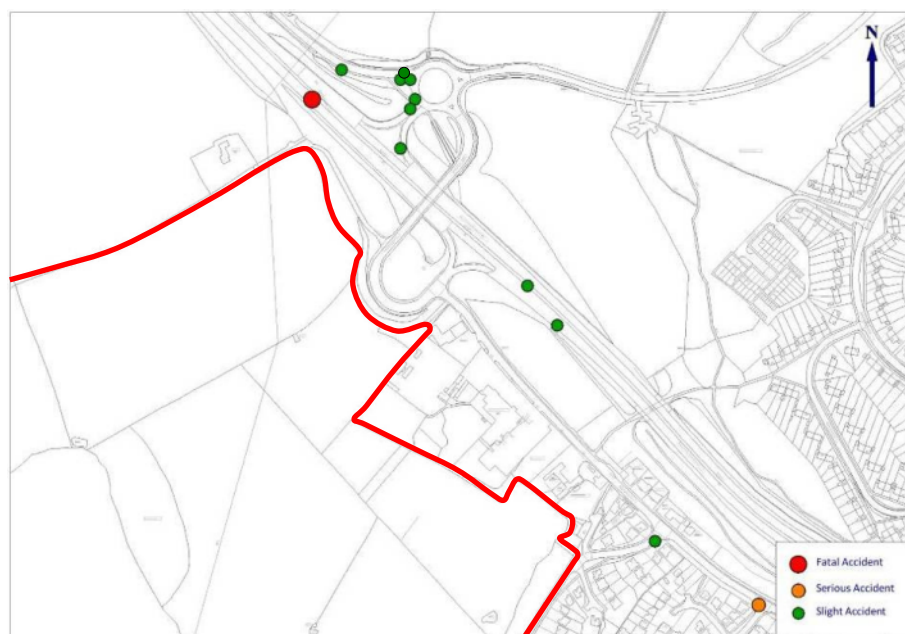


Figure 3.2: Accidents within the vicinity of the development site (past five years)

Table 3.2 provides further details of the accidents that occurred within the survey period, 2005 – 2010. It shows that although several of the slight accidents on the B4096 junction were shunt incidents, no two factors resulting in the accidents were the same. The serious incident was caused by low sun obstructing the driver's view of the road and the fatal accident was between a vehicle and a pedestrian crossing the A448.

Table 3.2: Accident survey data (2005 – 2010)

Type	Location	Causation Factor
Fatal	A448 (eastbound) near junction with B4096	Vehicle collided with pedestrian
Serious	Birchfield Road, junction with Reynard Close	Vehicles 1 & 2 travelling toward each on opposite sides of carriageway, for unknown reason Vehicle 1 travelled into opposite side of carriageway and collided with Vehicle 2.
Slight	Birchfield Road, junction with Foxlydiate Lane	Low sun blinded driver, collision with vehicle in opposite carriageway.
Slight	A448 (eastbound), approx 160m south-east of junction with Birchfield Road.	Icy road surface, vehicle collision (2 vehicles involved)
Slight	A448 (eastbound), approx 90m south-east of junction with Birchfield Road.	Icy road surface – vehicle leaves carriageway (nearside) into trees.
Slight	B4096 Hewell Lane RBT, junction with B4184 Bromsgrove	Vehicle 1 stops for traffic, struck in rear by Vehicle 2.
Slight	B4096 Hewell Lane RBT, junction with B4096 Birchfield Road	9-year passenger not fitted with seatbelt; driver not paying attention – brakes suddenly and passenger hurts head.
Slight	B4098 Hewell Road, approx 65m from junction with B4184	Vehicle 1 loses control on bend due to icy road, crosses paths with Vehicle 2 travelling in opposite direction.
Slight	A448, junction with B4096 Hewell Lane	Vehicle 1 loses control entering traffic island
Slight	B4096 Hewell Lane, junction with B4184	Vehicle 1 indicated right onto A448, Vehicle 2 followed closely and undertook Vehicle 1 on left – collided with nearside of Vehicle 1.

3.5 Mode split and existing traffic distribution

Journey to Work (Census 2001) data has been analysed to understand the current mode split of residents from the residential areas adjacent to the site. This information will be used to inform the assumptions made for the mode split and distribution of development traffic. Table 3.3 outlines the mode split of the residential areas surrounding the development site.

Table 3.3: Current mode split

Mode	Percentage
Rail	1
Bus	6.5
Walking	8
Cycling	1.5
Car (Drive)	75
Car (Passenger)	7
Motorcycle	1

The census data has also been plotted in GIS to understand the origin/destinations of work trips. The data indicates that 52% of residents work within Redditch; 19% of which work in Redditch (south of the A448) in areas around the Hospital, Park Farm and Washford; the other 33% of people work in Redditch north of the A448, which includes Redditch town centre. 48% of people work outside of the Redditch area.

3.6 Proposed Access Strategy

The proposed access strategy for the site will provide two access points; the first formed at the A448/Birchfield Road over-bridge via a new four-arm roundabout; the second via a new link to Curr Lane. The proposed access arrangements are shown in Halcrow drawing no's: CTB-AOE-0002, CTB-AOE-0003 and CTB-AOE-0004 (**Appendix C**). It should be noted that the alignment of the link road is indicative only at this stage; this will be subject to refinement during detailed design.

The access arrangements have been designed in accordance with the relevant design guidance and incorporate the following features:

- Re-alignment of A448/Birchfield Road carriageway to the south of the A448 to link to a new four-arm roundabout approximately 40 metres in diameter.
- Roundabout has been designed in accordance with DMRB TD16/07 "Geometric Design of Roundabouts".
- Residential Distributor Road connecting new A448 roundabout with Curr Lane. Link design provided in accordance with Worcestershire County Council's "Highway Design Guide for New Developments".
- Re-alignment of Curr Lane to connect with Residential Distributor Road at new priority junction. New junction designed in accordance with TD 92/95 "Geometric Design of Major/Minor junctions".
- Relevant earthworks have been identified and these are based upon a 1:2 slope.

It is anticipated that the provision of a new distributor road from the A448 to Curr Lane may lead to a re-assignment of background and other future development traffic, from lower grade local roads such as Foxlydiate Road, Church Road and Heathfield Road.

3.7 Stage One Road Safety Audit

Road Safety Audits provide an evaluation of highway improvement schemes during design and at the end of construction to identify potential road safety problems that may affect any users of the highway and to suggest measures to eliminate or mitigate these problems.

The preliminary design for the proposed access arrangements is shown in Halcrow drawing no: CTBAOE-OO2 (**Appendix C**). In accordance with the guidance set out in the Design Manual for Roads and Bridges (DMRB), Volume 5, Section 2, HD19/03, a Stage One Road Safety Audit has been undertaken. The primary purpose of the audit is to identify any road safety issues which may require mitigation. This is important as it allows all land requirements to be identified at this early stage, thus it can be demonstrated that a safe junction can be provided without a requirement for third party land.

A full copy of the Road Safety Audit is provided in **Appendix D**, a summary of the issues raised is provided below:

- Space for safety fencing on northern roundabout: As the proposed road is to serve a residential development, the roundabout is likely to have a footway behind the kerb lines. The roundabout is situated on a high embankment and thus vehicular safety fencing is likely to be required behind the footway.
- Severe entry deflections on northern roundabout: The SW, NW and NE entry arms have severe entry deflections without any transitional curve between the entry straight and entry radius. The driven entry reflection is much lower than 100m (the allowable maximum). The alignments approaching the roundabout are fairly straight and could permit high speeds. These arrangements could lead to loss of control type accidents.
- Potential for shunt accidents at new Curr Lane junction: The “T” junction is located mid-way around the 80m radius curve and could lead to southbound shunt accidents into vehicles waiting to turn right onto Curr Lane.

The Designer’s response to the issues raised is summarised below:

- Space for safety fencing on northern roundabout: Problem accepted - provision for footway and safety fence to be incorporated in detailed design.
- Severe entry deflections on northern roundabout: Problem accepted – alignments to be repositioned in detailed design.
- Potential for shunt accidents at new Curr Lane junction: Problem accepted – AADT flows to be interrogated to decide upon form of junction.

It is clear from this process that all issues raised can be incorporated within the detailed design, thus at this stage there are not considered to be any highway safety reasons which would preclude the implementation of this junction.

3.8 Summary

Currently there are no capacity issues regarding the three junctions surrounding the development site, with all junctions working within their capacity. Access to

Redditch town centre and beyond is good with free flowing routes via the A441 Alvechurch Highway, Bromsgrove Road, and the B4184 Brockhill Drive.

This section has also presented the proposed access vehicular access strategy for the site which comprises two new access points and the provision of a link road between the A448 and Curr Lane.

The scheme has been designed in accordance with the relevant design criteria and a Stage One Road safety Audit has also been undertaken. It has been demonstrated that access to the site can be provided which is safe, in accordance with the relevant design guidance, and without the need for third party land.

4 Traffic Impact Assessment

4.1 Introduction

This section of the report sets out the methodology used for the calculation of the traffic flows used in the traffic modelling. A summary of the junction capacity assessments undertaken to establish the predicted future operation of the site access points and other junctions immediately adjacent to the site, is also provided.

4.2 Baseline Traffic Flows

The background traffic flow data for the three adjacent junctions has been growthed to account for potential development growth on the network. A 10% increase in traffic has been assumed, this is considered to represent a worst case position as TEMPRO local growth suggests only an increase of 6.6% between 2010 and 2020.

The development will be accessed from at least two points on the local highway network. Principally, access will be gained from a modified A448 junction with Birchfield Road (Junction 4). Secondary access will be gained from Curr Lane, via a new link to the modified A448 junction with Birchfield Road.

As a result of the new junctions, baseline flows have been redistributed to account for the new junction with the A448 and the link road through the development. It is considered that at least 50% of the existing traffic on Foxlydiat will reassign via the new link road.

The growth and reassignment of traffic has resulted in revised traffic flows, which provide a robust baseline for modelling purposes.

Table 4.1 outlines the revised baseline traffic flows for all three original junctions, as well as the new A448 junction with the development. **Appendix A** provides full AM and PM peak traffic flow calculations and outlines the assumptions used.

Table 4.1: Baseline traffic flows (AM peak)

Road	Survey Flow	Baseline Flow
Junction One		
Birchfield Road (to A448 W'bound)	167	184
Birchfield Road	364	360
Birchfield Road (to A448 E'bound)	581	642
Total	1112	1186
Junction Two		
Birchfield Road (East)	272	299
Foxlydiat Lane	147	122
Birchfield Road (West)	284	278
Total	703	699

Road	Survey Flow	Baseline Flow
Junction Three		
Foxlydiat Lane	86	61
Church Road	101	111
Great Hockings Lane	81	89
Curr Lane	32	69
Total	300	330
Junction Four (new junction)		
Birchfield Road (to A448 E/bound)	581	656
Birchfield Road (to A448 W/bound)	383	438
Development Link Road	0	40
Development Access	0	0
Total	964	1135

4.3 Development Trip Generation

In order to calculate the vehicular demand from the development site, residential trip rates were calculated using the TRICS database. Appropriate selection parameters were used to ensure the trip rates were comparable for the type of development proposed in terms of its location. Assumptions included:

- Sites located outside of London;
- Sites located on the edge of town; and
- Residential houses – privately owned.

This selection provided eleven sites for calculations, average AM and PM peak trip rates were extracted and these are summarised alongside the trip generation in Table 4.2 below. Full TRICS outputs are contained within **Appendix E**.

Table 4.2: Trip rates and vehicle trips for the development

	AM		PM	
	Arrivals	Departures	Arrivals	Departures
Trip Rate	0.153	0.465	0.44	0.256
Vehicle Trips	214	651	616	358
<i>Total Vehicle Trips</i>	865		974	

4.4 Development Traffic: Trip Distribution

The development will be accessed from at least two points on the local highway network; the modified A448 junction with Birchfield Road and from Curr Lane, via a new link running through the development to the modified A448 junction with Birchfield Road.

Journey to Work data (Census 2001) for the surrounding residential areas provides the destinations of commuting trips for local residents. This data has been used to establish the distribution of development traffic. Table 4.3 provides a summary of the distribution, **Appendix F** contains the full Journey to Work data.

Table 4.3: Distribution of development trips

Destination	Percentage Distribution
Redditch (North, includes town centre)	33%
Redditch (South, includes hospital)	19%
Birmingham and North	19%
M5 North	4%
Bromsgrove, Worcester and South West	12%
M40, M1 and South	13%

Figure 4.1 illustrates the assignment assumptions, which feed into the traffic flow calculation sheets (**Appendix A**).

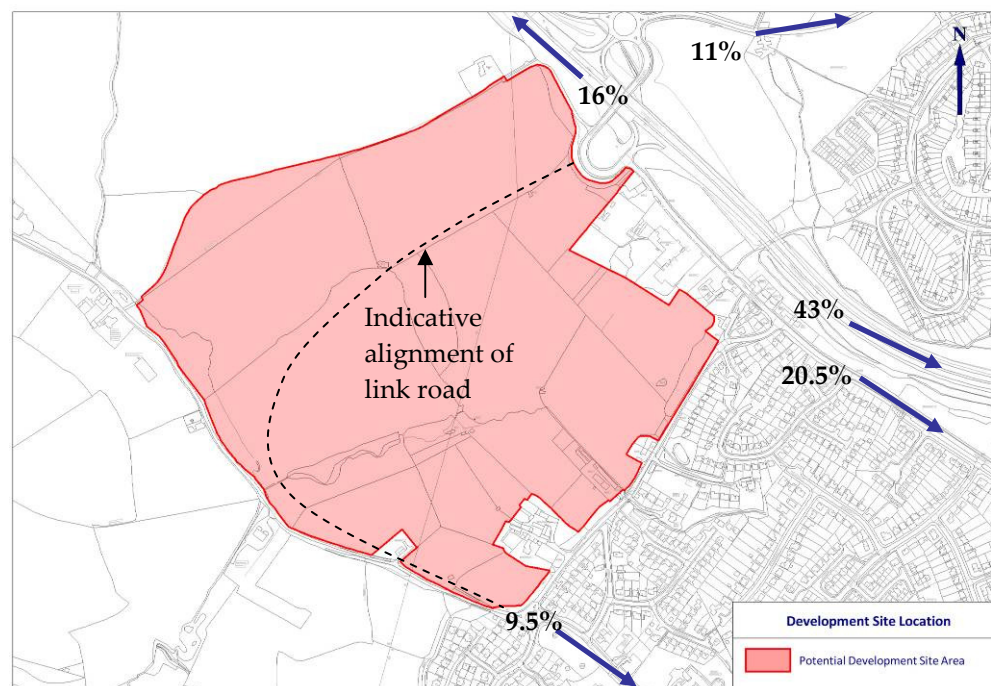


Figure 4.1: Distribution of development trips

Within the development it has been assumed that 30% of the development will be accessed directly from the fourth arm of the modified A448 junction, with the remaining 70% accessed via the link road (A448 to Curr Lane).

In order to be able to assess if the new A448 junction, as well as the existing junctions will accommodate the baseline and development traffic, traffic flows have been calculated in line with methodology outlined in this section. A summary of these flows can be found in Table 4.4 below, with further detailed calculations in **Appendix A**.

Table 4.4: Baseline plus development traffic flows

Road	Survey Flow	Baseline Flow	Baseline + Dev Flows
Junction One			
Birchfield Road (to A448 W'bound)	167	184	276
Birchfield Road	364	360	398
Birchfield Road (to A448 E'bound)	581	642	860
Total	1112	1186	1534
Junction Two			
Birchfield Road (East)	272	299	343
Foxlydiat Lane	147	122	141
Birchfield Road (West)	284	278	392
Total	703	699	876
Junction Three			
Foxlydiat Lane	86	61	67
Church Road	101	111	131
Great Hockings Lane	81	89	89
Curr Lane	32	69	151
Total	300	330	438
Junction Four (new junction)			
Birchfield Road (to A448 E/bound)	581	656	714
Birchfield Road (to A448 W/bound)	383	438	568
Development Link Road	0	40	447
Development Access	0	0	195
Total	964	1135	1924

4.5 Junction Capacity Assessments

Junction capacity assessments have been undertaken in order to demonstrate that the existing highway network and proposed site access points, will operate with reserve capacity in the future with the inclusion of development traffic. The following junctions have been assessed:

- Junction 1: A448 Slips/Birchfield Road T-Junction
- Junction 2: Birchfield Road/Foxlydiate Road T Junction
- Junction 3: Foxlydiate Lane/Church Road/Great Hockings Lane/Curr Lane Roundabout
- Junction 4: Primary Site Access/Birchfield Road

A summary of the junction capacity assessments is provided overleaf and full modelling outputs are provided within **Appendix G**.

Table 4.5: Junction One (PICADY output)

Junction One	AM			PM		
	RFC	Delay	Queue	RFC	Delay	Queue
Birchfield Road to Overbridge	0.657	0.27	2	0.645	2	2
Birchfield Road to A448	0.710	0.48	2	0.423	1	1
A448 right turn into Birchfield Road	0.838	0.40	5	0.870	6	6

Key

RFC = Ratio of flow to capacity (approaches typically considered to be at capacity at an RFC of 0.85 or 85% of capacity);

Delay = Vehicle delay in seconds

Queue = Queues generated in Passenger Car Units (PCU's)

The PICADY results indicate that the existing A448/Birchfield Road priority junction would operate with reserve capacity and acceptable levels of queuing and delays in both peak periods; with the inclusion of development traffic and an additional 10% growth in background traffic to represent other developments which may come forward in the area.

Table 4.6: Junction Two (PICADY output)

Junction Two	AM			PM		
	RFC	Delay	Queue	RFC	Delay	Queue
Foxlydiate Lane	0.273	0.19	0	0.406	0.22	1
Birchfield Road (West)	0.211	0.17	1	0.072	0.13	0

Key

RFC = Ratio of flow to capacity (approaches typically considered to be at capacity at an RFC of 0.85 or 85% of capacity);

Delay = Vehicle delay in seconds

Queue = Queues generated in Passenger Car Units (PCU's)

The PICADY results show that the existing Birchfield Road/Foxlydiate Lane priority junction would operate with high levels of reserve capacity and minimal queuing and delay in both peak periods; with the inclusion of development traffic and additional background growth on the network.

Table 4.7: Junction Three (ARCADY output)

Junction Three	AM			PM		
	RFC	Delay	Queue	RFC	Delay	Queue
Foxlydiate Lane	0.091	0.08	0	0.148	0.08	0
Church Road	0.153	0.07	0	0.190	0.08	0
Great Hockings Lane	0.094	0.06	0	0.043	0.06	0
Curr Lane	0.193	0.08	0	0.169	0.08	0

Key

RFC = Ratio of flow to capacity (approaches typically considered to be at capacity at an RFC of 0.85 or 85% of capacity);

Delay = Vehicle delay in seconds

Queue = Queues generated in Passenger Car Units (PCU's)

ARCADY modelling has been undertaken to understand the impact of providing the new residential distributor road linking the modified A448 junction to Curr Lane, in relation to the existing Foxlydiate Lane/Church Road/Great Hockings Lane/Curr Lane roundabout. The results of the modelling indicate that the roundabout would operate with significant levels of reserve capacity in both peak periods and minimal queuing and delays, with the inclusion of development traffic and additional background growth on the network.

Table 4.8: Junction Four (ARCADY output)

Junction Four	AM			PM		
	RFC	Delay	Queue	RFC	Delay	Queue
Birchfield Road (to A448 E/bound)	0.733	0.15	3	0.688	0.13	2
Birchfield Road (to A448 W/bound)	0.578	0.11	1	0.820	0.20	4
Development Link Road	0.582	0.13	1	0.367	0.10	1
Development Access	0.310	0.10	0	0.141	0.08	0

Key

RFC = Ratio of flow to capacity (approaches typically considered to be at capacity at an RFC of 0.85 or 85% of capacity);

Delay = Vehicle delay in seconds

Queue = Queues generated in Passenger Car Units (PCU's)

ARCADY modelling has been undertaken to reflect the proposed access strategy, which would see the current A448 junction being upgraded to provide a new four-arm roundabout and primary access to the site as shown in drawing no: CTB-AOE-0003. The modelling results indicate that the proposed junction will provide sufficient levels of reserve capacity to accommodate the development proposals and additional background growth.

4.6 Summary

In summary, the amount of traffic predicted to use the local road network will not be significant, and most traffic will use the strategic regional routes. It is envisaged that the site will not create any congestion, or exacerbate existing problems on the local road network.

Junction capacity assessments have been undertaken for the site access junctions and other junctions immediately adjacent to the site. The traffic flows used in these assessments include development traffic for the Foxlydiat development and an allowance for additional growth on the network that may come forward as part of future development proposals in the local area.

The results of the junction capacity assessments clearly indicate that all junctions would operate with reserve capacity and minimal levels of queuing and congestion. It is therefore clear that the proposed access junctions would provide sufficient capacity to accommodate the development proposals and the potential redistribution of background traffic. It has also been demonstrated that the two off-site junctions linking to Foxlydiat Lane would also operate with capacity during the peak periods.

5 Summary

5.1 Current Network

The site is ideally located for walk journeys to schools and shops with walk routes generally pleasant, safe and lightly trafficked. The site will be designed to be permeable and will provide amenities on site to encourage shorter and more sustainable journeys.

The site is ideally located for cycle journeys to local schools, jobs, healthcare, colleges, Redditch town centre and the Railway Station. This will be significantly enhanced by providing connections into the important National Cycle Network, which passes the site (within 500 metres) and by having a site layout that is sustainable by design.

The location of the site provides access to healthcare, employment, retail, educational and leisure facilities within 30-60 minutes using a conventional bus. The site is within 400-800 metres local bus services.

The site benefits from its good connections to the Railway Station, which is only ten minutes away by cycle or by bus.

Current mode splits indicate that 75% of trips undertaken by residents in the surrounding area to the development are made by private vehicle (driver), with a further 6% commuting as car passengers. Therefore 19% of trips are undertaken by more sustainable modes of transport, such as bus, train, walking and cycling.

Journey to Work information indicates that 48% of people work outside of Redditch town and 19% of people working in Redditch (south of the A448) most of whom are employed in areas around the Hospital, Park Farm and Washford. 33% of people are shown to work in Redditch north of the A448, which includes Redditch town centre.

The local junctions surrounding the development site have also undergone an accident investigation (2005-2010 review period). Accident data shows a total of eleven reported accidents have taken place during the review period. When investigating the causation factors of these accidents, no accidents were caused by the same factor.

Currently there are no observed capacity issues regarding the three junctions surrounding the development site, with all junctions working within their capacity. Access to Redditch town centre and beyond is good with free flowing routes via the A441 Alvechurch Highway, Bromsgrove Road, and the B4184 Brockhill Drive.

5.2 Future Network

The proposed access vehicular access strategy for the site comprises two new access points and the provision of a link road between the A448 and Curr Lane.

The vehicular access strategy has been designed in accordance with the relevant design criteria and a Stage One Road safety Audit has also been undertaken. It has been demonstrated that access to the site can be provided which is safe, in accordance with the relevant design guidance, and without the need for third party land.

Junction capacity assessments have been undertaken for the site access junctions and other junctions immediately adjacent to the site. The traffic flows used in these assessments include development traffic for the Foxlydiate development and an allowance for additional growth on the network that may come forward as part of future development proposals in the local area.

The results of the junction capacity assessments clearly indicate that all junctions would operate with reserve capacity and minimal levels of queuing and congestion. It is therefore clear that the proposed access junctions would provide sufficient capacity to accommodate the development proposals and the potential redistribution of background traffic. It has also been demonstrated that the two off-site junctions linking to Foxlydiate Lane would also operate with capacity during the peak periods.

5.3 Key Considerations

From a transport perspective the key considerations to note are:

- The development is located on the south western side of Redditch which means that the site is fully accessible by sustainable modes to health, employment, retail and education facilities.
- The site benefits from being well positioned in relation to existing high quality strategic roads which are not subject to significant delays or congestion, therefore significant off-site highway improvements will not be required.
- The development provides an opportunity to improve bus services in the area. These improvements will benefit both existing residents of the area and future residents associated with this site and other development sites.
- The site presents an excellent opportunity to deliver significant growth without the need for major infrastructure scheme, thus the site will not be subject to the negative environmental impacts which can be associated with the implementation of such schemes.
- The site will provide a new vehicular link between the A448 and Curr Lane/Foxlydiate Lane, this presents a significant opportunity to relieve existing local traffic issues in Webheath.

5.4 Conclusion

From the evidence and analysis presented within this report, it is concluded that the Foxlydiate site offers an excellent opportunity to deliver growth on the edge of Redditch, without the need for major highway improvements to the wider network. The site also offers an opportunity to enhance sustainable links in the Webheath area, therefore befitting both existing and future residents of the area.



Appendix A

Traffic Flow Spreadsheets

Appendix A Traffic Flow Calculation Spreadsheets

Includes:

- Current traffic flow spreadsheets
- Development traffic distribution
- Trip rate calculations

Baseline Traffic Calculations

Background Traffic Survey

Growth

110%

Link Road Assignment - Remove traffic

50%

Link Road Reassignment

Revised Baseline

AM

		A	B	C	Total	
J1 A448/Birchfield	A	0	19	148	167	
	B	129	0	235	364	
	C	308	273	0	581	
	Total	437	292	383	0	1112

		A	B	C	Total	
A	A	0	21	163	184	
	B	142	0	259	400	
	C	339	300	0	639	
	Total	481	321	421	0	1223

		A	B	C	Total	
A	A		-17		-17	
	B	-20		-20	-40	
	C		-17		-17	
	Total	-20	-34	-20	0	-74

		A	B	C	Total	
A	A			17	17	
	B				0	
	C	20			20	
	Total	20	0	17	0	37

		A	B	C	Total	
A	A	0	4	180	184	
	B	122	0	238	360	
	C	359	283	0	642	
	Total	481	287	418	0	1186

		A	B	C	Total	
J2 Birchfield/Foxl	A	0	30	242	272	
	B	50	0	97	147	
	C	231	53	0	284	
	Total	281	83	339	0	703

		A	B	C	Total	
A	A	0	33	266	299	
	B	55	0	107	162	
	C	254	58	0	312	
	Total	309	91	373	0	773

		A	B	C	Total	
A	A				0	
	B			-40	-40	
	C		-34		-34	
	Total	0	-34	-40	0	-74

		A	B	C	Total	
A	A				0	
	B				0	
	C				0	
	Total	0	0	0	0	0

		A	B	C	Total	
A	A	0	33	266	299	
	B	55	0	67	122	
	C	254	24	0	278	
	Total	309	57	333	0	699

		A	B	C	D	Total
J3 Church Rd Rbt	A	0	62	8	16	86
	B	73	1	7	20	101
	C	47	28	1	5	81
	D	13	18	1	0	32
	Total	133	109	17	41	300

		A	B	C	D	Total
A	A	0	68	9	18	95
	B	80	1	8	22	111
	C	52	31	1	6	89
	D	14	20	1	0	35
	Total	146	120	19	45	330

		A	B	C	D	Total
A	A		-34			-34
	B	-40				-40
	C					0
	D					0
	Total	-40	-34	0	0	-74

		A	B	C	D	Total
A	A					0
	B				40	40
	C					0
	D		34			34
	Total	0	34	0	40	74

		A	B	C	D	Total
A	A	0	34	9	18	61
	B	40	1	8	62	111
	C	52	31	1	6	89
	D	14	54	1	0	69
	Total	106	120	19	85	330

		A	B	C	D	Total
J4 New A448 site access	A	0	581	0	0	581
	B	383	0	0	0	383
	C	0	0	0	0	0
	D	0	0	0	0	0
	Total	383	581	0	0	964

		A	B	C	D	Total
A	A	0	639	0	0	639
	B	421	0	0	0	421
	C	0	0	0	0	0
	D	0	0	0	0	0
	Total	421	639	0	0	1060

		A	B	C	D	Total
A	A					0
	B					0
	C					0
	D					0
	Total	0	0	0	0	0

		A	B	C	D	Total
A	A			17		17
	B			17		17
	C	20	20			40
	D					0
	Total	20	20	34	0	74

		A	B	C	D	Total
A	A	0	639	17	0	656
	B	421	0	17	0	438
	C	20	20	0	0	40
	D	0	0	0	0	0
	Total	441	659	34	0	1135

PM

		A	B	C	Total	
J1 A448/Birchfield	A	0	32	167	199	
	B	76	0	171	247	
	C	181	301	0	482	
	Total	257	333	338	928	

		A	B	C	Total	
A	A	0	35	184	219	
	B	84	0	188	272	
	C	199	331	0	530	
	Total	283	366	372	0	1021

		A	B	C	Total	
A	A		-18		-18	
	B	-14		-14	-28	
	C		-18		-18	
	Total	-14	-35	-14	0	-63

		A	B	C	Total	
A	A			18	18	
	B				0	
	C	14			14	
	Total	14	0	18	0	32

		A	B	C	Total	
A	A	0	18	201	219	
	B	70	0	174	244	
	C	213	314	0	527	
	Total	283	331	375	0	989

		A	B	C	Total	
J2 Birchfield/Foxl	A	0	36	173	209	
	B	33	0	69	102	
	C	236	97	0	333	
	Total	269	133	242	644	

		A	B	C	Total	
A	A	0	40	190	230	
	B	36	0	76	112	
	C	260	107	0	366	
	Total	296	146	266	0	708

		A	B	C	Total	
A	A				0	
	B			-28	-28	
	C		-35		-35	
	Total	0	-35	-28	0	-63

		A	B	C	Total	
A	A				0	
	B				0	
	C				0	
	Total	0	0	0	0	0

		A	B	C	Total	
A	A	0	40	190	230	
	B	36	0	48	84	
	C	260	72	0	331	
	Total	296	111	238	0	645

		A	B	C	D	Total
J3 Church Rd Rbt	A	1	64	40	14	119
	B	51	1	23	17	92
	C	24	13	0	1	38
	D	26	23	3	0	52
	Total	102	101	66	32	301

		A	B	C	D	Total
A	A	1	70	44	15	131
	B	56	1	25	19	101
	C	26	14	0	1	42
	D	29	25	3	0	57
	Total	112	111	73	35	331

		A	B	C	D	Total
A	A		-35			-35
	B	-28				-28
	C					0
	D					0
	Total	-28	-35	0	0	-63

		A	B	C	D	Total
A	A					0
	B				28	28
	C					0
	D		35			35
	Total	0	35	0	28	63

		A	B	C	D	Total
A	A	1	35	44	15	96
	B	28	1			

Development Traffic Calculations

Distribution for access off Rbt						Distribution for access off Link Road						Development traffic for access off Rbt						Development traffic for access off Link Road						Base plus Development						
AM J1 A448/Birchfield	A			43.0%		Total	A			43.0%		Total	Arns		Depts		Arns		Depts		Arns		Depts		Arns		Depts			
	B			17.5%			B			17.5%			A	A	B	C		Total	A	A	B	C		Total	A	A	B	C		Total
	C	16.0%	17.5%				C	16.0%	17.5%				B			28		28	B			64		64	B			272	0	276
	Total						Total						C	31	34			65	C	73	80			153	C	463	397	0	0	860
													D					0	D					0	D	0	0	0	0	0
												Total	31	34	39	0	104	Total	73	80	91	0	243	Total	585	401	548	0	1534	
J2 Birchfield/Foxl	A		3.0%	17.5%		Total	A		3.0%	17.5%		Total	A		2	11		Total	A		4	26		Total	A		39	304	0	Total
	B	3.0%					B	3.0%					B	6			6	B	14				14	B	75	0	67	0	141	
	C	17.5%					C	17.5%					C	34			34	C	80				80	C	368	24	0	0	392	
	Total						Total						Total	40	2	11	0	53	Total	93	4	26	0	124	Total	0	0	0	0	0
J3 Church Rd Rbt	A				3.0%	Total	A				3.0%	Total	A				2	2	A				4	4	A	0	34	9	24	67
	B				9.5%		B				9.5%		B				6	6	B				14	14	B	40	1	8	82	131
	C						C						C				0	0	C				0	0	C	52	31	1	6	89
	D	3.0%	9.5%				D	3.0%	9.5%				D	6	19			24	D	14	43			57	D	34	116	1	0	151
	Total						Total						Total	6	19	0	8	32	Total	14	43	0	19	76	Total	126	182	19	112	438
J4 New A448 site access	A				27.0%	Total	A				27.0%	Total	A				17	17	A				40	40	A	0	639	58	17	714
	B				60.5%		B				60.5%		B				39	39	B				91	91	B	421	0	108	39	568
	C				12.5%		C	54.0%	33.5%				C				8	8	C	246	153			399	C	266	173	0	8	447
	D	54.0%	33.5%	12.5%			D						D	105	65	24		195	D					0	D	105	65	24	0	195
	Total						Total						Total	105	65	24	64	260	Total	246	153	131	0	530	Total	793	877	190	64	1924
PM J1 A448/Birchfield	A			43.0%		Total	A			43.0%		Total	Arns		Depts		Arns		Depts		Arns		Depts		Arns		Depts			
	B			17.5%			B			17.5%			A	A	B	C		Total	A	A	B	C		Total	A	A	B	C		Total
	C	16.0%	17.5%				C	16.0%	17.5%				B			79		79	B			185		185	B	70	0	282	0	351
	Total						Total						C	17	19			36	C	40	44			84	C	270	376	0	0	647
													D					0	D					0	D	0	0	0	0	0
												Total	17	19	112	0	148	Total	40	44	261	0	345	Total	340	394	748	0	1482	
J2 Birchfield/Foxl	A		3.0%	17.5%		Total	A		3.0%	17.5%		Total	A		6	32		Total	A		13	75		Total	A		58	298	0	Total
	B	3.0%					B	3.0%					B	3			3	B	8				8	B	47	0	48	0	95	
	C	17.5%					C	17.5%					C	19			19	C	44				44	C	322	72	0	0	394	
	Total						Total						Total	22	6	32	0	60	Total	51	13	75	0	140	Total	0	0	0	0	0
J3 Church Rd Rbt	A				3.0%	Total	A				3.0%	Total	A				6	6	A				13	13	A	1	35	44	34	114
	B				9.5%		B				9.5%		B				18	18	B				41	41	B	28	1	25	105	160
	C						C						C				0	0	C				0	0	C	26	14	0	1	42
	D	3.0%	9.5%				D	3.0%	9.5%				D	3	10			13	D	8	24			31	D	39	95	3	0	137
	Total						Total						Total	3	10	0	23	37	Total	8	24	0	54	85	Total	95	145	73	140	453
J4 New A448 site access	A				27.0%	Total	A				27.0%	Total	A				50	50	A				116	116	A	0	530	134	50	714
	B				60.5%		B				60.5%		B				112	112	B				261	261	B	372	0	278	112	762
	C				12.5%		C	54.0%	33.5%				C				23	23	C	135	84			220	C	150	98	0	23	271
	D	54.0%	33.5%	12.5%			D						D	58	36	13		108	D					0	D	58	36	13	0	108
	Total						Total						Total	58	36	13	185	292	Total	135	84	377	0	597	Total	579	664	426	185	1854

ok

Vehicle Trip Rates

8:00-09:00		17:00-18:00	
Arr	Dep	Arr	Dep
0.153	0.465	0.44	0.256

Dwellings

1400

Vehicle Trips

8:00-09:00		17:00-18:00	
Arr	Dep	Arr	Dep
214.2	651	616	358.4

Distribution (from JtW) - Vehicle Trips

Origin/ Destination	%	8:00-09:00		17:00-18:00	
		Arr	Dep	Arr	Dep
North Redditch	33%	70	214	202	118
South Redditch	19%	41	124	117	68
Birmingham and North	19%	42	126	120	70
M5 North	4%	8	25	24	14
Bromsgrove, Worcester and South West	12%	25	76	72	42
M40, M1 and South	13%	28	86	81	47
		214	651	616	358
Check		214	651	616	358

70%	150	456	431	251	Development traffic off link road
30%	64	195	185	108	Development traffic off roundabout

TRICS 2010(b)v6.6.1 270610 B14.36 (16/9/2010)

[Output saved under: U:\CTB AOE 000 - Foxlydiate Lane, Webheath, Redditch\Calcs\Traffic Surveys\Foxlydiate Trip Rates \(TRICs\).PDF](U:\CTB AOE 000 - Foxlydiate Lane, Webheath, Redditch\Calcs\Traffic Surveys\Foxlydiate Trip Rates (TRICs).PDF)

Dwelling assumption from Masterplan



Appendix B

Road Safety – Accident Surveys

Appendix B Road Safety – Accident Survey

Accidents between dates 01/08/2005 and 31/07/2010 (60) months
 Selection: Notes:
 Selected using Pre-defined Query : Foxlydiate Lane, Webheath

Rec.	Reference	Severity	Date	Veh	Cas.	Time	Easting	Northing	Location
1	06DE85081	Slight	04/11/2006	2	1	0830	401740	267230	BIRCHFIELD RD, REDDITCH J/W FOXLYDIATE LANE.
2	08DE87674	Slight	12/01/2008	2	2	0700	401610	267490	A448 BROMSGROVE HIGHWAY EB CW APPROX 160 M SE J/W BIRCHFIEL
3	08DE87000	Slight	12/01/2008	1	1	0943	401640	267450	A448, BROMSGROVE HIGHWAY, REDDITCH APPROX 90 M SE J/W BIRCH
4	08DE87886	Slight	20/02/2008	2	6	0032	401490	267700	B4096 HEWELL LANE R/ABOUT J/W B4184 BROMSGROVE
5	08DE88073	Slight	18/03/2008	1	1	0815	401480	267700	B4096 HEWELL LANE R/ABOUT J/W B4096 BIRCHFIELD RD REDDITCH
6	08DE88179	Slight	06/04/2008	2	3	0755	401420	267710	B4098, HEWELL RD TARDEBIGGE APPROX 65 MW J/W B 4184.
7	09D900420	Fatal	20/01/2009	1	1	2335	401390	267680	A448 BROMSGROVE HIGHWAY (LANE 2) 60 M W J/W B4096
8	09D901331	Slight	04/03/2009	1	1	1627	401495	267680	A448 BROMSGROVE HIGHWAY, JW B4096 HEWELL LANE REDDITCH
9	09D901825	Slight	26/03/2009	2	1	0930	401490	267700	B4096 HEWELL LANE REDDITCH J/W B4184 ROUNDABOUT
10	09D903929	Slight	17/07/2009	1	1	1915	401480	267630	A448 BROMSGROVE HIGHWAY 35 M SE J/W BIRCHFIELD RD ISLAND
11	09D904717	Slight	26/08/2009	2	1	1600	401490	267670	A448 AT REDDITCH J/W B4096 HEWELL LANE ISLAND
12	10D002108	Serious	22/04/2010	2	2	1436	401846	267165	BIRCHFIELD ROAD, REDDITCH J/W REYNARD CLOSE

Total number of accidents listed: 12

Accidents between dates 01/08/2005 and 31/07/2010 (60) months

Selection: Selected using Pre-defined Query :
Notes: Foxlydiat Lane, Webheath

06DE85081 04/11/2006 Time 0830 Vehicles 2 Casualties 1 Slight
 E: 401740 N: 267230 First Road: U Road Type Single carriageway
 Speed limit: 30 Junction Detail: T & Stag Jct Give way or controlled
 Crossing: Control None Facilities: None within 50m Road surface Dry
 Daylight:street lights present Fine without high winds

Special Conditions at Site None
 DR V2 BLINDED BY LOW SUN TURNING RT OFF BIRCHFIELD RD FAILS TO SEE V1 TRAVELLING IN OP DIRECTION.

Occurred on BIRCHFIELD RD, REDDITCH J/W FOXLYDIAT LANE.

Vehicle Reference 1 Car
 Vehicle movement from SE to NW
 Going ahead other
 No tow / articulation
 No skidding, jack-knifing or overturning

Location at impact Jct Approach First impact Front Hit vehicle: 2
 Breath test Negative Age of Driver 45 Female

Vehicle Reference 2 Car
 Vehicle movement from NW to SW
 Turning right
 No tow / articulation
 No skidding, jack-knifing or overturning

Location at impact Leaving main road First impact Front Hit vehicle: 1
 Breath test Negative Age of Driver 19 Male

Casualty Ref: 1 Vehicle: 2 Age: 19 Male Driver/rider Severity: Slight

08DE87674 12/01/2008 Time 0700 Vehicles 2 Casualties 2 Slight
 E: 401610 N: 267490 First Road: A 448 Road Type Dual carriageway
 Speed limit: 70 Junction Detail: Not within 20m of junction Not applicable
 Crossing: Control None Facilities: None within 50m Road surface Frost/Ice
 Darkness: street lights present and lit Other

Special Conditions at Site Mud
 V1 LOSES CONTROL ON ICY RD SURFACE WHILST IN THE PROCESS OF OVERTAKING, V1 COMES TO A HALT IN CW AND IS STRUCK BY V2 WHICH IS UNABLE TO AVOID A COLLISION.

Occurred on A448 BROMSGROVE HIGHWAY EB CW APPROX 160 M SE J/W BIRCHFIELD RD SLIP ON RD.

Vehicle Reference 1 Car
 Vehicle movement from NW to SE
 Stopping
 No tow / articulation
 Skidded

Location at impact Not at, or within 20M of Jct First impact Back Hit vehicle: 2
 Breath test Negative Age of Driver 26 Female Female

Casualty Ref: 1 Vehicle: 1 Age: 26 Female Driver/rider Severity: Slight

Accidents between dates 01/08/2005 and 31/07/2010 (60) months

Selection: Selected using Pre-defined Query : **Notes:** Foxlydiate Lane, Webheath

Vehicle Reference 2 Taxi/Private hire car Going ahead other
 Vehicle movement from NW to SE No tow / articulation
 Skidded

Location at impact Not at, or within 20M of Jct First impact Front Hit vehicle: 1
 Breath test Negative Age of Driver 23 Female

Casualty Ref: 2 Vehicle: 2 Age: 23 Female Driver/rider Severity: Slight

08DE87000 12/01/2008 Time 0943 Vehicles 1 Casualties 1 Slight
 E: 401640 N: 267450 First Road: A 448 Road Type Dual carriageway
 Speed limit: 70 Junction Detail: Not within 20m of junction Not applicable
 Crossing: Control None Facilities: None within 50m Road surface Frost/Ice
 Daylight:street lights present Fine without high winds

Special Conditions at Site None
 DR V1 LOSES CONTROL ON ICY RD SURFACE, V1 LEAVES CW TO NS INTO TREES.

Occurred on A448, BROMSGROVE HIGHWAY, REDDITCH APPROX 90 M SE J/W BIRCHFIELD RD SLIP OFF RD.

Vehicle Reference 1 Car Going ahead other
 Vehicle movement from SE to NW No tow / articulation
 Skidded and overturned

Location at impact Not at, or within 20M of Jct First impact Nearside Hit vehicle:
 Breath test Negative Age of Driver 25 Male

Casualty Ref: 1 Vehicle: 1 Age: 25 Male Driver/rider Severity: Slight

08DE87886 20/02/2008 Time 0032 Vehicles 2 Casualties 6 Slight
 E: 401490 N: 267700 First Road: B 4096 Road Type 1
 Speed limit: 60 Junction Detail: Roundabout Give way or controlled
 Crossing: Control None Facilities: None within 50m Road surface Frost/Ice
 Darkness: street lights present and lit Fine without high winds

Special Conditions at Site None
 BOTH VEHS APP ISLAND, V1 STOPS FOR TRAFFIC AND IS STRUCK IN REAR BY V2

Occurred on B4096 HEWELL LANE R/ABOUT J/W B4184 BROMSGROVE

Vehicle Reference 1 Taxi/Private hire car Stopping
 Vehicle movement from W to E No tow / articulation
 No skidding, jack-knifing or overturning

Location at impact Jct Approach First impact Back Hit vehicle: 2
 Breath test Negative Age of Driver 28 Male

Accidents between dates 01/08/2005 and 31/07/2010 (60) months

Selection:

Selected using Pre-defined Query :

Notes:

Foxlydiate Lane, Webheath

Casualty Ref: 2 Vehicle: 1 Age: 26 Female Passenger Severity: Slight

Casualty Ref: 3 Vehicle: 1 Age: 7 Male Passenger Severity: Slight

Casualty Ref: 4 Vehicle: 1 Age: 4 Female Passenger Severity: Slight

Vehicle Reference 2 Taxi/Private hire car Going ahead other
Vehicle movement from W to E No tow / articulation
Skidded

Location at impact Entering roundabout First impact Front Hit vehicle: 1
Breath test Not applicable Age of Driver 25 Male

Casualty Ref: 1 Vehicle: 2 Age: 25 Male Driver/rider Severity: Slight

Casualty Ref: 5 Vehicle: 2 Age: 24 Female Passenger Severity: Slight

Casualty Ref: 6 Vehicle: 2 Age: 23 Male Passenger Severity: Slight

08DE88073 18/03/2008 Time 0815 Vehicles 1 Casualties 1 Slight
E: 401480 N: 267700 First Road: B 4096 Road Type 1
Speed limit: 60 Junction Detail: Roundabout Give way or controlled
Crossing: Control None Facilities: None within 50m Road surface Dry
Daylight:street lights present Fine without high winds

Special Conditions at Site None

9 YR OLD CAS SAT IN TAXI AS PASS, NO SEAT BELTS FITTED IN TAXI, DRIVER APPARANTLY SINGING AND DANCING IN SEAT WHILE DRIVING, BRAKES SHARPLY ON APP/TO ISLAND CAUSING CAS TO HURT HER HEAD

Occurred on B4096 HEWELL LANE R/ABOUT J/W B4096 BIRCHFIELD RD REDDITCH

Vehicle Reference 1 Taxi/Private hire car Stopping
Vehicle movement from NW to E No tow / articulation
No skidding, jack-knifing or overturning

Location at impact Jct Approach First impact Did not impact Hit vehicle:
Breath test Driver not contacted Age of Driver 28 Male

Casualty Ref: 1 Vehicle: 1 Age: 9 Female Passenger Severity: Slight

08DE88179 06/04/2008 Time 0755 Vehicles 2 Casualties 3 Slight
E: 401420 N: 267710 First Road: B 4098 Road Type Single carriageway
Speed limit: 40 Junction Detail: Not within 20m of junction Not applicable
Crossing: Control None Facilities: None within 50m Road surface Snow
Daylight: no street lighting Snowing without high winds

Accidents between dates 01/08/2005 and 31/07/2010 (60) months
Selection: Notes:
 Selected using Pre-defined Query : Foxlydiate Lane, Webheath

Special Conditions at Site None
 DR V1 LOSES CONTROL NEG LH BEND ON SNOW COVERED ICY RD SUR FACE, V1 CROSSES INTO PATH V2 TRAVELLING IN OP DIRECTION.

Occurred on B4098, HEWELL RD TARDEBIGGE APPROX 65 MW J/W B 4184.

Vehicle Reference 1 Car
 Vehicle movement from NW to E
 Going ahead left bend
 No tow / articulation
 Skidded and overturned

Location at impact Not at, or within 20M of Jct First impact Front Hit vehicle: 2
 Breath test Negative Age of Driver 50 Female

Casualty Ref: 1 Vehicle: 1 Age: 50 Female Driver/rider Severity: Slight

Vehicle Reference 2 Car
 Vehicle movement from E to NW
 Going ahead right bend
 No tow / articulation
 No skidding, jack-knifing or overturning

Location at impact Not at, or within 20M of Jct First impact Front Hit vehicle: 1
 Breath test Negative Age of Driver 35 Female

Casualty Ref: 2 Vehicle: 2 Age: 35 Female Driver/rider Severity: Slight

Casualty Ref: 3 Vehicle: 2 Age: 44 Male Passenger Severity: Slight

09D900420 20/01/2009 Time 2335 Vehicles 1 Casualties 1 Fatal
 E: 401390 N: 267680 First Road: A 448 Road Type Dual carriageway
 Speed limit: 70 Junction Detail: Not within 20m of junction Not applicable
 Crossing: Control None Facilities: None within 50m Road surface Frost/Ice
 Darkness: street lights present and lit Other

Special Conditions at Site None
 V1 HAS COLLIDED WITH PEDESTRIAN. INCIDENT OCCURED IN LANE 2 OF A448 BROMSGROVE HIGHWAY.
 BROMSGROVE - REDDITCH 70 MPH LIMIT

Occurred on A448 BROMSGROVE HIGHWAY (LANE 2) 60 M W J/W B4096

Vehicle Reference 1 Car
 Vehicle movement from NW to SE
 Going ahead other
 No tow / articulation
 Skidded

Location at impact Not at, or within 20M of Jct First impact Front Hit vehicle:
 Breath test Negative Age of Driver 31 Female

Casualty Ref: 1 Vehicle: 1 Age: 43 Male Pedestrian Severity: Fatal

Accidents between dates 01/08/2005 and 31/07/2010 (60) months

Selection: Selected using Pre-defined Query :
Notes: Foxlydiate Lane, Webheath

09D901331 04/03/2009 Time 1627 Vehicles 1 Casualties 1 Slight
 E: 401495 N: 267680 First Road: A 448 Road Type Slip road
 Speed limit: 30 Junction Detail: Roundabout Give way or controlled
 Crossing: Control None Facilities: None within 50m Road surface Dry
 Daylight:street lights present Fine without high winds

Special Conditions at Site None
 DR V1 LOSES CONTROL ENTERING TRAFFIC ISLAND

Occurred on A448 BROMSGROVE HIGHWAY, JW B4096 HEWELL LANE REDDITCH

Vehicle Reference 1 Car
 Vehicle movement from NW to NE
 Going ahead left bend
 No tow / articulation
 Overturned

Location at impact Entering roundabout First impact Front Hit vehicle:
 Breath test Not applicable Age of Driver 25 Female

Casualty Ref: 1 Vehicle: 1 Age: 25 Female Driver/rider Severity: Slight

09D901825 26/03/2009 Time 0930 Vehicles 2 Casualties 1 Slight
 E: 401490 N: 267700 First Road: B 4096 Road Type Single carriageway
 Speed limit: 40 Junction Detail: Roundabout Give way or controlled
 Crossing: Control None Facilities: None within 50m Road surface Dry
 Daylight:street lights present Fine without high winds

Special Conditions at Site None
 V1 INDICATED RIGHT ONTO A448. V2 FOLLOWED CLOSELY AND AS V1 MOVED TO THE RIGHT V2 MOVED
 AROUND TO V1 LEFT NEARSIDE. V2 COLLIDED WITH REAR NEARSIDE OF V1

Occurred on B4096 HEWELL LANE REDDITCH J/W B4184 ROUNDABOUT

Vehicle Reference 1 Car
 Vehicle movement from W to S
 Waiting to turn right
 No tow / articulation
 No skidding, jack-knifing or overturning

Location at impact Jct Approach First impact Nearside Hit vehicle:
 Breath test Driver not contacted Age of Driver 47 Female

Casualty Ref: 1 Vehicle: 1 Age: 47 Female Driver/rider Severity: Slight

Vehicle Reference 2 Car
 Vehicle movement from W to E
 Going ahead other
 No tow / articulation
 No skidding, jack-knifing or overturning

Location at impact Jct Approach First impact Front Hit vehicle:
 Breath test Driver not contacted Age of Driver 30 Female

Accidents between dates 01/08/2005 and 31/07/2010 (60) months
Selection: Notes:
Selected using Pre-defined Query : Foxlydiate Lane, Webheath

09D903929 17/07/2009 Time 1915 Vehicles 1 Casualties 1 Slight
E: 401480 N: 267630 First Road: A 448 Road Type Slip road
Speed limit: 70 Junction Detail: Not within 20m of junction Not applicable
Crossing: Control None Facilities: None within 50m Road surface Wet/Damp
Daylight:street lights present Other

Special Conditions at Site None
VEH 1 WAS TRAVELLING TOO FAST AND ON APPROACHING THE HIGHWAY HAS LOST CONTROL AND REAR
END OF VEH 1 HAS PULLED OUT AND COLLIDED WITH THE CENTRAL RESERVATION.

Occurred on A448 BROMSGROVE HIGHWAY 35 M SE J/W BIRCHFIELD RD ISLAND

Vehicle Reference 1 Car
Vehicle movement from NE to S
Going ahead left bend
No tow / articulation
Skidded

Location at impact Not at, or within 20M of Jct First impact Front Hit vehicle:
Breath test Negative Age of Driver 18 Female

Casualty Ref: 1 Vehicle: 1 Age: 18 Female Driver/rider Severity: Slight

09D904717 26/08/2009 Time 1600 Vehicles 2 Casualties 1 Slight
E: 401490 N: 267670 First Road: A 448 Road Type 1
Speed limit: 30 Junction Detail: Roundabout Give way or controlled
Crossing: Control None Facilities: None within 50m Road surface Wet/Damp
Daylight:street lights present Raining without high winds

Special Conditions at Site None
DR/V2 WAS STAT AT ISLAND WHEN STRUCK IN REAR BY V1

Occurred on A448 AT REDDITCH J/W B4096 HEWELL LANE ISLAND

Vehicle Reference 1 Car
Vehicle movement from SW to SE
Turning right
No tow / articulation
No skidding, jack-knifing or overturning

Location at impact Entering roundabout First impact Front Hit vehicle: 2
Breath test Driver not contacted Age of Driver 42 Male

Vehicle Reference 2 Car
Vehicle movement from SW to SE
Waiting to turn right
No tow / articulation
No skidding, jack-knifing or overturning

Location at impact Jct Approach First impact Back Hit vehicle: 1
Breath test Driver not contacted Age of Driver 43 Female

Accidents between dates 01/08/2005 and 31/07/2010 (60) months

Selection:

Selected using Pre-defined Query :

Notes:

Foxlydiat Lane, Webheath

Casualty Ref: 1 Vehicle: 2 Age: 43 Female Driver/rider Severity: Slight

10D002108 22/04/2010 Time 1436 Vehicles 2 Casualties 2 Serious
 E: 401846 N: 267165 First Road: U Road Type Single carriageway
 Speed limit: 30 Junction Detail: T & Stag Jct Give way or controlled
 Crossing: Control None Facilities: None within 50m Road surface Dry
 Daylight:street lights present Fine without high winds

Special Conditions at Site None

VEH 1 AND VEH 2 TRAVELLING TOWARDS EACH OTHER ON THE OPPOSITE SIDES OF THE CARRIAGEWAY.
 FOR AN UNKNOWN REASON VEH 1 HAS TRAVELLED ONTO THE OPPOSITE SIDE OF THE CARRIAGEWAY
 COLLIDING WITH VEH 2.

Occurred on BIRCHFIELD ROAD, REDDITCH J/W REYNARD CLOSE

Vehicle Reference 1 Car Going ahead other
 Vehicle movement from SE to NW No tow / articulation
 No skidding, jack-knifing or overturning

Location at impact Cleared junction or waiting/parked First impact Front Hit vehicle: 2
 Breath test Not applicable Age of Driver 70 Female

Casualty Ref: 1 Vehicle: 1 Age: 70 Female Driver/rider Severity: Serious

Vehicle Reference 2 Car Going ahead other
 Vehicle movement from NW to SE No tow / articulation
 No skidding, jack-knifing or overturning

Location at impact Jct Approach First impact Front Hit vehicle:
 Breath test Negative Age of Driver 47 Male

Casualty Ref: 2 Vehicle: 2 Age: 47 Male Driver/rider Severity: Slight

Accidents between dates **01/08/2005** and **31/07/2010** (60) months

Selection:

Selected using Pre-defined Query :

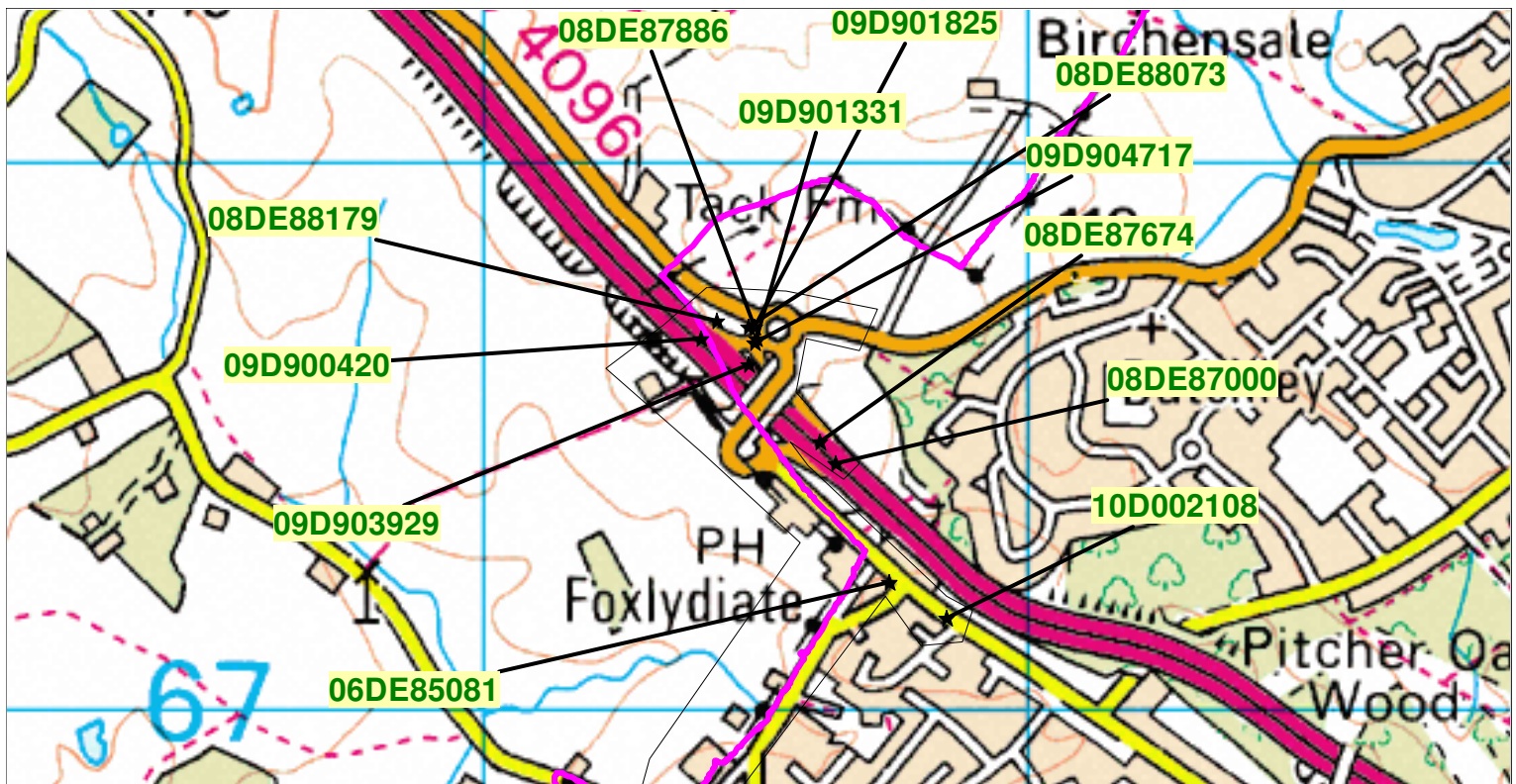
Notes:

Foxlydiat Lane, Webheath

Accidents involving:

Casualties:

	Fatal	Serious	Slight	Total		Fatal	Serious	Slight	Total
Motor vehicles only (excluding 2-wheels)	1	1	10	12	Vehicle driver	0	1	12	13
					Passenger	0	0	7	7
2-wheeled motor vehicles	0	0	0	0	Motorcycle rider	0	0	0	0
					Cyclist	0	0	0	0
Pedal cycles	0	0	0	0	Pedestrian	1	0	0	1
Horses & other	0	0	0	0	Other	0	0	0	0
Total	1	1	10	12	Total	1	1	19	21





Appendix C

Existing and proposed access drawings

Appendix C Existing and proposed access drawings

Includes:

- CTBAOE001 – Existing Highway Network
- CTBAOE002 – Proposed Access Arrangements
- CTBAOE003 – Birchfield Road Access Arrangements
- CTBAOE004 – Curr Lane Access Arrangements



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Rev	By	Chkd	Apprvd	Date	Description

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Drawing Status: **PRELIMINARY**

Client:
HEYFORD DEVELOPMENTS

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Red Hill House 227 London Road Worcester WR5 2JG
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halcrow.com



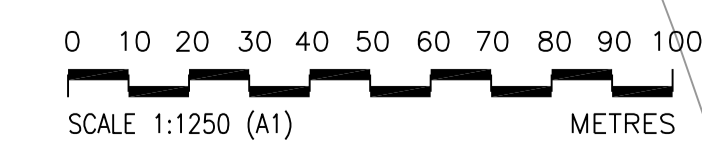
Project:
FOXLYDIATE, REDDITCH

Drawing:
EXISTING SURVEY

Drawn by: AM Date: 14/10/2010
Checked by: SD Date: 26/10/2010
Approved by: ME Date: 26/10/2010

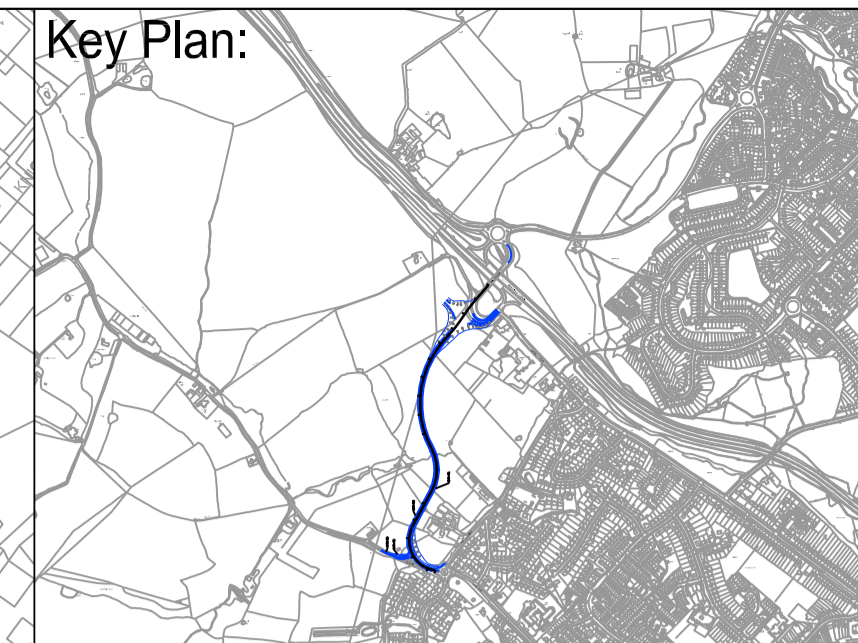
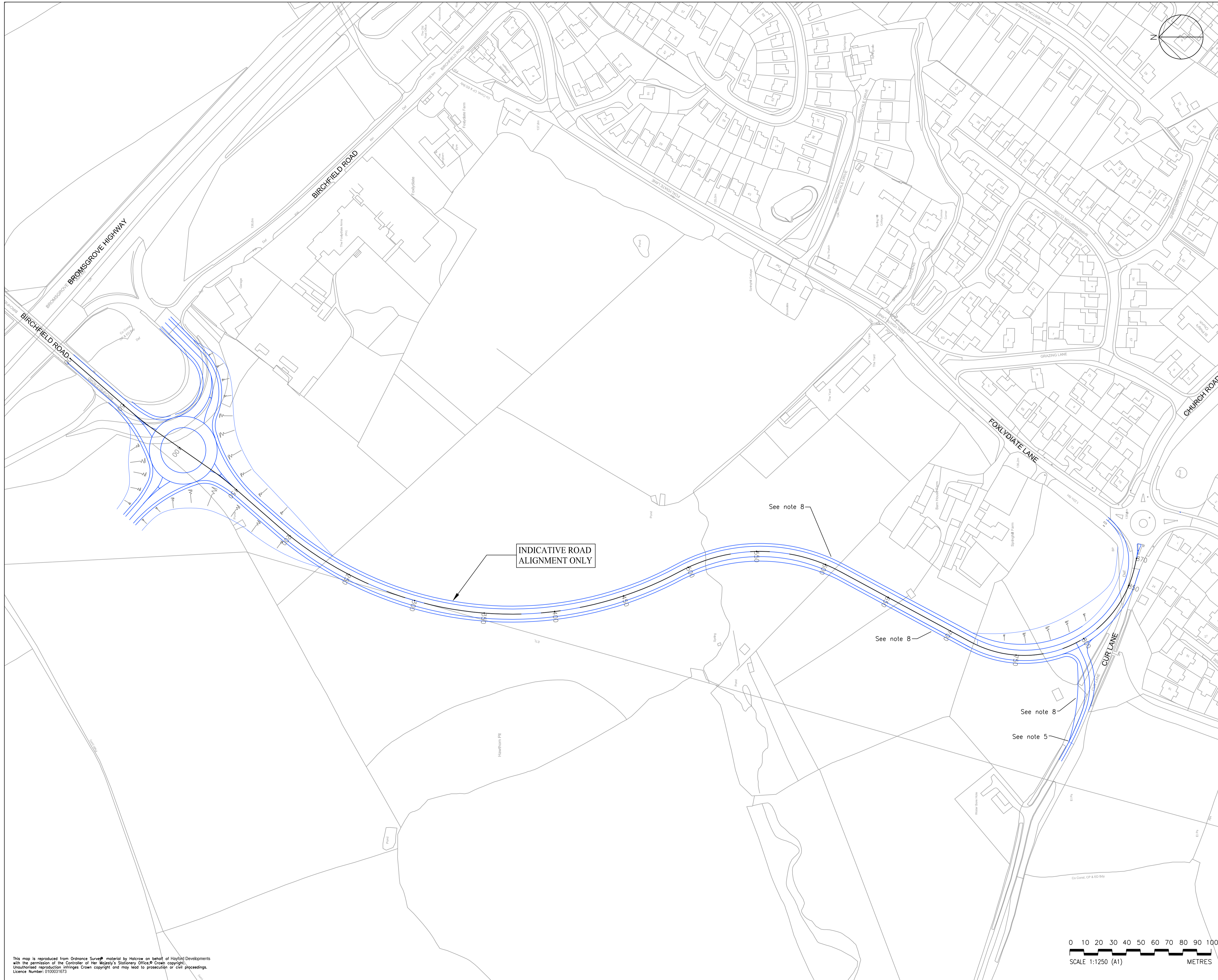
Drawing No. **CTBAOE-0001** Revision: -

Drawing Scale: 1:1250 at A1



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 User and Plot Date: : neeka : 26/10/2010 - 12:10 pm

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Legend:

Indicative earthworks

- Notes:**
1. All dimensions are in metres unless noted otherwise.
 2. Birchfield Road roundabout designed to TD 16/07.
 3. Design speed assumed to be 60 kph.
 4. Link Road design Carriageway width of 7.3m, forward visibility of 60m and minimum centerline radius of 80m taken from Worcestershire's Highways Design Guide for New Developments. Based upon Industrial and Commercial Access Roads.
 5. Speed limit on Cur Lane to be relocated.
 6. Junction visibility of x=4.5m and Y=90M taken from Worcestershire's Highways Design Guide for New Developments.
 7. Verge / footway width assumed to be 2m min (plus any additional requirements for visibility)
 8. No topographical survey in this area.

INDICATIVE ROAD ALIGNMENT ONLY

Rev	By	Chkd	Apprvd	Date	Description

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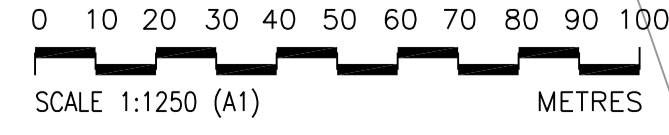


Project: **FOXLYDIATE, REDDITCH**

Drawing: **ACCESS ARRANGEMENTS**

Drawn by: AM Date: 21/10/2010
Checked by: SD Date: 26/10/2010
Approved by: ME Date: 26/10/2010

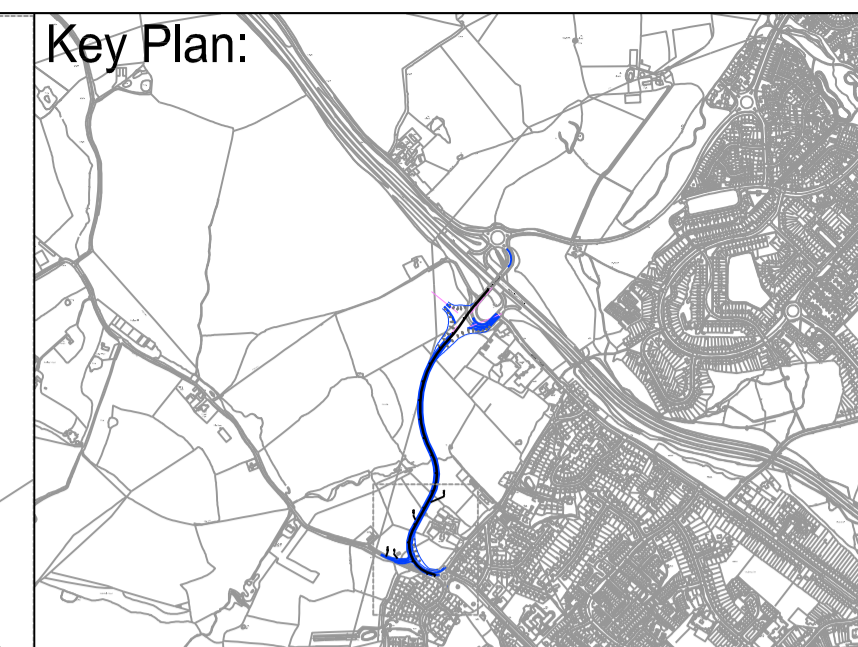
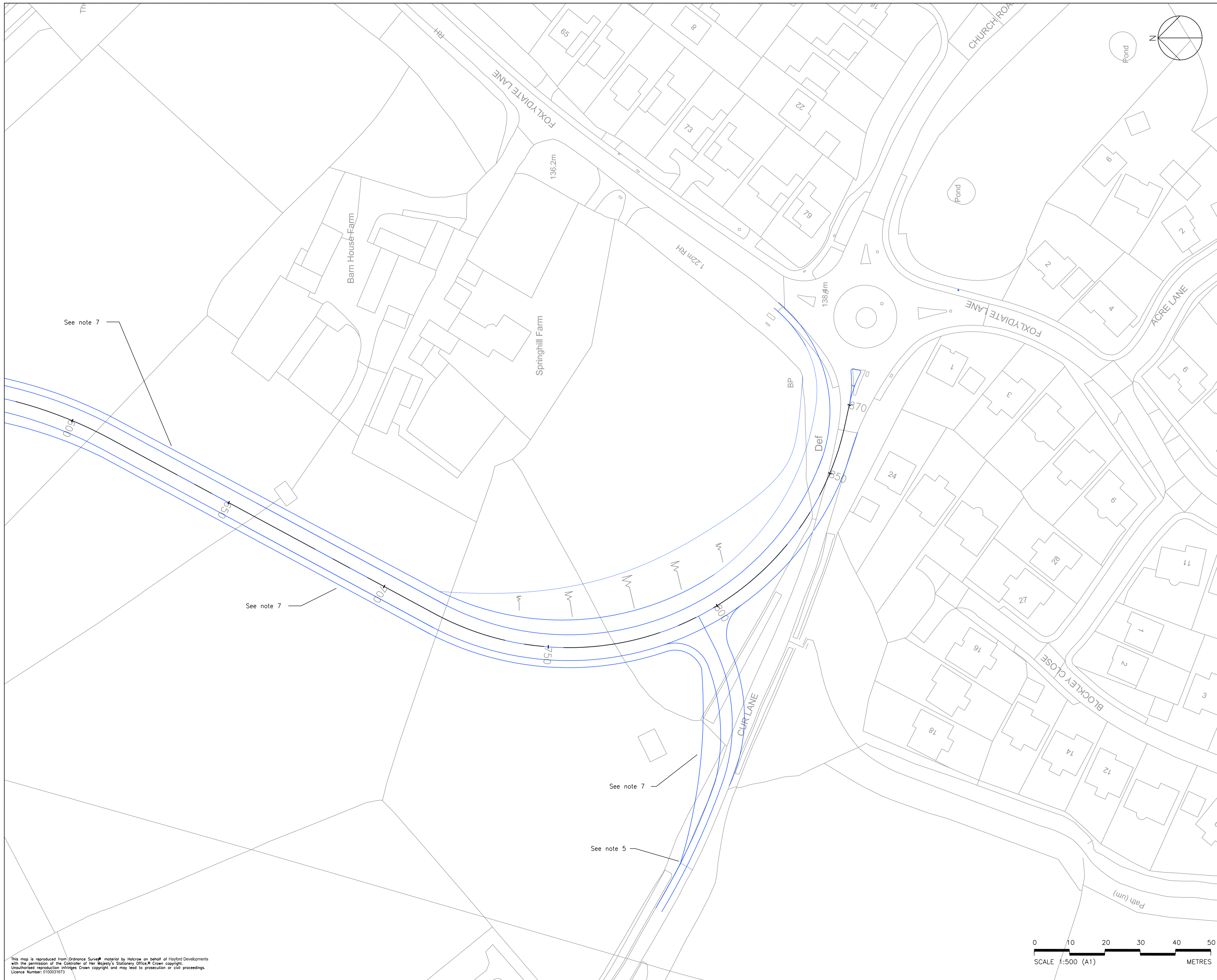
Drawing No. **CTBAOE-0002** Revision: -
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 User and Plot Date: : MeeKA : 26/10/2010 - 2:10 pm

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Legend:

 Indicative earthworks

- Notes:**
1. All dimensions are in metres unless noted otherwise.
 2. Design speed assumed to be 60 kph.
 3. Link Road design Carriageway width of 7.3m, forward visibility of 60m and minimum centerline radius of 80m taken from Worcestershire's Highways Design Guide for New Developments. Based upon Industrial and Commercial Access Roads.
 4. Speed limit on Cur Lane to be relocated.
 5. Junction visibility of x=4.5m and Y=90M taken from Worcestershire's Highways Design Guide for New Developments.
 6. Verge / footway width assumed to be 2m min +/- visibility requirements.
 7. No topographical survey in this area.

Rev	By	Chkd	Apprvd	Date	Description

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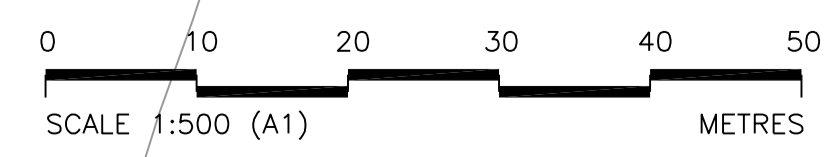


Project: **FOXYLDIATE, REDDITCH**

Drawing: **CUR LANE ACCESS ARRANGEMENTS**

Drawn by: AM Date: 21/10/2010
Checked by: SD Date: 26/10/2010
Approved by: ME Date: 26/10/2010

Drawing No. **CTBAOE-0004** Revision: -



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Appendix D

Road Safety Audit

Appendix D Road Safety Audit

Halcrow Yolles

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Technical note

Project	Heyford Developments, Land off Foxlydiate Lane, Redditch	Date	26 October 2010
Note	Designers Response to Stage 1 Road Safety Audit	Ref	CT BAOE/68
Author	Alex Hayes		

1. Introduction

1.1 This Technical Note addresses the problems highlighted in the Stage 1 Road Safety Audit carried out by D Lines and J Richardson of Halcrow Safety Audit Section, Worcester, in October 2010.

1.2 All references made in this Note use the same referencing system as per the Audit.

2. Cross Section Variation

2.1 *Problem A2.1.1 – Northern Roundabout safety fence*

- a) Problem accepted, provision for footway and safety fence to be incorporated into the design when upon embankment.

2.2 *Problem A3.1.1- Northern roundabout severe entry deflections*

- a) Problem accepted, repositioning of approach alignments with inclusion of an intermediate radius to be provided.

2.3 *Problem A3.1.2-Curr Lane T Junction, Shunt type accidents*

- a) Potential for accidents and inhibiting southbound through flow accepted; projected AADT flows into Curr Lane to be analysed in order to decide upon the form of junction to be used at this location. It is noted that due to the proximity to the existing roundabout, non standard tapers or Works at the tie in to the existing roundabout may be required in order to provide a ghost island right turn facility into Curr Lane.





Appendix E

TRICS assumptions and output

Appendix E TRICS assumptions and output

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 03 - RESIDENTIAL
 Category : A - HOUSES PRIVATELY OWNED
 VEHICLES

Selected regions and areas:

02	SOUTH EAST	
	EX ESSEX	1 days
04	EAST ANGLIA	
	CA CAMBRIDGESHIRE	1 days
	SF SUFFOLK	1 days
05	EAST MIDLANDS	
	LN LINCOLNSHIRE	1 days
	NT NOTTINGHAMSHIRE	1 days
06	WEST MIDLANDS	
	ST STAFFORDSHIRE	1 days
	WO WORCESTERSHIRE	2 days
08	NORTH WEST	
	LC LANCASHIRE	2 days
10	WALES	
	CF CARDIFF	1 days

Filtering Stage 2 selection:

Parameter: Number of dwellings
 Range: 48 to 237 (units:)

Public Transport Provision:

Selection by: Include all surveys

Date Range: 01/01/00 to 26/06/09

Selected survey days:

Tuesday	6 days
Wednesday	1 days
Thursday	3 days
Friday	1 days

Selected survey types:

Manual count	11 days
Directional ATC Count	0 days

Selected Locations:

Edge of Town	11
--------------	----

Selected Location Sub Categories:

Residential Zone	8
No Sub Category	3

LIST OF SITES relevant to selection parameters

1	CA-03-A-01 FALLOWFIELD CHESTERTON CAMBRIDGE Edge of Town Residential Zone Total Number of dwellings: 124	SEMI D./TERRACED, CAMBRIDGE	CAMBRIDGESHIRE
2	CF-03-A-02 DROPE ROAD CARDIFF Edge of Town Residential Zone Total Number of dwellings: 196	MIXED HOUSES, CARDIFF	CARDIFF
3	EX-03-A-01 MILTON ROAD CORRINGHAM STANFORD-LE-HOPE Edge of Town Residential Zone Total Number of dwellings: 237	SEMI-DET., STANFORD-LE-HOPE	ESSEX
4	LC-03-A-22 CLIFTON DRIVE NORTH BLACKPOOL Edge of Town Residential Zone Total Number of dwellings: 98	BUNGALOWS, BLACKPOOL	LANCASHIRE
5	LC-03-A-29 REVIDGE ROAD FOUR LANE ENDS BLACKBURN Edge of Town Residential Zone Total Number of dwellings: 185	DETACHED/SEMI D., BLACKBURN	LANCASHIRE
6	LN-03-A-01 BRANT ROAD BRACEBRIDGE LINCOLN Edge of Town Residential Zone Total Number of dwellings: 150	MIXED HOUSES, LINCOLN	LINCOLNSHIRE
7	NT-03-A-03 B6018 SUTTON ROAD KIRKBY-IN-ASHFIELD Edge of Town Residential Zone Total Number of dwellings: 166	SEMI DETACHED, KIRKBY-IN-ASHFD	NOTTINGHAMSHIRE
8	SF-03-A-02 STOKE PARK DRIVE MAIDENHALL IPSWICH Edge of Town Residential Zone Total Number of dwellings: 230	SEMI DET./TERRACED, IPSWICH	SUFFOLK
9	ST-03-A-03 QUEENSVILLE STAFFORD Edge of Town No Sub Category Total Number of dwellings: 224	MIXED HOUSES, STAFFORD	STAFFORDSHIRE

LIST OF SITES relevant to selection parameters (Cont.)

10	WO-03-A-02	SEMI DETACHED, REDDITCH	WORCESTERSHIRE
		MEADOWHILL ROAD	
		REDDITCH	
		Edge of Town	
		No Sub Category	
		Total Number of dwellings:	48
11	WO-03-A-06	DET./TERRACED, BROMSGROVE	WORCESTERSHIRE
		ST GODWALDS ROAD	
		ASTON FIELDS	
		BROMSGROVE	
		Edge of Town	
		No Sub Category	
		Total Number of dwellings:	232

TRIP RATE for Land Use 03 - RESIDENTIAL/A - HOUSES PRIVATELY OWNED
 VEHICLES

Calculation factor: 1 DWELLS

BOLD print indicates peak (busiest) period

Time Range	ARRIVALS			DEPARTURES			TOTALS		
	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate
00:00 - 01:00	0	0	0.000	0	0	0.000	0	0	0.000
01:00 - 02:00	0	0	0.000	0	0	0.000	0	0	0.000
02:00 - 03:00	0	0	0.000	0	0	0.000	0	0	0.000
03:00 - 04:00	0	0	0.000	0	0	0.000	0	0	0.000
04:00 - 05:00	0	0	0.000	0	0	0.000	0	0	0.000
05:00 - 06:00	0	0	0.000	0	0	0.000	0	0	0.000
06:00 - 07:00	0	0	0.000	0	0	0.000	0	0	0.000
07:00 - 08:00	11	172	0.089	11	172	0.312	11	172	0.401
08:00 - 09:00	11	172	0.153	11	172	0.465	11	172	0.618
09:00 - 10:00	11	172	0.184	11	172	0.219	11	172	0.403
10:00 - 11:00	11	172	0.146	11	172	0.198	11	172	0.344
11:00 - 12:00	11	172	0.195	11	172	0.188	11	172	0.383
12:00 - 13:00	11	172	0.209	11	172	0.202	11	172	0.411
13:00 - 14:00	11	172	0.187	11	172	0.187	11	172	0.374
14:00 - 15:00	11	172	0.199	11	172	0.179	11	172	0.378
15:00 - 16:00	11	172	0.333	11	172	0.230	11	172	0.563
16:00 - 17:00	11	172	0.350	11	172	0.221	11	172	0.571
17:00 - 18:00	11	172	0.440	11	172	0.256	11	172	0.696
18:00 - 19:00	11	172	0.309	11	172	0.250	11	172	0.559
19:00 - 20:00	0	0	0.000	0	0	0.000	0	0	0.000
20:00 - 21:00	0	0	0.000	0	0	0.000	0	0	0.000
21:00 - 22:00	0	0	0.000	0	0	0.000	0	0	0.000
22:00 - 23:00	0	0	0.000	0	0	0.000	0	0	0.000
23:00 - 24:00	0	0	0.000	0	0	0.000	0	0	0.000
Total Rates:			2.794			2.907			5.701

Parameter summary

Trip rate parameter range selected: 48 - 237 (units:)
 Survey date range: 01/01/00 - 26/06/09
 Number of weekdays (Monday-Friday): 11
 Number of Saturdays: 0
 Number of Sundays: 0
 Surveys manually removed from selection: 0



Appendix F

Journey to Work data

Appendix F Journey to Work data

Journey to Work- Mode split

	Tube/LRT	Train	Bus/Coach	Taxi	CarDrive	CarPax	MCycle	Bicycle	Walk	TOTAL
ALL	3	45	331	12	3738	342	54	81	398	5004
%	0%	1%	7%	0%	75%	7%	1%	2%	8%	100%

Ward	Zone	Tube/LRT	Train	Bus/Coach	Taxi	CarDrive	CarPax	MCycle	Bicycle	Walk	TOTAL
Batchley	North Redditch	0	0	105	3	517	78	6	45	259	1013
	South Redditch	0	0	99	3	198	39	12	9	18	378
	Birmingham and North	0	30	6	0	395	36	3	3	3	476
	M5 North	0	3	3	0	86	12	0	0	0	104
	Bromsgrove, Worcester and South West	0	0	6	3	208	21	9	6	24	277
	M42, M1 and South	0	3	12	0	259	15	9	0	6	304
	Total	0	36	231	9	1663	201	39	63	310	2552
West	North Redditch	0	0	61	0	458	72	3	9	27	630
	South Redditch	0	0	21	3	458	24	6	6	55	573
	Birmingham and North	0	9	9	0	457	15	3	3	0	496
	M5 North	0	0	0	0	87	3	0	0	0	90
	Bromsgrove, Worcester and South West	0	0	6	0	281	12	3	0	6	308
	M42, M1 and South	3	0	3	0	334	15	0	0	0	355
	Total	3	9	100	3	2075	141	15	18	88	2452
Total	North Redditch	0	0	166	3	975	150	9	54	286	1643
	South Redditch	0	0	120	6	656	63	18	15	73	951
	Birmingham and North	0	39	15	0	852	51	6	6	3	972
	M5 North	0	3	3	0	173	15	0	0	0	194
	Bromsgrove, Worcester and South West	0	0	12	3	489	33	12	6	30	585
	M40, M1 and South	3	3	15	0	593	30	9	0	6	659
	Total	3	45	331	12	3738	342	54	81	398	5004

TOTAL
40%
15%
19%
4%
11%
12%
26%
23%
20%
4%
13%
14%
33%
19%
19%
4%
12%
13%

Ward	Zone	Tube/LRT	Train	Bus/Coach	Taxi	CarDrive	CarPax	MCycle	Bicycle	Walk	TOTAL
Batchley	North Redditch	0%	0%	10%	0%	51%	8%	1%	4%	26%	100%
	South Redditch	0%	0%	26%	1%	52%	10%	3%	2%	5%	100%
	Birmingham and North	0%	6%	1%	0%	83%	8%	1%	1%	1%	100%
	M5 North	0%	3%	3%	0%	83%	12%	0%	0%	0%	100%
	Bromsgrove, Worcester and South West	0%	0%	2%	1%	75%	8%	3%	2%	9%	100%
	M42, M1 and South	0%	1%	4%	0%	85%	5%	3%	0%	2%	100%
	Total	0%	10%	0%	0%	73%	11%	0%	1%	4%	100%
West	North Redditch	0%	0%	4%	1%	80%	4%	1%	1%	10%	100%
	South Redditch	0%	0%	2%	0%	92%	3%	1%	1%	0%	100%
	Birmingham and North	0%	0%	0%	0%	97%	3%	0%	0%	0%	100%
	M5 North	0%	0%	2%	0%	91%	4%	1%	0%	2%	100%
	Bromsgrove, Worcester and South West	0%	0%	1%	0%	94%	4%	0%	0%	0%	100%
	M42, M1 and South	0%	0%	10%	0%	59%	9%	1%	3%	17%	100%
	Total	0%	0%	13%	1%	69%	7%	2%	2%	8%	100%
Total	North Redditch	0%	0%	2%	0%	88%	5%	1%	1%	0%	100%
	South Redditch	0%	0%	2%	0%	89%	8%	0%	0%	0%	100%
	Birmingham and North	0%	0%	2%	0%	84%	6%	2%	1%	5%	100%
	M5 North	0%	0%	2%	0%	90%	5%	1%	0%	1%	100%
	Bromsgrove, Worcester and South West	0%	0%	2%	0%	84%	6%	2%	1%	5%	100%
	M40, M1 and South	0%	0%	2%	0%	90%	5%	1%	0%	1%	100%
	Total	0%	0%	2%	0%	89%	7%	2%	2%	8%	100%



Appendix G

Modelling outputs

Appendix G Modelling outputs

Includes:

- Junction One – PICADY results
- Junction Two – PICADY results
- Junction Three – ARCADY results
- Junction Four – ARCADY results

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CAPACITIES, QUEUES, AND DELAYS AT 3 OR 4-ARM MAJOR/MINOR PRIORITY JUNCTIONS

PICADY 4.1 ANALYSIS PROGRAM
RELEASE 4.0 (NOV 2003)

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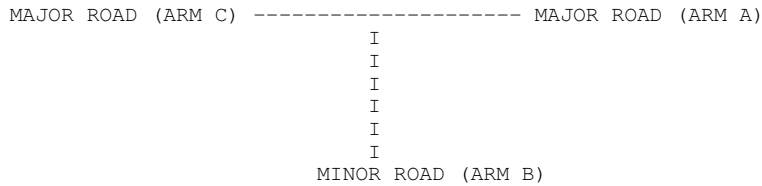
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Final Modelling for Report\Junction 1\Junction 1 AM Peak.vpi"
(drive-on-the-left) at 10:08:21 on Friday, 15 October 2010

RUN TITLE

Junction 1: A448/Birchfield Road- AM Peak

.MAJOR/MINOR JUNCTION CAPACITY AND DELAY

INPUT DATA



ARM A IS A448 from offslip
ARM B IS Birchfield Road
ARM C IS A448 from Overbridge

STREAM LABELLING CONVENTION

STREAM A-B CONTAINS TRAFFIC GOING FROM ARM A TO ARM B
STREAM B-AC CONTAINS TRAFFIC GOING FROM ARM B TO ARM A AND TO ARM C
ETC.

 GEOMETRIC DATA

I	DATA ITEM	I	MINOR ROAD B	I
I	TOTAL MAJOR ROAD CARRIAGEWAY WIDTH	I	(W) 9.00 M.	I
I	CENTRAL RESERVE WIDTH	I	(WCR) 0.00 M.	I
I		I		I
I	MAJOR ROAD RIGHT TURN - WIDTH	I	(WC-B) 2.20 M.	I
I	- VISIBILITY	I	(VC-B) 30.0 M.	I
I	- BLOCKS TRAFFIC	I	NO	I
I		I		I
I	MINOR ROAD - VISIBILITY TO LEFT	I	(VB-C) 30.0 M.	I
I	- VISIBILITY TO RIGHT	I	(VB-A) 30.0 M.	I
I	- LANE 1 WIDTH	I	(WB-C) -	I
I	- LANE 2 WIDTH	I	(WB-A) -	I
I	- WIDTH AT 0 M FROM JUNC.	I	9.78 M.	I
I	- WIDTH AT 5 M FROM JUNC.	I	4.78 M.	I
I	- WIDTH AT 10 M FROM JUNC.	I	3.68 M.	I
I	- WIDTH AT 15 M FROM JUNC.	I	3.66 M.	I
I	- WIDTH AT 20 M FROM JUNC.	I	3.60 M.	I
I	- LENGTH OF FLARED SECTION	I	1 VEHS	I

 TRAFFIC DEMAND DATA

TIME PERIOD BEGINS 07.45 AND ENDS 09.15

LENGTH OF TIME PERIOD - 90 MINUTES.
 LENGTH OF TIME SEGMENT - 15 MINUTES.

DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

I	I	NUMBER OF MINUTES FROM START WHEN			RATE OF FLOW (VEH/MIN) I								
I	ARM	I	I	I	I	I	I						
I		I	I	I	I	I	I						
I		I	I	I	I	I	I						
I		I	I	I	I	I	I						
I	ARM A	I	15.00	I	45.00	I	75.00	I	3.45	I	5.18	I	3.45
I	ARM B	I	15.00	I	45.00	I	75.00	I	4.97	I	7.46	I	4.97
I	ARM C	I	15.00	I	45.00	I	75.00	I	10.75	I	16.13	I	10.75

I	TURNING PROPORTIONS								
I	TURNING COUNTS (VEH/HR)								
I	(PERCENTAGE OF H.V.S)								
I	-----								
I	TIME	I	FROM/TO	I	ARM A	I	ARM B	I	ARM C
I	07.45 - 09.15	I		I		I		I	
I		I	ARM A	I	0.000	I	0.014	I	0.986
I		I		I	0.0	I	4.0	I	272.0
I		I		I	(0.0)	I	(2.0)	I	(2.0)
I		I		I		I		I	
I		I	ARM B	I	0.307	I	0.000	I	0.693
I		I		I	122.0	I	0.0	I	276.0
I		I		I	(2.0)	I	(0.0)	I	(2.0)
I		I		I		I		I	
I		I	ARM C	I	0.538	I	0.462	I	0.000
I		I		I	463.0	I	397.0	I	0.0
I		I		I	(2.0)	I	(2.0)	I	(0.0)
I		I		I		I		I	

 TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
07.45-08.00								
B-C	3.45	9.85	0.350		0.0	0.5	7.6	
B-A	1.52	5.32	0.287		0.0	0.4	5.5	
C-A	5.79							
C-B	4.96	8.98	0.553		0.0	1.2	16.4	
A-B	0.05							
A-C	3.40							

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.00-08.15								
B-C	4.12	9.07	0.454		0.5	0.8	11.7	
B-A	1.82	4.66	0.391		0.4	0.6	8.7	
C-A	6.91							
C-B	5.93	8.84	0.670		1.2	1.9	26.5	
A-B	0.06							
A-C	4.06							

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.15-08.30								
B-C	5.05	7.25	0.696		0.8	2.1	27.8	
B-A	2.23	3.56	0.626		0.6	1.5	19.6	
C-A	8.46							
C-B	7.26	8.66	0.838		1.9	4.2	53.4	
A-B	0.07							
A-C	4.97							

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.30-08.45								
B-C	5.05	7.68	0.657		2.1	2.0	30.5	
B-A	2.23	3.14	0.710		1.5	2.1	28.2	
C-A	8.46							
C-B	7.26	8.66	0.838		4.2	4.6	66.6	
A-B	0.07							
A-C	4.97							

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.45-09.00								
B-C	4.12	8.86	0.465		2.0	0.9	14.4	
B-A	1.82	4.60	0.396		2.1	0.7	11.7	
C-A	6.91							
C-B	5.93	8.84	0.670		4.6	2.2	36.5	
A-B	0.06							
A-C	4.06							

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
09.00-09.15								
B-C	3.45	9.79	0.352		0.9	0.6	8.6	
B-A	1.52	5.27	0.289		0.7	0.4	6.6	
C-A	5.79							
C-B	4.96	8.98	0.553		2.2	1.3	20.6	
A-B	0.05							
A-C	3.40							

QUEUE FOR STREAM B-C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
08.00	0.5	*
08.15	0.8	*
08.30	2.1	**
08.45	2.0	**
09.00	0.9	*
09.15	0.6	*

QUEUE FOR STREAM B-A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
08.00	0.4	
08.15	0.6	*
08.30	1.5	*
08.45	2.1	**
09.00	0.7	*
09.15	0.4	

QUEUE FOR STREAM C-B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
08.00	1.2	*
08.15	1.9	**
08.30	4.2	****
08.45	4.6	*****
09.00	2.2	**
09.15	1.3	*

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

I	STREAM	I	TOTAL DEMAND	I	* QUEUEING *	I	* INCLUSIVE QUEUEING *	I		
I		I		I	* DELAY *	I	* DELAY *	I		
I		I	(VEH)	I	(MIN)	I	(MIN)	I		
I		I	(VEH/H)	I	(MIN/VEH)	I	(MIN/VEH)	I		
I	B-C	I	378.5	I	252.3	I	100.6	I	0.27	I
I	B-A	I	167.3	I	111.5	I	80.3	I	0.48	I
I	C-A	I	634.9	I	423.2	I		I		I
I	C-B	I	544.4	I	362.9	I	219.9	I	0.40	I
I	A-B	I	5.5	I	3.7	I		I		I
I	A-C	I	373.0	I	248.6	I		I		I
I	ALL	I	2103.4	I	1402.3	I	400.8	I	0.19	I

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD .
 * INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD.
 * THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

END OF JOB

***** PICADY 4 run completed.
 ===== end of file =====

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CAPACITIES, QUEUES, AND DELAYS AT 3 OR 4-ARM MAJOR/MINOR PRIORITY JUNCTIONS

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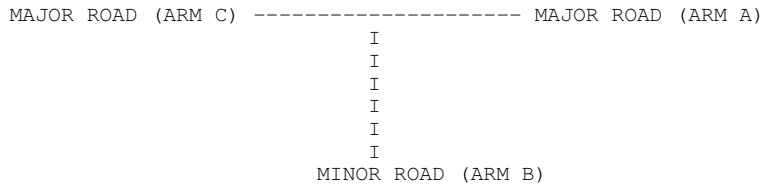
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Final Modelling for Report\Junction 1\Junction 1 PM Peak.vpi"
(drive-on-the-left) at 10:09:45 on Friday, 15 October 2010

RUN TITLE

Junction 1: A448/Birchfield Road- PM Peak

.MAJOR/MINOR JUNCTION CAPACITY AND DELAY

INPUT DATA



ARM A IS A448 from offslip
ARM B IS Birchfield Road
ARM C IS A448 from Overbridge

STREAM LABELLING CONVENTION

STREAM A-B CONTAINS TRAFFIC GOING FROM ARM A TO ARM B
STREAM B-AC CONTAINS TRAFFIC GOING FROM ARM B TO ARM A AND TO ARM C
ETC.

 GEOMETRIC DATA

I	DATA ITEM	I	MINOR ROAD B	I
I	TOTAL MAJOR ROAD CARRIAGEWAY WIDTH	I (W)	9.00 M.	I
I	CENTRAL RESERVE WIDTH	I (WCR)	0.00 M.	I
I		I		I
I	MAJOR ROAD RIGHT TURN - WIDTH	I (WC-B)	2.20 M.	I
I	- VISIBILITY	I (VC-B)	30.0 M.	I
I	- BLOCKS TRAFFIC	I	NO	I
I		I		I
I	MINOR ROAD - VISIBILITY TO LEFT	I (VB-C)	30.0 M.	I
I	- VISIBILITY TO RIGHT	I (VB-A)	30.0 M.	I
I	- LANE 1 WIDTH	I (WB-C)	-	I
I	- LANE 2 WIDTH	I (WB-A)	-	I
I	- WIDTH AT 0 M FROM JUNC.	I	9.78 M.	I
I	- WIDTH AT 5 M FROM JUNC.	I	4.78 M.	I
I	- WIDTH AT 10 M FROM JUNC.	I	3.68 M.	I
I	- WIDTH AT 15 M FROM JUNC.	I	3.66 M.	I
I	- WIDTH AT 20 M FROM JUNC.	I	3.60 M.	I
I	- LENGTH OF FLARED SECTION	I	1 VEHS	I

 TRAFFIC DEMAND DATA

TIME PERIOD BEGINS 16.45 AND ENDS 18.15

LENGTH OF TIME PERIOD - 90 MINUTES.
 LENGTH OF TIME SEGMENT - 15 MINUTES.

DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

I	I	NUMBER OF MINUTES FROM START WHEN			RATE OF FLOW (VEH/MIN) I		
I	ARM	I FLOW STARTS	I TOP OF PEAK	I FLOW STOPS	I BEFORE	I AT TOP	I AFTER
I	I	I TO RISE	I IS REACHED	I FALLING	I PEAK	I OF PEAK	I PEAK
I	ARM A	I 15.00	I 45.00	I 75.00	I 6.05	I 9.08	I 6.05
I	ARM B	I 15.00	I 45.00	I 75.00	I 4.40	I 6.60	I 4.40
I	ARM C	I 15.00	I 45.00	I 75.00	I 8.07	I 12.11	I 8.07

I	TURNING PROPORTIONS						I
I	TURNING COUNTS (VEH/HR)						I
I	(PERCENTAGE OF H.V.S)						I
I	-----						I
I	TIME	I FROM/TO	I ARM A	I ARM B	I ARM C	I	I
I	16.45 - 18.15	I	I	I	I	I	I
I		I ARM A	I 0.000	I 0.037	I 0.963	I	I
I		I	I 0.0	I 18.0	I 466.0	I	I
I		I	I (0.0)	I (2.0)	I (2.0)	I	I
I		I	I	I	I	I	I
I		I ARM B	I 0.199	I 0.000	I 0.801	I	I
I		I	I 70.0	I 0.0	I 282.0	I	I
I		I	I (2.0)	I (0.0)	I (2.0)	I	I
I		I	I	I	I	I	I
I		I ARM C	I 0.418	I 0.582	I 0.000	I	I
I		I	I 270.0	I 376.0	I 0.0	I	I
I		I	I (2.0)	I (2.0)	I (0.0)	I	I
I		I	I	I	I	I	I

 TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
16.45-17.00								
B-C	3.53	9.59	0.368		0.0	0.6	8.1	
B-A	0.88	4.96	0.176		0.0	0.2	3.0	
C-A	3.38							
C-B	4.70	8.46	0.556		0.0	1.2	16.5	
A-B	0.22							
A-C	5.82							

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
17.00-17.15								
B-C	4.21	9.06	0.465		0.6	0.8	12.1	
B-A	1.04	4.22	0.248		0.2	0.3	4.6	
C-A	4.03							
C-B	5.61	8.22	0.682		1.2	2.0	27.5	
A-B	0.27							
A-C	6.96							

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
17.15-17.30								
B-C	5.16	8.07	0.639		0.8	1.7	22.9	
B-A	1.28	3.10	0.413		0.3	0.7	9.1	
C-A	4.94							
C-B	6.87	7.90	0.870		2.0	4.9	60.4	
A-B	0.33							
A-C	8.52							

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
17.30-17.45								
B-C	5.16	7.99	0.645		1.7	1.8	25.8	
B-A	1.28	3.02	0.423		0.7	0.7	10.4	
C-A	4.94							
C-B	6.87	7.90	0.870		4.9	5.6	79.4	
A-B	0.33							
A-C	8.52							

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
17.45-18.00								
B-C	4.21	9.00	0.468		1.8	0.9	14.4	
B-A	1.04	4.12	0.253		0.7	0.3	5.6	
C-A	4.03							
C-B	5.61	8.22	0.682		5.6	2.3	40.7	
A-B	0.27							
A-C	6.96							

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
18.00-18.15								
B-C	3.53	9.56	0.369		0.9	0.6	9.3	
B-A	0.88	4.91	0.178		0.3	0.2	3.5	
C-A	3.38							
C-B	4.70	8.46	0.556		2.3	1.3	21.0	
A-B	0.22							
A-C	5.82							

 QUEUE FOR STREAM B-C

 TIME SEGMENT NO. OF
 ENDING VEHICLES
 IN QUEUE

17.00	0.6	*
17.15	0.8	*
17.30	1.7	**
17.45	1.8	**
18.00	0.9	*
18.15	0.6	*

 QUEUE FOR STREAM B-A

 TIME SEGMENT NO. OF
 ENDING VEHICLES
 IN QUEUE

17.00	0.2	
17.15	0.3	
17.30	0.7	*
17.45	0.7	*
18.00	0.3	
18.15	0.2	

 QUEUE FOR STREAM C-B

 TIME SEGMENT NO. OF
 ENDING VEHICLES
 IN QUEUE

17.00	1.2	*
17.15	2.0	**
17.30	4.9	*****
17.45	5.6	*****
18.00	2.3	**
18.15	1.3	*

 QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

I	STREAM	I	TOTAL DEMAND	I	* QUEUEING *	I	* INCLUSIVE QUEUEING *	I		
I		I		I	* DELAY *	I	* DELAY *	I		
I		I	(VEH)	I	(MIN)	I	(MIN)	I		
I		I	(VEH/H)	I	(MIN/VEH)	I	(MIN/VEH)	I		
I	B-C	I	386.7	I	257.8	I	92.7	I	0.24	I
I	B-A	I	96.0	I	64.0	I	36.1	I	0.38	I
I	C-A	I	370.2	I	246.8	I		I		I
I	C-B	I	515.6	I	343.7	I	245.5	I	0.48	I
I	A-B	I	24.7	I	16.5	I		I		I
I	A-C	I	639.0	I	426.0	I		I		I
I	ALL	I	2032.1	I	1354.8	I	374.3	I	0.18	I

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD .
 * INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD.
 * THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

END OF JOB
 ***** PICADY 4 run completed.
 ===== end of file =====

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CAPACITIES, QUEUES, AND DELAYS AT 3 OR 4-ARM MAJOR/MINOR PRIORITY JUNCTIONS

PICADY 4.1 ANALYSIS PROGRAM
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Run with file:-
"u:\CTB AOE 000 - Foxlydiat Lane, Webheath, Redditch\Calcs\Traffic Surveys\modelling\
Final Modelling for Report\Junction 2\Junction 2 AM Peak.vpi"
(drive-on-the-left) at 16:07:23 on Thursday, 14 October 2010

RUN TITLE

J2 - Birchfield Road/Foxlydiat Lane - AM Peak

.MAJOR/MINOR JUNCTION CAPACITY AND DELAY

INPUT DATA

```

MAJOR ROAD (ARM C) ----- MAJOR ROAD (ARM A)
                        I
                        I
                        I
                        I
                        I
                        I
                        I
                        I
MINOR ROAD (ARM B)
    
```

ARM A IS Birchfield Road (East)
ARM B IS Foxlydiat Lane
ARM C IS Birchfield Road (West)

STREAM LABELLING CONVENTION

STREAM A-B CONTAINS TRAFFIC GOING FROM ARM A TO ARM B
STREAM B-AC CONTAINS TRAFFIC GOING FROM ARM B TO ARM A AND TO ARM C
ETC.

GEOMETRIC DATA

I	DATA ITEM	I	MINOR ROAD B	I
I	TOTAL MAJOR ROAD CARRIAGEWAY WIDTH	I (W)	6.97 M.	I
I	CENTRAL RESERVE WIDTH	I (WCR)	0.00 M.	I
I	MAJOR ROAD RIGHT TURN - WIDTH	I (WC-B)	2.20 M.	I
I	- VISIBILITY	I (VC-B)	80.0 M.	I
I	- BLOCKS TRAFFIC	I	YES	I
I	MINOR ROAD - VISIBILITY TO LEFT	I (VB-C)	0.0 M.	I
I	- VISIBILITY TO RIGHT	I (VB-A)	0.0 M.	I
I	- LANE 1 WIDTH	I (WB-C)	3.50 M.	I
I	- LANE 2 WIDTH	I (WB-A)	0.00 M.	I

TRAFFIC DEMAND DATA

TIME PERIOD BEGINS 07.45 AND ENDS 09.15

LENGTH OF TIME PERIOD - 90 MINUTES.
 LENGTH OF TIME SEGMENT - 15 MINUTES.

DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

I I I	I I I	NUMBER OF MINUTES FROM START WHEN			RATE OF FLOW (VEH/MIN)		
		I I I	I I I	I I I	I I I	I I I	I I I
	ARM	FLOW STARTS TO RISE	TOP OF PEAK IS REACHED	FLOW STOPS FALLING	BEFORE PEAK	AT TOP OF PEAK	AFTER PEAK
I	ARM A	15.00	45.00	75.00	4.45	6.67	4.45
I	ARM B	15.00	45.00	75.00	1.19	1.78	1.19
I	ARM C	15.00	45.00	75.00	4.93	7.39	4.93

I I I I	I I I	TURNING PROPORTIONS			I I I
		TURNING COUNTS (VEH/HR)			
(PERCENTAGE OF H.V.S)					
	TIME	FROM/TO	ARM A	ARM B	ARM C
I	07.45 - 09.15				
I		ARM A	0.000	0.163	0.837
I			0.0	58.0	298.0
I			(0.0)	(10.0)	(10.0)
I		ARM B	0.495	0.000	0.505
I			47.0	0.0	48.0
I			(10.0)	(0.0)	(10.0)
I		ARM C	0.817	0.183	0.000
I			322.0	72.0	0.0
I			(10.0)	(10.0)	(0.0)

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA

DEFAULT PROPORTIONS OF HEAVY VEHICLES ARE USED

I I I	TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/TIME SEGMENT)
I	07.45-08.00								
I	B-AC	1.19	7.11	0.167		0.0	0.2	2.8	
I	C-AB	1.40	11.16	0.126		0.0	0.2	3.3	
I	C-A	3.52							
I	A-B	0.73							
I	A-C	3.72							

I I I	TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/TIME SEGMENT)
I	08.00-08.15								
I	B-AC	1.42	6.80	0.209		0.2	0.3	3.8	
I	C-AB	1.84	11.53	0.159		0.2	0.3	4.6	
I	C-A	4.04							
I	A-B	0.87							
I	A-C	4.45							

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.15-08.30								
B-AC	1.74	6.36	0.273		0.3	0.4	5.3	
C-AB	2.55	12.05	0.211		0.3	0.5	6.9	
C-A	4.66							
A-B	1.06							
A-C	5.45							

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.30-08.45								
B-AC	1.74	6.36	0.273		0.4	0.4	5.6	
C-AB	2.55	12.06	0.211		0.5	0.5	7.0	
C-A	4.65							
A-B	1.06							
A-C	5.45							

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.45-09.00								
B-AC	1.42	6.79	0.209		0.4	0.3	4.2	
C-AB	1.84	11.54	0.160		0.5	0.3	4.7	
C-A	4.04							
A-B	0.87							
A-C	4.45							

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
09.00-09.15								
B-AC	1.19	7.10	0.167		0.3	0.2	3.1	
C-AB	1.41	11.16	0.126		0.3	0.2	3.4	
C-A	3.52							
A-B	0.73							
A-C	3.72							

WARNING NO MARGINAL ANALYSIS OF CAPACITIES AS MAJOR ROAD BLOCKING MAY OCCUR

QUEUE FOR STREAM B-AC

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
08.00	0.2
08.15	0.3
08.30	0.4
08.45	0.4
09.00	0.3
09.15	0.2

QUEUE FOR STREAM C-AB

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
08.00	0.2
08.15	0.3
08.30	0.5
08.45	0.5
09.00	0.3
09.15	0.2

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

STREAM	TOTAL DEMAND	* QUEUEING * * DELAY *	* INCLUSIVE QUEUEING * * DELAY *
(VEH)	(VEH/H)	(MIN)	(MIN/VEH)
B-AC	130.3	86.8	24.8
C-AB	173.7	115.8	29.9
C-A	366.5	244.3	
A-B	79.5	53.0	
A-C	408.6	272.4	
ALL	1158.7	772.4	54.7

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD .
 * INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD.
 * THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

END OF JOB

***** PICADY 4 run completed.
 ===== end of file =====

[Printed at 16:08:47 on 14/10/2010]

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CAPACITIES, QUEUES, AND DELAYS AT 3 OR 4-ARM MAJOR/MINOR PRIORITY JUNCTIONS

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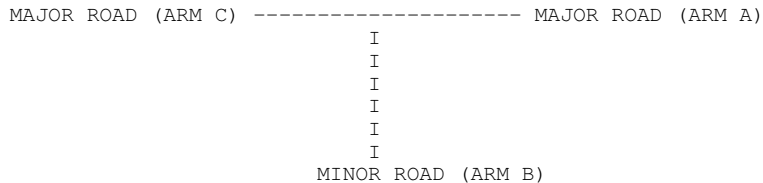
Run with file:-
"u:\CTB AOE 000 - Foxlydiat Lane, Webheath, Redditch\Calcs\Traffic Surveys\modelling\
Final Modelling for Report\Junction 2\Junction 2 PM Peak.vpi"
(drive-on-the-left) at 16:10:26 on Thursday, 14 October 2010

RUN TITLE

J2 - Birchfield Road/Foxlydiat Lane - PM Peak

.MAJOR/MINOR JUNCTION CAPACITY AND DELAY

INPUT DATA



ARM A IS Birchfield Road (East)
ARM B IS Foxlydiat Lane
ARM C IS Birchfield Road (West)

STREAM LABELLING CONVENTION

STREAM A-B CONTAINS TRAFFIC GOING FROM ARM A TO ARM B
STREAM B-AC CONTAINS TRAFFIC GOING FROM ARM B TO ARM A AND TO ARM C
ETC.

GEOMETRIC DATA

I	DATA ITEM	I	MINOR ROAD B	I
I	TOTAL MAJOR ROAD CARRIAGEWAY WIDTH	I (W)	6.97 M.	I
I	CENTRAL RESERVE WIDTH	I (WCR)	0.00 M.	I
I		I		I
I	MAJOR ROAD RIGHT TURN - WIDTH	I (WC-B)	2.20 M.	I
I	- VISIBILITY	I (VC-B)	80.0 M.	I
I	- BLOCKS TRAFFIC	I	YES	I
I		I		I
I	MINOR ROAD - VISIBILITY TO LEFT	I (VB-C)	0.0 M.	I
I	- VISIBILITY TO RIGHT	I (VB-A)	0.0 M.	I
I	- LANE 1 WIDTH	I (WB-C)	3.50 M.	I
I	- LANE 2 WIDTH	I (WB-A)	0.00 M.	I

TRAFFIC DEMAND DATA

TIME PERIOD BEGINS 16.45 AND ENDS 18.15

LENGTH OF TIME PERIOD - 90 MINUTES.
 LENGTH OF TIME SEGMENT - 15 MINUTES.

DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

I I I	I I I	NUMBER OF MINUTES FROM START WHEN			RATE OF FLOW (VEH/MIN)		
		I I I	I I I	I I I	I I I	I I I	I I I
	ARM	FLOW STARTS TO RISE	TOP OF PEAK IS REACHED	FLOW STOPS FALLING	BEFORE PEAK	AT TOP OF PEAK	AFTER PEAK
I	ARM A	15.00	45.00	75.00	4.29	6.43	4.29
I	ARM B	15.00	45.00	75.00	1.77	2.66	1.77
I	ARM C	15.00	45.00	75.00	4.90	7.35	4.90

I I I I	I I I	TURNING PROPORTIONS			I I I
		TURNING COUNTS (VEH/HR)			
(PERCENTAGE OF H.V.S)					
	TIME	FROM/TO	ARM A	ARM B	ARM C
I	16.45 - 18.15				
I		ARM A	0.000	0.114	0.886
I			0.0	39.0	304.0
I			(0.0)	(10.0)	(10.0)
I		ARM B	0.528	0.000	0.472
I			75.0	0.0	67.0
I			(10.0)	(0.0)	(10.0)
I		ARM C	0.939	0.061	0.000
I			368.0	24.0	0.0
I			(10.0)	(10.0)	(0.0)

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA

DEFAULT PROPORTIONS OF HEAVY VEHICLES ARE USED

I I I	TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/TIME SEGMENT)
I	16.45-17.00								
I	B-AC	1.78	7.09	0.250		0.0	0.3	4.7	
I	C-AB	0.48	11.52	0.042		0.0	0.1	0.9	
I	C-A	4.42							
I	A-B	0.49							
I	A-C	3.80							

I I I	TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/TIME SEGMENT)
I	17.00-17.15								
I	B-AC	2.12	6.80	0.312		0.3	0.4	6.4	
I	C-AB	0.63	11.93	0.053		0.1	0.1	1.2	
I	C-A	5.22							
I	A-B	0.58							
I	A-C	4.54							

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
17.15-17.30								
B-AC	2.60	6.40	0.406		0.4	0.7	9.5	
C-AB	0.92	12.67	0.072		0.1	0.1	1.9	
C-A	6.25							
A-B	0.71							
A-C	5.56							

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
17.30-17.45								
B-AC	2.60	6.39	0.406		0.7	0.7	10.1	
C-AB	0.92	12.67	0.072		0.1	0.1	1.9	
C-A	6.25							
A-B	0.71							
A-C	5.56							

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
17.45-18.00								
B-AC	2.12	6.80	0.312		0.7	0.5	7.2	
C-AB	0.63	11.93	0.053		0.1	0.1	1.2	
C-A	5.22							
A-B	0.58							
A-C	4.54							

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
18.00-18.15								
B-AC	1.78	7.09	0.250		0.5	0.3	5.3	
C-AB	0.48	11.52	0.042		0.1	0.1	0.9	
C-A	4.42							
A-B	0.49							
A-C	3.80							

WARNING NO MARGINAL ANALYSIS OF CAPACITIES AS MAJOR ROAD BLOCKING MAY OCCUR

QUEUE FOR STREAM B-AC

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
17.00	0.3
17.15	0.4
17.30	0.7 *
17.45	0.7 *
18.00	0.5
18.15	0.3

QUEUE FOR STREAM C-AB

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
17.00	0.1
17.15	0.1
17.30	0.1
17.45	0.1
18.00	0.1
18.15	0.1

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

STREAM	TOTAL DEMAND	* QUEUEING * * DELAY *	* INCLUSIVE QUEUEING * * DELAY *
(VEH)	(VEH/H)	(MIN)	(MIN/VEH)
B-AC	194.7	43.1	0.22
C-AB	60.8	8.1	0.13
C-A	476.8		
A-B	53.5		
A-C	416.8		
ALL	1202.6	51.2	0.04

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD .
 * INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD.
 * THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

END OF JOB

***** PICADY 4 run completed.

===== end of file =====

[Printed at 16:10:43 on 14/10/2010]

A R C A D Y 6

ASSESSMENT OF ROUNDABOUT CAPACITY AND DELAY

Analysis Program: Release 2.0 (MAR 2005)

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RG40 3GA, UK

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IN NO WAY RELIEVED OF THEIR RESPONSIBILITY FOR THE CORRECTNESS OF THE SOLUTION

Run with file:-

"u:\CTB AOE 000 - Foxlydiat Lane, Webheath, Redditch\Calcs\Traffic Surveys\modelling\
Final Modelling for Report\Junction 3\Junction 3 Secondary Site Access AM Peak.vai"
(drive-on-the-left) at 16:12:47 on Thursday, 14 October 2010

FILE PROPERTIES

RUN TITLE: Junction 3: Secondary Site Access - AM Peak
LOCATION: Redditch
DATE: 17/09/2010
CLIENT: Heyford Developments
ENUMERATOR: ME
JOB NUMBER: CTBAOE
STATUS: Preliminary
DESCRIPTION:

INPUT DATA

ARM A - Foxlydiat Lane
ARM B - Church Road
ARM C - Great Hockings Lane
ARM D - Curr Lane

GEOMETRIC DATA

I	ARM	I	V (M)	I	E (M)	I	L (M)	I	R (M)	I	D (M)	I	PHI (DEG)	I	SLOPE	I	INTERCEPT (PCU/MIN)	I
I	ARM A	I	2.87	I	4.89	I	2.90	I	10.60	I	30.00	I	35.0	I	0.495	I	16.581	I
I	ARM B	I	2.77	I	5.26	I	4.60	I	14.90	I	30.00	I	40.0	I	0.511	I	17.635	I
I	ARM C	I	3.01	I	4.89	I	8.80	I	27.40	I	30.00	I	33.0	I	0.567	I	20.898	I
I	ARM D	I	2.23	I	4.99	I	5.90	I	34.20	I	30.00	I	32.0	I	0.524	I	17.069	I

V = approach half-width L = effective flare length D = inscribed circle diameter
E = entry width R = entry radius PHI = entry angle

TRAFFIC DEMAND DATA

(Only sets included in the current run are shown)

I	ARM	I	FLOW	I	SCALE (%)	I
I	A	I	100	I		I
I	B	I	100	I		I
I	C	I	100	I		I
I	D	I	100	I		I

TIME PERIOD BEGINS 07.45 AND ENDS 09.15

LENGTH OF TIME PERIOD - 90 MINUTES.
 LENGTH OF TIME SEGMENT - 15 MINUTES.

DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

DEMAND SET TITLE: AM Peak

I	I	NUMBER OF MINUTES FROM START WHEN			RATE OF FLOW (VEH/MIN)		
		I	I	I	I	I	I
I	ARM	FLOW STARTS	TOP OF PEAK	IS REACHED	BEFORE	AT TOP	AFTER
I	I	TO RISE	IS REACHED	FALLING	PEAK	OF PEAK	PEAK
I	ARM A	15.00	45.00	75.00	0.85	1.28	0.85
I	ARM B	15.00	45.00	75.00	1.64	2.46	1.64
I	ARM C	15.00	45.00	75.00	1.13	1.69	1.13
I	ARM D	15.00	45.00	75.00	1.89	2.83	1.89

DEMAND SET TITLE: AM Peak

I	I	TURNING PROPORTIONS			
		TURNING COUNTS (VEH/HR)			
I		I (PERCENTAGE OF H.V.S)			
I		I			
I		I			
I		I			
TIME	FROM/TO	ARM A	ARM B	ARM C	ARM D
07.45 - 09.15	ARM A	0.015	0.500	0.132	0.353
		1.0	34.0	9.0	24.0
		(10.0)	(10.0)	(10.0)	(10.0)
	ARM B	0.305	0.008	0.061	0.626
		40.0	1.0	8.0	82.0
		(10.0)	(10.0)	(10.0)	(10.0)
	ARM C	0.578	0.344	0.011	0.067
		52.0	31.0	1.0	6.0
		(10.0)	(10.0)	(10.0)	(10.0)
	ARM D	0.225	0.768	0.007	0.000
		34.0	116.0	1.0	0.0
		(10.0)	(10.0)	(10.0)	(10.0)

QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
07.45-08.00									
ARM A	0.85	14.15	0.060		0.0	0.1	0.9		0.08
ARM B	1.64	15.80	0.104		0.0	0.1	1.7		0.07
ARM C	1.13	17.95	0.063		0.0	0.1	1.0		0.06
ARM D	1.89	14.69	0.128		0.0	0.1	2.1		0.08

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
08.00-08.15									
ARM A	1.01	13.96	0.073		0.1	0.1	1.2		0.08
ARM B	1.96	15.76	0.124		0.1	0.1	2.1		0.07
ARM C	1.34	17.74	0.076		0.1	0.1	1.2		0.06
ARM D	2.25	14.53	0.155		0.1	0.2	2.7		0.08

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
08.15-08.30									
ARM A	1.24	13.71	0.091		0.1	0.1	1.5		0.08
ARM B	2.39	15.69	0.153		0.1	0.2	2.6		0.08
ARM C	1.65	17.46	0.094		0.1	0.1	1.5		0.06
ARM D	2.76	14.31	0.193		0.2	0.2	3.5		0.09

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
08.30-08.45									
ARM A	1.24	13.71	0.091		0.1	0.1	1.5		0.08
ARM B	2.39	15.69	0.153		0.2	0.2	2.7		0.08
ARM C	1.65	17.45	0.094		0.1	0.1	1.6		0.06
ARM D	2.76	14.31	0.193		0.2	0.2	3.6		0.09

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
08.45-09.00									
ARM A	1.01	13.96	0.073		0.1	0.1	1.2		0.08
ARM B	1.96	15.76	0.124		0.2	0.1	2.2		0.07
ARM C	1.34	17.74	0.076		0.1	0.1	1.3		0.06
ARM D	2.25	14.53	0.155		0.2	0.2	2.8		0.08

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
09.00-09.15									
ARM A	0.85	14.14	0.060		0.1	0.1	1.0		0.08
ARM B	1.64	15.80	0.104		0.1	0.1	1.8		0.07
ARM C	1.13	17.94	0.063		0.1	0.1	1.0		0.06
ARM D	1.89	14.69	0.129		0.2	0.1	2.3		0.08

QUEUE AT ARM A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
08.00	0.1
08.15	0.1
08.30	0.1
08.45	0.1
09.00	0.1
09.15	0.1

QUEUE AT ARM B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
08.00	0.1
08.15	0.1
08.30	0.2
08.45	0.2
09.00	0.1
09.15	0.1

QUEUE AT ARM C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
08.00	0.1
08.15	0.1
08.30	0.1
08.45	0.1
09.00	0.1
09.15	0.1

 QUEUE AT ARM D

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
08.00	0.1
08.15	0.2
08.30	0.2
08.45	0.2
09.00	0.2
09.15	0.1

 QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

I	ARM	I	TOTAL DEMAND	I	* QUEUEING *	I	* INCLUSIVE QUEUEING *	I						
I	I	I	I	I	* DELAY *	I	* DELAY *	I						
I	I	I	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)						
I	A	I	93.2	I	62.2	I	7.2	I	0.08	I	7.2	I	0.08	I
I	B	I	179.6	I	119.8	I	13.0	I	0.07	I	13.0	I	0.07	I
I	C	I	123.4	I	82.3	I	7.5	I	0.06	I	7.5	I	0.06	I
I	D	I	207.1	I	138.0	I	17.0	I	0.08	I	17.0	I	0.08	I
I	ALL	I	603.3	I	402.2	I	44.8	I	0.07	I	44.8	I	0.07	I

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD.
 * INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD.
 * THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

END OF JOB

===== end of file =====

A R C A D Y 6

ASSESSMENT OF ROUNDABOUT CAPACITY AND DELAY

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IN NO WAY RELIEVED OF THEIR RESPONSIBILITY FOR THE CORRECTNESS OF THE SOLUTION

Run with file:-
"u:\CTB AOE 000 - Foxlydiat Lane, Webheath, Redditch\Calcs\Traffic Surveys\modelling\
Final Modelling for Report\Junction 3\Junction 3 Secondary Site Access PM Peak.vai"
(drive-on-the-left) at 14:13:33 on Thursday, 14 October 2010

FILE PROPERTIES

RUN TITLE: Junction 3: Secondary Site Access - PM Peak
LOCATION: Redditch
DATE: 17/09/2010
CLIENT: Heyford Developments
ENUMERATOR: ME
JOB NUMBER: CTBAOE
STATUS: Preliminary
DESCRIPTION:

INPUT DATA

ARM A - Foxlydiat Lane
ARM B - Church Road
ARM C - Great Hockings Lane
ARM D - Curr Lane

GEOMETRIC DATA

I	ARM	I	V (M)	I	E (M)	I	L (M)	I	R (M)	I	D (M)	I	PHI (DEG)	I	SLOPE	I	INTERCEPT (PCU/MIN)	I
I	ARM A	I	2.87	I	4.89	I	2.90	I	10.60	I	30.00	I	35.0	I	0.495	I	16.581	I
I	ARM B	I	2.77	I	5.26	I	4.60	I	14.90	I	30.00	I	40.0	I	0.511	I	17.635	I
I	ARM C	I	3.01	I	4.89	I	8.80	I	27.40	I	30.00	I	33.0	I	0.567	I	20.898	I
I	ARM D	I	2.23	I	4.99	I	5.90	I	34.20	I	30.00	I	32.0	I	0.524	I	17.069	I

V = approach half-width L = effective flare length D = inscribed circle diameter
E = entry width R = entry radius PHI = entry angle

TRAFFIC DEMAND DATA

(Only sets included in the current run are shown)

I	ARM	I	FLOW	SCALE(%)	I
I	A	I	100	I	I
I	B	I	100	I	I
I	C	I	100	I	I
I	D	I	100	I	I

TIME PERIOD BEGINS 16.45 AND ENDS 18.15
LENGTH OF TIME PERIOD - 90 MINUTES.
LENGTH OF TIME SEGMENT - 15 MINUTES.

DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

DEMAND SET TITLE: PM Peak

I	I	NUMBER OF MINUTES FROM START WHEN			RATE OF FLOW (VEH/MIN)		
		I	I	I	I	I	I
I	ARM	FLOW STARTS TO RISE	TOP OF PEAK IS REACHED	IFLOW STOPS FALLING	BEFORE PEAK	AT TOP OF PEAK	AFTER PEAK
I	ARM A	15.00	45.00	75.00	1.42	2.14	1.42
I	ARM B	15.00	45.00	75.00	1.99	2.98	1.99
I	ARM C	15.00	45.00	75.00	0.51	0.77	0.51
I	ARM D	15.00	45.00	75.00	1.71	2.57	1.71

DEMAND SET TITLE: PM Peak

I	I	TURNING PROPORTIONS				
		TURNING COUNTS (VEH/HR)				
I	I	(PERCENTAGE OF H.V.S)				
		FROM/TO	ARM A	ARM B	ARM C	ARM D
I	16.45 - 18.15					
I		ARM A	0.009	0.307	0.386	0.298
I			1.0	35.0	44.0	34.0
I			(10.0)	(10.0)	(10.0)	(10.0)
I		ARM B	0.176	0.006	0.157	0.660
I			28.0	1.0	25.0	105.0
I			(10.0)	(10.0)	(10.0)	(10.0)
I		ARM C	0.634	0.341	0.000	0.024
I			26.0	14.0	0.0	1.0
I			(10.0)	(10.0)	(10.0)	(10.0)
I		ARM D	0.285	0.693	0.022	0.000
I			39.0	95.0	3.0	0.0
I			(10.0)	(10.0)	(10.0)	(10.0)

QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

I	TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
I	16.45-17.00									
I	ARM A	1.42	14.37	0.099		0.0	0.1	1.6		0.08
I	ARM B	1.99	15.51	0.128		0.0	0.1	2.1		0.07
I	ARM C	0.51	17.80	0.029		0.0	0.0	0.4		0.06
I	ARM D	1.71	15.06	0.114		0.0	0.1	1.9		0.07

I	TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
I	17.00-17.15									
I	ARM A	1.70	14.24	0.120		0.1	0.1	2.0		0.08
I	ARM B	2.37	15.40	0.154		0.1	0.2	2.7		0.08
I	ARM C	0.61	17.56	0.035		0.0	0.0	0.5		0.06
I	ARM D	2.04	14.97	0.137		0.1	0.2	2.3		0.08

I	TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
I	17.15-17.30									
I	ARM A	2.08	14.05	0.148		0.1	0.2	2.6		0.08
I	ARM B	2.91	15.26	0.190		0.2	0.2	3.4		0.08
I	ARM C	0.75	17.24	0.043		0.0	0.0	0.7		0.06
I	ARM D	2.50	14.84	0.169		0.2	0.2	3.0		0.08

I	TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
I	17.30-17.45									
I	ARM A	2.08	14.05	0.148		0.2	0.2	2.6		0.08
I	ARM B	2.91	15.26	0.190		0.2	0.2	3.5		0.08
I	ARM C	0.75	17.24	0.043		0.0	0.0	0.7		0.06
I	ARM D	2.50	14.84	0.169		0.2	0.2	3.0		0.08

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.45-18.00									
ARM A	1.70	14.23	0.120		0.2	0.1	2.1		0.08
ARM B	2.37	15.40	0.154		0.2	0.2	2.8		0.08
ARM C	0.61	17.56	0.035		0.0	0.0	0.6		0.06
ARM D	2.04	14.97	0.137		0.2	0.2	2.4		0.08

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
18.00-18.15									
ARM A	1.42	14.37	0.099		0.1	0.1	1.7		0.08
ARM B	1.99	15.50	0.128		0.2	0.1	2.3		0.07
ARM C	0.51	17.79	0.029		0.0	0.0	0.5		0.06
ARM D	1.71	15.06	0.114		0.2	0.1	2.0		0.07

QUEUE AT ARM A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
17.00	0.1
17.15	0.1
17.30	0.2
17.45	0.2
18.00	0.1
18.15	0.1

QUEUE AT ARM B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
17.00	0.1
17.15	0.2
17.30	0.2
17.45	0.2
18.00	0.2
18.15	0.1

QUEUE AT ARM C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
17.00	0.0
17.15	0.0
17.30	0.0
17.45	0.0
18.00	0.0
18.15	0.0

QUEUE AT ARM D

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
17.00	0.1
17.15	0.2
17.30	0.2
17.45	0.2
18.00	0.2
18.15	0.1

 QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

I	ARM	I	TOTAL	DEMAND	I	* QUEUEING *	I	* INCLUSIVE QUEUEING *	I		
I		I			I	* DELAY *	I	* DELAY *	I		
I		I	(VEH)	(VEH/H)	I	(MIN)	(MIN/VEH)	I	(MIN)		
I		I			I			I	(MIN/VEH)		
I	A	I	156.3	I 104.2	I	12.5	I 0.08	I	12.5	I 0.08	I
I	B	I	218.0	I 145.3	I	16.8	I 0.08	I	16.8	I 0.08	I
I	C	I	56.2	I 37.5	I	3.3	I 0.06	I	3.3	I 0.06	I
I	D	I	187.9	I 125.2	I	14.6	I 0.08	I	14.6	I 0.08	I
I	ALL	I	618.4	I 412.3	I	47.3	I 0.08	I	47.3	I 0.08	I

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD.

* INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD.

* THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

END OF JOB

===== end of file =====

[Printed at 14:13:45 on 14/10/2010]

ARCADY 6

ASSESSMENT OF ROUNDABOUT CAPACITY AND DELAY

Analysis Program: Release 2.0 (MAR 2005)

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IN NO WAY RELIEVED OF THEIR RESPONSIBILITY FOR THE CORRECTNESS OF THE SOLUTION

Run with file:-
"u:\CTB AOE 000 - Foxlydiat Lane, webheath, Redditch\Calcs\Traffic Surveys\modelling\
Final Modelling for Report\Junction 4\Junction 4 - Primary Site Access AM Peak.vai"
(drive-on-the-left) at 13:59:03 on Thursday, 14 October 2010

FILE PROPERTIES

RUN TITLE: Junction 4: Primary Site Access - AM Peak
LOCATION: Redditch
DATE: 17/09/2010
CLIENT: Heyford Developments
ENUMERATOR: ME
JOB NUMBER: CTBAOE
STATUS: Preliminary
DESCRIPTION:

INPUT DATA

ARM A - A448 from overbridge
ARM B - From offslip
ARM C - Link Road
ARM D - Site Access

GEOMETRIC DATA

I	ARM	I	V (M)	I	E (M)	I	L (M)	I	R (M)	I	D (M)	I	PHI (DEG)	I	SLOPE	I	INTERCEPT (PCU/MIN)	I
I	ARM A	I	3.65	I	5.00	I	10.00	I	20.00	I	40.00	I	38.0	I	0.564	I	22.549	I
I	ARM B	I	3.65	I	4.50	I	10.00	I	20.00	I	40.00	I	43.0	I	0.538	I	20.823	I
I	ARM C	I	3.65	I	4.50	I	10.00	I	20.00	I	40.00	I	47.0	I	0.530	I	20.521	I
I	ARM D	I	3.65	I	5.00	I	10.00	I	20.00	I	40.00	I	43.0	I	0.554	I	22.147	I

V = approach half-width L = effective flare length D = inscribed circle diameter
E = entry width R = entry radius PHI = entry angle

TRAFFIC DEMAND DATA

(Only sets included in the current run are shown)

I	ARM	I	FLOW	SCALE(%)	I
I	A	I	100	I	
I	B	I	100	I	
I	C	I	100	I	
I	D	I	100	I	

TIME PERIOD BEGINS 07.45 AND ENDS 09.15

LENGTH OF TIME PERIOD - 90 MINUTES.
LENGTH OF TIME SEGMENT - 15 MINUTES.

DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

DEMAND SET TITLE: AM Peak

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS TO RISE	TOP OF PEAK IS REACHED	MINUTES FROM START WHEN FLOW STOPS FALLING	RATE OF FLOW BEFORE PEAK	RATE OF FLOW AT TOP OF PEAK	RATE OF FLOW AFTER PEAK
ARM A	15.00	45.00	75.00	8.93	13.39	8.93
ARM B	15.00	45.00	75.00	7.10	10.65	7.10
ARM C	15.00	45.00	75.00	5.59	8.38	5.59
ARM D	15.00	45.00	75.00	2.42	3.64	2.42

DEMAND SET TITLE: AM Peak

TIME	TURNING PROPORTIONS			
	ARM A	ARM B	ARM C	ARM D
07.45 - 09.15	0.000	0.895	0.081	0.024
	0.0	639.0	58.0	17.0
	(10.0)	(10.0)	(10.0)	(10.0)
	0.741	0.000	0.190	0.069
	421.0	0.0	108.0	39.0
	(10.0)	(10.0)	(10.0)	(10.0)
	0.595	0.387	0.000	0.018
	266.0	173.0	0.0	8.0
	(10.0)	(10.0)	(10.0)	(10.0)
	0.541	0.335	0.124	0.000
	105.0	65.0	24.0	0.0
	(10.0)	(10.0)	(10.0)	(10.0)

QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
07.45-08.00									
ARM A	8.93	18.66	0.478		0.0	0.9	13.0		0.10
ARM B	7.10	18.27	0.389		0.0	0.6	9.1		0.09
ARM C	5.59	15.51	0.360		0.0	0.6	8.1		0.10
ARM D	2.42	14.21	0.171		0.0	0.2	3.0		0.08

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
08.00-08.15									
ARM A	10.66	18.30	0.582		0.9	1.4	19.7		0.13
ARM B	8.48	18.14	0.467		0.6	0.9	12.6		0.10
ARM C	6.67	14.89	0.448		0.6	0.8	11.6		0.12
ARM D	2.90	13.04	0.222		0.2	0.3	4.2		0.10

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
08.15-08.30									
ARM A	13.05	17.81	0.733		1.4	2.6	36.2		0.20
ARM B	10.38	17.96	0.578		0.9	1.3	19.3		0.13
ARM C	8.17	14.04	0.582		0.8	1.4	19.3		0.17
ARM D	3.55	11.46	0.310		0.3	0.4	6.4		0.13

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
08.30-08.45									
ARM A	13.05	17.80	0.733		2.6	2.7	39.8		0.21
ARM B	10.38	17.96	0.578		1.3	1.4	20.3		0.13
ARM C	8.17	14.03	0.582		1.4	1.4	20.5		0.17
ARM D	3.55	11.42	0.310		0.4	0.4	6.7		0.13

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
08.45-09.00									
ARM A	10.66	18.28	0.583		2.7	1.4	22.5		0.13
ARM B	8.48	18.13	0.468		1.4	0.9	13.8		0.10
ARM C	6.67	14.86	0.449		1.4	0.8	12.9		0.12
ARM D	2.90	12.99	0.223		0.4	0.3	4.5		0.10

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
09.00-09.15									
ARM A	8.93	18.65	0.479		1.4	0.9	14.4		0.10
ARM B	7.10	18.26	0.389		0.9	0.6	9.9		0.09
ARM C	5.59	15.48	0.361		0.8	0.6	8.8		0.10
ARM D	2.42	14.16	0.171		0.3	0.2	3.2		0.09

QUEUE AT ARM A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
08.00	0.9 *
08.15	1.4 *
08.30	2.6 ***
08.45	2.7 ***
09.00	1.4 *
09.15	0.9 *

QUEUE AT ARM B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
08.00	0.6 *
08.15	0.9 *
08.30	1.3 *
08.45	1.4 *
09.00	0.9 *
09.15	0.6 *

QUEUE AT ARM C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
08.00	0.6 *
08.15	0.8 *
08.30	1.4 *
08.45	1.4 *
09.00	0.8 *
09.15	0.6 *

QUEUE AT ARM D

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
08.00	0.2
08.15	0.3
08.30	0.4
08.45	0.4
09.00	0.3
09.15	0.2

 QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

I	ARM	I	TOTAL	DEMAND	I	* QUEUEING *	I	* INCLUSIVE QUEUEING *	I	
I		I			I	* DELAY *	I	* DELAY *	I	
I		I	(VEH)	(VEH/H)	I	(MIN)	(MIN/VEH)	I	(MIN)	
I		I			I			I	(MIN/VEH)	
I	A	I	979.0	I 652.7	I	145.7	I 0.15	I	145.8	I 0.15
I	B	I	778.8	I 519.2	I	85.0	I 0.11	I	85.1	I 0.11
I	C	I	612.9	I 408.6	I	81.2	I 0.13	I	81.2	I 0.13
I	D	I	266.0	I 177.3	I	27.9	I 0.10	I	27.9	I 0.10
I	ALL	I	2636.8	I 1757.9	I	339.9	I 0.13	I	339.9	I 0.13

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD.

* INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD.

* THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

END OF JOB

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[Printed at 14:00:41 on 14/10/2010]

ARCADY 6

ASSESSMENT OF ROUNDABOUT CAPACITY AND DELAY

Analysis Program: Release 2.0 (MAR 2005)

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Run with file:-
"u:\CTB AOE 000 - Foxlydiat Lane, webheath, Redditch\Calcs\Traffic Surveys\modelling\
Final Modelling for Report\Junction 4\Junction 4 - Primary Site Access PM Peak.vai"
(drive-on-the-left) at 14:01:53 on Thursday, 14 October 2010

FILE PROPERTIES

RUN TITLE: Junction 4: Primary Site Access - PM Peak
LOCATION: Redditch
DATE: 17/09/2010
CLIENT: Heyford Developments
ENUMERATOR: ME
JOB NUMBER: CTBAOE
STATUS: Preliminary
DESCRIPTION:

INPUT DATA

ARM A - A448 from overbridge
ARM B - From offslip
ARM C - Link Road
ARM D - Site Access

GEOMETRIC DATA

I	ARM	I	V (M)	I	E (M)	I	L (M)	I	R (M)	I	D (M)	I	PHI (DEG)	I	SLOPE	I	INTERCEPT (PCU/MIN)	I
I	ARM A	I	3.65	I	5.00	I	10.00	I	20.00	I	40.00	I	38.0	I	0.564	I	22.549	I
I	ARM B	I	3.65	I	4.50	I	10.00	I	20.00	I	40.00	I	43.0	I	0.538	I	20.823	I
I	ARM C	I	3.65	I	4.50	I	10.00	I	20.00	I	40.00	I	47.0	I	0.530	I	20.521	I
I	ARM D	I	3.65	I	5.00	I	10.00	I	20.00	I	40.00	I	43.0	I	0.554	I	22.147	I

V = approach half-width L = effective flare length D = inscribed circle diameter
E = entry width R = entry radius PHI = entry angle

TRAFFIC DEMAND DATA

(Only sets included in the current run are shown)

I	ARM	I	FLOW	SCALE(%)	I
I	A	I	100	I	
I	B	I	100	I	
I	C	I	100	I	
I	D	I	100	I	

TIME PERIOD BEGINS 16.45 AND ENDS 18.15

LENGTH OF TIME PERIOD - 90 MINUTES.
LENGTH OF TIME SEGMENT - 15 MINUTES.

DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

DEMAND SET TITLE: PM Peak

I I I	I I I	NUMBER OF MINUTES FROM START WHEN			RATE OF FLOW (VEH/MIN)		
		I I I	I I I	I I I	I I I	I I I	I I I
ARM	FLOW STARTS TO RISE	TOP OF PEAK IS REACHED	IFLOW STOPS IF FALLING	BEFORE PEAK	AT TOP OF PEAK	AFTER PEAK	
ARM A	15.00	45.00	75.00	8.93	13.39	8.93	
ARM B	15.00	45.00	75.00	9.52	14.29	9.52	
ARM C	15.00	45.00	75.00	3.39	5.08	3.39	
ARM D	15.00	45.00	75.00	1.34	2.01	1.34	

DEMAND SET TITLE: PM Peak

I I I I I	I I I I I	TURNING PROPORTIONS			
		TURNING COUNTS (VEH/HR)			
		(PERCENTAGE OF H.V.S)			
TIME	FROM/TO	ARM A	ARM B	ARM C	ARM D
16.45 - 18.15	ARM A	0.000	0.742	0.188	0.070
		0.0	530.0	134.0	50.0
		(10.0)	(10.0)	(10.0)	(10.0)
	ARM B	0.488	0.000	0.365	0.147
		372.0	0.0	278.0	112.0
		(10.0)	(10.0)	(10.0)	(10.0)
	ARM C	0.554	0.362	0.000	0.085
		150.0	98.0	0.0	23.0
		(10.0)	(10.0)	(10.0)	(10.0)
	ARM D	0.542	0.336	0.121	0.000
		58.0	36.0	13.0	0.0
		(10.0)	(10.0)	(10.0)	(10.0)

QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

I I I	TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
16.45-17.00										
ARM A		8.93	19.47	0.458		0.0	0.8	12.1		0.09
ARM B		9.52	17.61	0.541		0.0	1.2	16.5		0.12
ARM C		3.39	15.14	0.224		0.0	0.3	4.2		0.08
ARM D		1.34	15.87	0.084		0.0	0.1	1.3		0.07

I I I	TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.00-17.15										
ARM A		10.66	19.26	0.553		0.8	1.2	17.6		0.12
ARM B		11.37	17.35	0.656		1.2	1.8	26.2		0.17
ARM C		4.05	14.44	0.280		0.3	0.4	5.7		0.10
ARM D		1.60	15.02	0.106		0.1	0.1	1.7		0.07

I I I	TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.15-17.30										
ARM A		13.05	18.99	0.687		1.2	2.1	30.0		0.16
ARM B		13.93	17.00	0.819		1.8	4.1	54.3		0.30
ARM C		4.95	13.53	0.366		0.4	0.6	8.3		0.12
ARM D		1.96	13.90	0.141		0.1	0.2	2.4		0.08

I I I	TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.30-17.45										
ARM A		13.05	18.98	0.688		2.1	2.2	32.2		0.17
ARM B		13.93	16.99	0.820		4.1	4.3	63.3		0.32
ARM C		4.95	13.48	0.367		0.6	0.6	8.6		0.12
ARM D		1.96	13.86	0.141		0.2	0.2	2.5		0.08

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.45-18.00									
ARM A	10.66	19.26	0.553		2.2	1.3	19.8		0.12
ARM B	11.37	17.34	0.656		4.3	2.0	31.9		0.18
ARM C	4.05	14.37	0.281		0.6	0.4	6.1		0.10
ARM D	1.60	14.96	0.107		0.2	0.1	1.8		0.07

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
18.00-18.15									
ARM A	8.93	19.46	0.459		1.3	0.9	13.3		0.10
ARM B	9.52	17.60	0.541		2.0	1.2	18.8		0.13
ARM C	3.39	15.10	0.224		0.4	0.3	4.5		0.09
ARM D	1.34	15.82	0.085		0.1	0.1	1.4		0.07

QUEUE AT ARM A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
17.00	0.8 *
17.15	1.2 *
17.30	2.1 **
17.45	2.2 **
18.00	1.3 *
18.15	0.9 *

QUEUE AT ARM B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
17.00	1.2 *
17.15	1.8 **
17.30	4.1 ****
17.45	4.3 ****
18.00	2.0 **
18.15	1.2 *

QUEUE AT ARM C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
17.00	0.3
17.15	0.4
17.30	0.6 *
17.45	0.6 *
18.00	0.4
18.15	0.3

QUEUE AT ARM D

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
17.00	0.1
17.15	0.1
17.30	0.2
17.45	0.2
18.00	0.1
18.15	0.1

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

I	ARM	I	TOTAL	DEMAND	I	* QUEUEING *	I	* INCLUSIVE QUEUEING *	I	
I		I			I	* DELAY *	I	* DELAY *	I	
I		I	(VEH)	(VEH/H)	I	(MIN)	(MIN/VEH)	I	(MIN)	
I		I			I			I	(MIN/VEH)	
I	A	I	979.0	I 652.7	I	124.9	I 0.13	I	124.9	I 0.13
I	B	I	1044.9	I 696.6	I	211.0	I 0.20	I	211.1	I 0.20
I	C	I	371.6	I 247.7	I	37.3	I 0.10	I	37.3	I 0.10
I	D	I	146.7	I 97.8	I	11.2	I 0.08	I	11.2	I 0.08
I	ALL	I	2542.2	I 1694.8	I	384.4	I 0.15	I	384.5	I 0.15

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD.
 * INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD.
 * THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

END OF JOB
 ===== end of file =====

[Printed at 14:02:34 on 14/10/2010]