

DOCUMENT A

PRELIMINARY TRANSPORT STUDY MAY 2010

AND

TECHNICAL NOTE OCTOBER 2010 (RPS)

DOCUMENT A: NOTE

The Preliminary Transport Study (May 2010) was prepared in the context of a larger scale development proposal at Brockhill West for discussion with the Highway Authority. The proposals shown in the Masterplan Options at Document G relate to a smaller area and reduced development capacity having regard to more detailed constraints analysis.

A revised Transport Study will be issued to replace this document following further consideration of the area. The conclusions of May 2010 study are that transport measures can be implemented to accommodate the impact of the Brockhill West development.

7 October 2010

RPS Planning & Development



LAND AT BROCKHILL WEST, REDDITCH

TECHNICAL NOTE: PRELIMINARY TRANSPORT STUDY

**ON BEHALF OF: MILLER STRATEGIC LAND,
PERSIMMON HOMES SOUTH MIDLANDS
AND SOUTHERN & REGIONAL
DEVELOPMENTS**

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1 INTRODUCTION

- 1.1 RPS Planning and Development is instructed by Miller Strategic Land, Persimmon South Midlands and Southern & Regional Developments to undertake a preliminary investigation of the potential transportation implications in relation to a proposed mixed use Sustainable Urban Extension (SUE) at Brockhill West, Redditch.
- 1.2 This report aims to provide a preliminary assessment of the forecast impact of development on the existing highway, pedestrian and cycle networks and identify transport-related issues that may impact on the deliverability of the site. Proposals for improvements to bus services serving the development are presented in detail in the accompanying Public Transport Strategy (PTS) for Brockhill West (ref: JNW7044.B7436 Rev A).
- 1.3 The analysis described in this report has been undertaken in advance of the publication of Worcestershire County Councils' traffic model for Redditch and Bromsgrove, which is currently under development. At this stage it is considered inappropriate to undertake detailed analysis of the operational performance of all links and junctions. Where traffic data exists preliminary capacity assessments have been undertaken. In general, a risk-based assessment has been utilised, referring to observed traffic conditions on the local highway network and robust forecasts of trip generation, distribution and assignment models in order to identify specific locations that may be adversely affected by the introduction of substantial development at Brockhill West.
- 1.4 Furthermore it is as yet unknown which other sites might come forward as a result of the development and assessment of the Bromsgrove and Redditch Core Strategies which may produce a simultaneous impact on sections of the transport network under review in consideration of development at Brockhill West.
- 1.5 This report presents a commentary of the operation and capacity of the existing traffic network in the vicinity of the proposed development based on observations made during peak traffic flow conditions and inspection of the existing infrastructure.
- 1.6 Analysis of the scale and content of the proposed development based on current knowledge has enabled a preliminary forecast of the potential number of vehicle trips that might be generated, their distribution and assignment through the highway network. This analysis provides the basis for an initial assessment of the links and junctions likely to be affected by the proposed development.
- 1.7 In the absence of a detailed analysis of operational performance, a qualitative assessment of the likely impact on the highway network has been undertaken and is included in this report. The analysis uses a systematic approach to provide a 'risk'-based assessment of the likelihood of traffic impact and its severity. The purpose of this assessment is to identify the junctions most likely to be affected by traffic generated by the proposed development and vehicular access arrangements.

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- 1.8 This report concludes that some links and junctions on the local network are sensitive to additional traffic demand and it is likely that mitigation will be required. The scope of measures considered in this report includes: highway modifications; road safety improvements; new infrastructure to promote 'active' travel modes and travel planning. Further proposals to promote bus travel to and from the site are contained in the PTS, currently being considered together with WCC.

2 EXISTING SITUATION

Introduction

- 2.1 This section considers the existing highway, pedestrian, cycle and public transport networks, with particular regard to the current operation and performance of the local and strategic road network. The assessment is based on a number of observations undertaken during peak periods which aimed to identify existing or potential problems.

Surrounding Highway Network

B4184

- 2.2 The B4184 is a local distributor road serving the existing residential and employment areas of North West Redditch. It extends between the Riverside roundabout junction to the east where it meets the A441 Alvechurch Highway and the Foxlydiate interchange to the west where it meets the A448 Bromsgrove Highway. The B4184 is a single carriageway along its full length and is formed of the following sections: Brockhill Drive; Hewell Road; Windsor Road and Middlehouse Lane.

Brockhill Drive (B4184)

- 2.3 Brockhill Drive forms the link between the Foxlydiate interchange and the roundabout junction with Hewell Road and Salters Lane. Brockhill Drive was introduced to serve as a local distributor road for residential development at Brockhill and is constructed to modern design standards, comprising a 7.3m wide carriageway and a system of street lighting. Traffic is subject to a 40mph Speed Limit Order.
- 2.4 Brockhill Drive has three junctions along its length, feeding three residential roads: Lily Green Lane; Appletree Lane and Carthorse Lane in the form of three roundabout junctions. Observations of the performance of the roundabout junctions along this section of B4184 revealed no evidence of queues or delays to vehicles, indicating significant reserve capacity with respect to current traffic demand.
- 2.5 Grade-separated pedestrian and cycle crossing facilities in the form of bridges and under-passes provide permeability across Brockhill Drive for non-motorised modes. There are no footways or cycle facilities provided adjacent to the carriageway.

Hewell Road (B4184)

- 2.6 Hewell Road forms a link between the roundabout junction with Salters Lane and Brockhill Drive and Redditch town centre. Hewell Road is a single carriageway serving a number of local access roads including Batchley Road and Salters Lane.
- 2.7 Observed traffic flows were relatively low and no capacity problems were observed at the junctions along its length. The predominant traffic movements were observed to be between Hewell Road and Windsor Road towards the A441 Alvechurch Highway; a small proportion of total traffic on Hewell Road continues towards the town centre.

2.8 Footways are provided on both sides of the carriageway and crossing facilities are provided at all junctions with Hewell Road in the form of pedestrian refuges or informal crossings. At the roundabout junction with Windsor Road pedestrian and cycle crossing facilities are provided on the traffic splitter islands, but are considered to be inadequate for current and future provision with respect to pedestrian storage space and protection from vehicles.

2.9 Hewell Road meets Windsor Road at a four-arm roundabout junction (also serving the Swimming Pool access). The junction has a large central island, creating a relatively narrow, single lane circulatory carriageway around a raised over-run area to accommodate turns by long vehicles. The carriageway alignment resulting from the abrupt change in level between the main circulatory carriageway and the over-run area induces significant delay for bus services operating along Hewell Road. Bus drivers navigate a course through the junction that avoids the over-run. On several occasions wheels of buses were observed to run over the kerbs on the approach and exit radii.

Windsor Road / Middlehouse Lane (B4184)

2.10 Windsor Road forms a link between the roundabout junction with Hewell Road to the west and a four-arm signal-controlled junction with Birmingham Road to the east.

2.11 Windsor Road serves both residential and industrial development accesses, including Windsor Heights, a residential development with consent for up to 255 dwellings, the Enfield Industrial Estate and Mettis Aerospace factory. This section of the B4184 is a single carriageway road, approximately 7.3m wide with footways provided on both sides of the carriageway.

2.12 The existing signal controlled junction currently operates within capacity, with evidence of small transitory queues occurring on B4164 Windsor Road during the morning peak period. The junction currently operates in response to traffic demand under Vehicle Actuated (VA) signal control, resulting in a relatively efficient operation.

2.13 To the west of the signal-controlled junction the B4184 continues as Middlehouse Lane to the 'Riverside Roundabout' at the junction with the A441 Alvechurch Highway, Abbey Retail Park and Millrace Road. The junction carries significant traffic flows generated by trips between Redditch and Birmingham and the M42 to the north. Local traffic represents a significant proportion of the total demand; Abbey Stadium and Sainsbury's foodstore are served directly from the junction. Further observations of the operational performance of the junction have been limited by current roadworks affecting traffic conditions.

A448 Bromsgrove Highway

2.14 The A448 Bromsgrove Highway is the principal link between Redditch and Bromsgrove, and performs a strategic function carrying traffic between Droitwich, Worcester and the M5 motorway (Junction 5). The A448 is a dual carriageway accessed directly from the grade-separated junction known as the Foxlydiate interchange situated adjacent to the southwest corner of the site. The interchange comprises a roundabout junction with the B4184 Brockhill Drive and B4096 Hewell Lane and a priority T-junction with Birchfield Road.

2.15 Observations of existing traffic conditions reveal slight transient queuing occurring during the morning peak period on the Birchfield Road approach. This is considered to be attributable to the principal traffic movements between A448 Bromsgrove Highway (westbound) towards

Tardebigge via Hewell Lane. Further queuing was evident on the A448 Bromsgrove Highway (eastbound) Off-slip at the roundabout Give Way line. In summary, it is considered that the junction is currently operating within acceptable operational parameters, but with limited reserved capacity. No queues were observed at the T-junction with Birchfield Road.

B4096 Hewell Lane

- 2.16 The B4096 Hewell Lane abuts the western boundary of the site and extends north from the Foxlydiate interchange and parallel to the A448 Bromsgrove Highway. Hewell Lane serves local villages including Tardebigge, Tutnall and Finstall and provides access to HMP Hewell. The road also provides an alternative route for traffic from Redditch towards the M5 North, avoiding Bromsgrove. Consequently, the B4096 is subject to significant traffic demand in both directions during peak traffic periods.

A441 Alvechurch Highway

- 2.17 The A441 Alvechurch Highway is a principal north-south strategic route for traffic travelling between Redditch and the M42 motorway (Junction 2) and Birmingham to the north. To the south of the 'Riverside Roundabout', the A441 serves the town centre and operates as a distributor giving access to the majority of residential and employment districts within Redditch Borough.
- 2.18 Previous analysis by Worcestershire County Council and Redditch Borough Council has identified the section of the A441 to the north of the Riverside Roundabout and passing through Bordesley as a bottleneck; subject to significant traffic congestion and limited environmental capacity. Specifically, this relates to the signal-controlled junction of A441 Birmingham Road and Dagnell End Road and the single carriageway section of road passing through Bordesley, currently constrained by residential frontages. This is illustrated in a WCC Committee Report which states that:

"the Dagnell End Road junction effectively controls the level of traffic queuing through Bordesley. This junction is already deficient at peak times and will only get significantly worse through to 2021."

*Source: Minutes of Planning and Regulatory Committee - 21 March 2006
Worcestershire County Council*

- 2.19 Proposals for the introduction of a Bordesley bypass have been considered and approved by Worcestershire County Council but are currently on hold whilst appropriate funding streams are sought. Planning permission was granted in 2005, but has subsequently lapsed in March 2010.

Pedestrian and Cycle Network

- 2.20 Well established networks of footways, footpaths, on-street cycle lanes and segregated cycle routes are present within the residential areas of Brockhill and Batchley, providing access to a range of local community centres, education and health facilities.
- 2.21 In addition to the pedestrian provision ancillary to the roads in the network described above, facilities for pedestrians and cyclists are complemented by the 'Greenway' which follows the alignment of Batchley Brook. The 'Greenway' bisects the residential developments of Batchley and Brockhill, extending from Brockhill Drive through Batchley local centre and continues in the

direction of Redditch town centre, terminating at Hewell Road. The route provides a safe, direct and attractive route for pedestrians and cyclists and is particularly important in the absence of any linear pedestrian and cycle facilities adjacent to Brockhill Drive.

- 2.22 However, it is noted that the quality of facilities for cyclists diminishes on the approach to the town centre and the bus/rail stations, specifically from Hewell Road where cyclists are directed to an advisory route along Hewell Road. This reduces the overall attractiveness and continuity of the 'whole route' and is likely to present an obstacle to encouraging mode shift to cycle trips.

Public Transport

- 2.23 The existing public transport network, serving residential areas to the northwest of Redditch is discussed in the Public Transport Strategy (PTS) document, produced by RPS (ref: JNW7044.B7436 Rev A).
- 2.24 Recent development at Brockhill is currently served by a single daytime service (no. 50), which operates at a peak frequency of 60 minutes during the day between Brockhill and Redditch Bus Station via Salters Lane. In comparison, Batchley local centre is better served during the day by the 51 service operating at a peak frequency of 10 to 12 minutes between Batchley and Redditch Bus Station, via Batchley Road.
- 2.25 It is considered that the existing bus service provision to a significant proportion of the recent residential development at Brockhill is inadequate. Many dwellings are located in excess of acceptable walking distance of a bus stop (400m), specifically those to the north of Brockhill Drive. It is considered that the existing lack of bus access results in a significant over-reliance on travel by private car by residents of Brockhill and Batchley.

3 TRIP GENERATION, DISTRIBUTION & ASSIGNMENT

Introduction

- 3.1 This section provides a preliminary forecast of the generation, distribution and assignment of vehicle trips associated with the proposed development at Brockhill West. The report outlines the methodology, assumptions and calculations used in this preliminary analysis.
- 3.2 The analysis is based on an estimated quantum of development of 2,000 dwellings and 34,400m² GFA of employment, comprising B1 and B2 Use. Further refinement of the forecast traffic impact will be undertaken following the production of a concept Masterplan for the development.

Trip Generation

Trip Rates

- 3.3 In order to forecast the daily traffic generation associated with the proposed residential and employment development, preliminary vehicle trip rates have been determined through interrogation of the Trip Rate Information Computer System (TRICS). Refinement of the forecast trip rates will be undertaken at the Planning Application stage following detailed scoping with Local Highway Authority officers. It is considered that the use of trip rates derived from 'Privately Owned Houses' will provide a sufficiently robust analysis, making no deductions for affordable housing provision or flats at this stage, both of which are generally considered to exhibit lower levels of trip generation.
- 3.4 Furthermore, no deductions have been made at this stage with respect to the 'internalisation' of trips (trips made wholly within the site e.g. to the local centre, primary school etc.) or as a result of mitigation measures proposed in association with the development (e.g. Travel Plan initiatives and Public Transport Strategy). Assumptions in respect of the likely benefits generated by these measures will be assessed in consultation with the highway authority at a later stage. The trip generation forecast contained in this document is therefore considered to provide a robust assessment of the worst-case scenario, from which significant reductions may be achieved as a result of specific travel demand measures.

Table 3.1 Forecast Vehicle Trip Rates

Trip Rates	AM Peak (08:00-09:00)			PM Peak (17:00-18:00)		
	Arr	Dep	Tot	Arr	Dep	Tot
Houses Privately Owned	0.16	0.49	0.64	0.46	0.24	0.70
B1 Office	1.93	0.32	2.24	0.29	1.65	1.94
B2 General Industry	0.49	0.19	0.68	0.13	0.41	0.54

Trip Generation

- 3.5 The number of vehicle trips forecast to be generated by the proposed development is estimated by applying the trip rates identified in Table 3.1 above to a preliminary schedule of development. The quantum of dwellings is estimated from previous assessment of the residential capacity of the site, whilst the potential employment capacity of the site is estimated from an assessment of

similar B1 / B2 mixed use developments. The assessment uses sites of comparable scale, location and accessibility to provide an indication of the potential Gross Floor Area to Site Area ratio. The forecast development trip generation is shown in Table 3.3 below.

Table 3.2 Preliminary Schedule of Development

Land Use	Quantum	Notes
Residential	2,000 dwellings	<ul style="list-style-type: none"> Based on previous estimate of site development capacity
Employment	34,400m² GFA employment: B1 Office: 20,640m ² B2:General Industry: 13,760m ²	<ul style="list-style-type: none"> Proposed employment site area: 8ha Development rate: 4,300m² per ha 60:40 split between B1 and B2 Use

Table 3.3 Forecast Vehicle Trip Generation

Trip Rates	Quantum dw. / GFA	AM Peak (08:00-09:00)			PM Peak (17:00-18:00)		
		Arr	Dep	Tot	Arr	Dep	Tot
Houses Privately Owned	2,000	310	974	1284	914	484	1398
B1 Office	20,640m ²	398	65	463	60	340	400
B2 General Industry	13,760m ²	68	23	94	18	56	74
Development Total		776	1065	1841	992	881	1873

Development Traffic Distribution & Assignment

- 3.6 To assess the likely traffic impact on the local highway network, models of the forecast trip distribution and assignment have been developed using robust methodologies. The analysis uses 'Journey to Work' data derived from 2001 National Census, which provides information on daily travel patterns of residents and employees between wards. The dataset is used to forecast the likely travel patterns of future residents and employees of the proposed development based on the current travel behaviour of the population of Batchley Ward.
- 3.7 Wards have been assembled into groups referred to as 'zones'. Each zone reflects a distinct geographical area, determined either by its location relative to Batchley Ward, an administrative boundary (e.g. local authority area) or defined by the existing highway network. The process of zoning also takes into consideration the attendant traffic conditions and relative attractiveness of each route.
- 3.8 Distribution models have been developed for both the residential and employment elements of the proposed development, based on 12 population zones and 12 traffic routes to and from the site. Development traffic is assigned to the local highway network based on AM and PM peak hour assignment models illustrating the likely additional traffic to be added to the highway network. The distribution and assignment models are illustrated in Figures A1 – A4, whilst the full preliminary traffic model is contained at Appendix A.

4 TRAFFIC IMPACT

Introduction

- 4.1 This section considers the forecast traffic impact associated with the proposed development in regard to the observed traffic conditions and network operation. The assessment has been undertaken using a structured and systematic approach to provide an assessment of the risk of impact forecast to be generated by the proposals.

Risk Assessment

- 4.2 An assessment of the risk of impact is estimated for junctions expected to receive significant additional demand as a result of the proposed development based on the distribution and assignment model discussed in Section 3. The assessment considers (a) the likelihood of impact based on the forecast assignment of development and the location of the junction relative to the site and (b) the expected severity of traffic impact, based on the attendant traffic conditions and observed reserve operational capacity.
- 4.3 A risk score has been determined as a product of the two components; the highest scores indicate those junctions which are most likely to be affected by the proposed development and are therefore more likely to require mitigation measures in the form of junction modifications or capacity improvements.
- 4.4 Whilst the object of this report is not to formally examine the forecast traffic impact of other potential development proposals (e.g. Brockhill East, Abbey Stadium, Bordesley Bypass), it is considered that some junctions in the network under consideration will be affected by the cumulative impact of such developments and development at Brockhill West.
- 4.5 It is considered prudent to provide a brief assessment of the potential risk of the cumulative impact becoming detrimental to the efficient operation of the highway network. The results of the risk assessment are contained at Appendix B and a discussion of the outcomes is provided below.

Synopsis

Foxlydiat Interchange – Roundabout (Proposed Site Access)

- 4.6 Observations of the operation of the Foxlydiat interchange revealed that the interchange operates as two discrete elements, consisting of the roundabout junction of Brockhill Drive / Hewell Lane / Bromsgrove Highway to the north of the Bromsgrove Highway and the priority T-junction of Birchfield Road / Bromsgrove Highway slip road to the south. Observations revealed little interaction between the operation of the two elements with regards to queuing, therefore it is appropriate to consider the junctions separately.
- 4.7 The roundabout junction was observed to operate under constant traffic demand during the morning peak period, resulting in slight transient queuing on the approaches from Birchfield Road and the A448 Bromsgrove Highway (eastbound) Off-slip.
- 4.8 The introduction of the proposed development is forecast to result in a significant increase in traffic demand on all approaches to the junction. The proposed site access, in the form of a fifth

junction arm is expected to serve a large proportion of the forecast residential traffic and the majority of any employment traffic. Brockhill Drive is also expected to receive additional traffic demand on its section between the A448 Bromsgrove Highway and the two vehicular accesses at Lily Green Lane and Appletree Lane.

- 4.9 Based on current assumptions it is forecast that the proposed development will result in an increase of up to 1000 vehicles through the junction in the AM and PM peak hours respectively. The addition of forecast development traffic flows represents a significant increase on current demand levels, resulting in significant changes to the traffic flow dynamics and consequently the operation of the junction.
- 4.10 Detailed analysis of the junction is required in order to accurately determine the current and forecast operational performance of the junction, with respect to industry-standard indicators such as reserve capacity, vehicle delay and queues. To ensure a robust and comparable assessment consistent with WCC's proposed regime, it is recommended that analysis should be undertaken using traffic data extracted from the forthcoming WCC Redditch (and Bromsgrove) Traffic Model.
- 4.11 The outcome of the analysis will enable identification of geometric modifications required to create a junction capable of accommodating the forecast demand flows from both the proposed development and wider growth scenario envisaged in WCC's traffic model.
- 4.12 Analysis of Personal Injury Accident (PIA) records reveals a cluster of 6 PIAs at the roundabout junction within the past 5 years. All of the incidents were of 'slight' severity; four were single vehicle incidents.
- 4.13 Three incidents were recorded on the Hewell Lane approach to the junction, including a 'rear-shunt' incident, a single vehicle incident and a head-on collision between two vehicles in snowy conditions. Two incidents were recorded on the A448 Bromsgrove Highway Off-slip; a 'rear-shunt' collision and a single vehicle incident caused by excessive speed on the approach to the roundabout. A third incident was recorded on the on-slip to the A448 where the vehicle left the junction at excessive speed.
- 4.14 It is considered that the majority of incidents were attributable to lack of driver care and attention; however the occurrence of several rear-shunt incidents indicates poor driver anticipation on approaching the junction. It is considered that contributing factors may include inadequate warning of the bend and potential queuing. On the A448 Off-slip in particular forward visibility may be obstructed by overgrown vegetation and the position of an existing road sign located in the highway verge.
- 4.15 An incident resulting in a pedestrian fatality was recorded on the A448 Bromsgrove Highway in the vicinity of the junction. Analysis of the time, location and circumstances suggests that the incident was not the result of any defect or deficiency in highway geometry or traffic management provision.
- 4.16 It is considered that the existing roundabout will require significant modification to achieve the additional capacity necessary to accommodate the introduction of a fifth arm and forecast traffic growth. The modifications should incorporate sufficient attention to road user safety to produce a reduction in the frequency of accidents at the junction.

Site Access Roundabouts – Brockhill Drive / Lily Green Lane & Brockhill Drive / Appletree Lane

- 4.17 The roundabout junctions located adjacent to the proposed site accesses will be subject to a significant increase in traffic demand generated by the proposed development. Previous operational performance analyses based on existing AM peak hour traffic surveys revealed significant reserve capacity. It is considered that both junctions have sufficient reserve capacity to accommodate the forecast traffic increase without detriment to the operation of the junctions.
- 4.18 Three accidents were recorded at the junction of Lily Green Lane in the past 5 years, two of the incidents involved vehicles travelling along Brockhill Drive, first in the direction of the town centre and second in the direction of the Foxlydiate interchange. The third incident recorded comprised a 2 vehicle offside-to-offside collision to the west of the roundabout junction. It is considered that all of these incidents are directly attributable to excessive speed whilst negotiating the junction. It is considered that additional signs and road markings as well as modifications in geometry may be required on the approach to the junction.

B4164 Hewell Road / B4164 Brockhill Drive / Salters Lane / Brockhill Lane Roundabout

- 4.19 Previous operational performance analyses of the roundabout junction revealed that there was sufficient reserve capacity for linear traffic growth and modest additional development. Recent observations of the operation of the junction reveals no evidence of queuing or delays at the junction, thus confirming the results of the previous analysis.
- 4.20 It is considered that whilst the introduction of the proposed development at Brockhill West alone would impact significantly on the operation of the junction, it would continue to operate within acceptable performance parameters. However, preliminary junction assessments based on available traffic data indicate that the junction will exceed its design capacity during peak periods following the cumulative increase in traffic demand associated with development at Brockhill East Phase 1 (ADR and IN67) and Brockhill West. Moderate increases in vehicle delay and queues are forecast as a result.
- 4.21 It is recommended that the interaction of development traffic generated by the two sites should be assessed once the development proposals and strategy for both sites are determined. Amongst the options to be tested, the potential benefits of a link road between B4164 Brockhill Drive and the A441 Alvechurch Highway (via Weights Lane) should be assessed. A link at this point might have a significant impact on the route assignment of trips from Brockhill West.
- 4.22 The link road (Weights Lane Link) could result in significant changes in the dynamics of the operation of the junction, with respect to traffic demand on each approach and route assignment. The introduction of Weights Lane Link will attract traffic already present on the network using less attractive routes, for example vehicles travelling between Batchley and A441 (northbound), currently using Windsor Road. The overall benefits to be gained from the introduction of Weights Lane Link will be established through detailed modelling.
- 4.23 To ensure a robust and comparable assessment consistent with WCC's proposed regime, it is recommended that analysis should be undertaken using traffic data extracted from the forthcoming WCC Redditch (and Bromsgrove) Traffic Model.

B4164 Hewell Road / B4164 Windsor Road / Swimming Pool Roundabout

- 4.24 Hewell Road forms the principal traffic route between the site and the A441 Alvechurch Highway and is therefore expected to carry a significant proportion of northbound traffic (towards Birmingham and M42 eastbound). The road will also be the principal route to local employment, education and retail facilities to the north, east and centre of Redditch.
- 4.25 The design capacity of the junction of Hewell Road and Windsor Road is constrained by the existing layout, having single lane approaches and a large central over-run. The existing carriageway alignment and geometric design of the roundabout creates significant delay to bus services operating along Hewell Road, as described in paragraph 2.9. Consequently, the existing junction arrangement may reduce the attractiveness for operators to provide additional services along Hewell Road as a result of potential damage to vehicles, service delay and impact on passenger comfort.
- 4.26 The roundabout junction is expected to receive approximately 600 additional vehicle trips during the AM and PM peak hours respectively following the introduction of the proposed development. Preliminary junction assessments based on existing available traffic data indicate that the junction will significantly exceed its design capacity during peak periods following the introduction of development at Brockhill East Phase 1 and Brockhill West. Significant vehicle delay and queuing is forecast as a result.
- 4.27 The introduction of Weights Lane Link may have a significant impact on the route assignment of trips from Brockhill West, as well as local and strategic traffic re-routing along the link road. This is likely to result in a net reduction in traffic demand at the junction.

B4164 Windsor Road / B4164 Middlehouse Lane / Birmingham Road Signal Junction

- 4.28 The existing signal-controlled junction currently operates within capacity, with evidence of small transitory queues occurring on B4164 Windsor Road during the morning peak period. Windsor Road is expected to receive up to 450 additional vehicle trips during the AM and PM peak hours and is forecast to result in an increase in queues and delays during the peak periods.
- 4.29 The scale and significance of impact will be determined through detailed analysis of the junction's operational performance. It is recommended that a range of modelling scenarios are tested, including a 'do-minimum' scenario consisting of the existing network and a 'do-something' scenario, whereby proposals to introduce Weights Lane Link are considered. Weights Lane Link may have a significant impact on the route assignment of trips from Brockhill West, as well as local and strategic traffic re-routing along the link road. The introduction of Weights Lane Link is likely to result in a net reduction in vehicle trips on Windsor Road, resulting in a positive impact on the operation of the junction.
- 4.30 It is expected that the Highway Authority will seek to ensure there remains capacity at the junction so as not to prejudice the operation of the existing Fire Station located adjacent to the junction, or to significantly impact on Birmingham Road which functions as a principal bus route and access route to the town centre.

Riverside Roundabout

- 4.31 Previous analysis has shown that the junction is subject to significant background traffic demand and operates at or near capacity during the peak periods. During the PM peak the junction operates at 81% of its capacity. Based on the forecast distribution and assignment models Riverside roundabout is expected to receive an increase in traffic demand of up to 450 vehicles during the peak hours. This is in excess of the theoretical remaining capacity established by previous analysis. It is therefore likely that the proposed development will result in increased queue lengths and delays. The creation of a link road between B4164 Brockhill Drive and the A441 Alvechurch Highway (via Weights Lane) would serve to alleviate potential congestion at the junction.
- 4.32 The junction is located close to Abbey Stadium, proposed to be redeveloped. The junction could receive additional demand from any development of Abbey Stadium which would result in capacity of the junction being exceeded.

Hewell Road / Cedar Road Roundabout

- 4.33 The small roundabout at Hewell Road and Cedar Road currently operates with sufficient reserve capacity to accommodate current traffic demand. Some transitory queuing was observed on the Hewell Road (north) and Cedar Road approaches, associated with demand generated by the local primary schools.
- 4.34 The roundabout is formed with a physical central island, creating a single lane circulatory carriageway and raised over-run area to accommodate turns by long vehicles. Similar to the junction of Hewell Road and Windsor Road, the existing layout of the junction induces considerable delay for bus services negotiating the junction. The existing junction arrangement may reduce the attractiveness for operators to provide additional services along Hewell Road as a result of the potential for service delay and impact on passenger comfort.

Hewell Road / Clive Road Mini-Roundabout

- 4.35
- 4.36 The mini-roundabout, located at the junction of Hewell Road and Clive Road is formed with a large Inscribed Circle Diameter (ICD) for manoeuvres by large vehicles and white road markings. No evidence of queues or undue delays was observed at the roundabout.

A441 Alvechurch Highway / A441 Birmingham Road / Dagnell End Road Signal Controlled Junction

- 4.37 Observations revealed that the existing signal controlled junction at the A441 and Dagnell End Road currently develops significant queues and delays during the peak periods on all three approaches to the junction. Previous capacity analysis indicates that the junction is operating at its operational capacity during the PM peak, but could potentially accommodate approximately 100 additional vehicle trips. Development at Brockhill West is forecast to generate a significant number of additional trips through the junction during the peak periods and therefore likely to exacerbate existing queues and delay at the junction.

A441 Birmingham Road

- 4.38 The section of A441 Birmingham Road to the north of the signal junction with Dagnell End Road is subject to significant congestion during the peak periods; queues frequently develop along the

A441 link through Bordesley village. This is confirmed by previous analysis which revealed the observed Average Annual Daily Traffic Flows (AADT) already exceeded the design capacity of the link in 2007. It is forecast that the addition of traffic associated with the development proposals will exacerbate existing congestion on this section of the A441 link.

A441 Alvechurch Highway

- 4.39 Previous analysis of the A441 Alvechurch Highway link to the south of the Dagnell End Road junction demonstrated that current traffic demand on the link is greater than the theoretical design capacity of the road. Recent observations of the operation of the link did not reveal evidence of congestion or queuing during the peak periods, although it is considered that traffic conditions during the period observed may have been affected by roadworks.
- 4.40 It is forecast that the addition of traffic associated with the development proposals may result in increased congestion on the southern section of the A441 link, specifically on the approach to the Riverside Roundabout. It is considered that the creation of a link road between B4164 Brockhill Drive and the A441 Alvechurch Highway (via Weights Lane) would serve to alleviate potential congestion on the link.

Other junctions

- 4.41 Observations of the operation of a further five junctions during the peak traffic periods did not reveal any evidence of a risk of saturation of capacity. The junctions are therefore considered to be at lower risk of impact as a result of the proposed development and it is considered that no further analysis is required at this stage. These junctions comprise:
- B4164 Brockhill Drive / Carthorse Lane
 - Foxlydiate Interchange (T-Junction): Birchfield Drive / A448 Bromsgrove Highway off-slip
 - A4189 Warwick Highway / B4497 Battens Drive
 - A4189 Warwick Highway / A435 Birmingham Road
 - A4189 Warwick Highway / Claybrook Drive / Alders Drive

5 MITIGATION

Introduction

- 5.1 This section seeks to provide an indication of potential mitigation measures that could be implemented in association with the proposed development at sites where problems are forecast. These sites are identified in Appendix B, whilst a discussion of potential engineering solutions and 'soft' travel demand measures are contained in Appendix C.

Potential Highway Improvements

Foxlydiat Roundabout

- 5.2 It is considered that significant capacity improvements will be required at the Foxlydiat roundabout junction in order to accommodate the forecast traffic demand. This could be achieved through modification of the circulatory carriageway and central island, increasing the Inscribed Circle Diameter (ICD) and realignment of Hewell Lane and Brockhill Drive approaches. A preliminary examination of the land ownership boundaries indicates that there is sufficient land available for capacity improvements at the existing junction (subject to design and confirmation of land ownership).

- 5.3 Whilst any significant modification, including the addition of a new spur off the roundabout would be subject to stringent safety audit procedures, measures will be required to identify potential road safety improvements in order to reduce the risk of accidents at the junction resulting from the intensification of use of the junction. These may range from 'soft' measures, such as signing, maintenance etc. to more substantial engineering measures such as carriageway re-alignment on the approaches to the junction. Options will be considered at preliminary design stage in consultation with WCC Road Safety and Traffic Management officers in order to determine an appropriate programme of measures.

Hewell Road / Windsor Road / Swimming Pool Roundabout

- 5.4 A range of potential mitigation measures could be considered to address the limitations of operational capacity of the junction, ranging from modification of the existing layout (i.e. removal or altered central over-run area), realignment of the existing roundabout junction or new junction control arrangement (i.e. signal controlled junction). The scale of measures required will be determined from a detailed assessment of the junction and other policy objectives, such as improving provision for bus priority, pedestrians and cyclists.
- 5.5 The extent of modifications required at the Hewell Road / Windsor Road roundabout will be dependent on the development of proposals for a new link road between Brockhill Drive and the A441 via Weights Lane. The introduction of a link road would reduce the volume of traffic using the junction and will therefore influence any requirements for future capacity improvements.
- 5.6 Modifications to meet secondary objectives may still be required; the Public Transport Strategy – Route Options Development document currently under consideration by WCC proposes improvements to bus services to Brockhill West. At present, all options pass through the Hewell Road / Windsor Road roundabout, operating between the town centre and the proposed development site. It is considered necessary to create a less tortuous layout which will facilitate

increased bus frequency. Options should be investigated with officers from WCC in order to determine the most appropriate improvement measures.

Riverside Roundabout

- 5.7 Proposals to achieve capacity improvements at the junction were identified in previous analysis of the Future Growth Options for Redditch. The previous analysis considered the following junction improvements:

“substantial gyratory widening works, entry and exit arm widening along with part signalisation an additional peak hour throughput of 850 PCU’s [Passenger Car Units] could be accommodated”

- 5.8 It is considered that capacity improvements similar to those identified above would be required to serve the forecast traffic demand associated with Brockhill West in the absence of any other mitigation measures. However, the proposed Brockhill West development is unlikely to be constructed in isolation and should be considered in relation to current proposals including Abbey Stadium, Brockhill East and other Core Strategy sites.
- 5.9 It is considered that mitigation measures may be required to enable the redevelopment of Abbey Stadium. A Planning Application has recently been submitted to the Local Planning Authority for the development of a new 25m swimming pool with associated spectator seating, parking, access and landscaping, although submission of the Transport Assessment (TA) remains outstanding. It is expected that the TA will provide details of the forecast traffic impact on the highway network and potential mitigation measures. It is possible that some improvements may be implemented in advance of development at Brockhill West.
- 5.10 Modifications to the Riverside roundabout may be unnecessary if proposals for a Weights Lane Link were implemented as part of the strategic development of North West Redditch. The potential impacts of Weights Lane Link are described below.

Weights Lane Link

- 5.11 Preliminary proposals to create a link road between B4164 Brockhill Drive and the A441 Alvechurch Highway via Weights Lane have been developed in conjunction with proposals for a mixed use development at Brockhill East. The new road is proposed to extend along the alignment of the consented link road from the Brockhill Drive, Salters Lane and Hewell Road junction and connect with Weights Lane immediately west of the railway. The link road would serve new development and also carry traffic from both the existing Brockhill and Batchley residential areas and the proposed development at Brockhill West.
- 5.12 It is expected that the majority of existing and forecast traffic accessing the A441 from Brockhill and parts of Batchley would reassign to the new link road, resulting in a net reduction of vehicle trips along Hewell Road, Windsor Road and through the Riverside Roundabout. It is considered that the introduction of a new link road could preclude the requirement for significant developer contributions towards capacity-related improvements at junctions including Hewell Road / Windsor Road roundabout, Windsor Road / Middlehouse Lane junction, Riverside roundabout and the A441 Alvechurch Highway link (south of Dagnell End Road).

A441 / Dagnell End Road Signal-controlled Junction

- 5.13 Minor mitigation measures could be considered to address the limitations of operational capacity of the junction in the short term. There may be potential to upgrade the existing signal controller technology to MOVA as an interim solution to increase the throughput of vehicles during peak periods.

Bordesley Bypass

- 5.14 The Bordesley Bypass has long been an established element of the strategy for major new development in Redditch. The proposals for the bypass were first approved by the Local Planning and Highway Authorities in 1995 and again in 2005, but consent lapsed in March 2010.
- 5.15 Previous analysis with respect to the 'Growth of Redditch' identifies the need for the Bordesley Bypass in all growth options. Discussions with Highway Authority officers also indicate continued support for the scheme, although no formal funding streams have been identified.
- 5.16 Analysis referred to in Section 4 of this report demonstrates that the A441 / Dagnell End Road junction and the section of the A441 Birmingham are already operating above their design capacities, resulting in significant congestion during peak periods. It is considered that a range of demand management methods are investigated to mitigate the impact of traffic demand on the A441 and consideration given to the cumulative effect that might be achieved in the absence of a bypass.

Public Transport Infrastructure Improvements

Bus Gate – Salters Lane

- 5.17 To encourage modal shift it is necessary to generate a competitive advantage over the private car for users of public transport and to ensure bus priority measures are integrated into the design of the site at the Master Planning stage. Preliminary discussions with Public Transport Officers at WCC indicated that the introduction of a 'Bus Gate' (or bus-only link) might be considered at the western extent of Salters Lane, creating a more direct route for potential bus services operating through Brockhill and Batchley and connecting with the proposed employment element at Brockhill West.

On-site Measures

- 5.18 Consideration should be given to the potential for a range of bus priority measures throughout the site in order to maximise bus patronage, promote modal shift and to support the principles and proposals contained in the Public Transport Strategy. Measures including Bus Gates, Busways and bus priority / information technologies should be considered at the Masterplanning stage. This is consistent with national and local policy to promote closely integrated land use and transport planning and accords with the principles enshrined in Worcestershire's Integrated Passenger Transport Strategy (2008). The key elements include:

- **Short (<300m), safe and convenient walk links to passenger transport services**
- **High quality infrastructure, including bus stops and rail stations**

- **High quality information systems, including real time information**
- **Measures to protect road based passenger transport services from the effects of traffic congestion, including bus priority measures (e.g. segregated bus and cycle ways, bus and cycle lanes, selective vehicle detection systems, bus and cycle "gates" etc.)**
- **Effective travel plans, the performance of which is closely monitored.**

*Source: Integrated Passenger Transport Strategy (2008)
Worcestershire County Council*

Pedestrian & Cycle Infrastructure Improvements

On-site Infrastructure

- 5.19 It is recommended that the existing Batchley Brook Greenway should be extended along the alignment of the watercourse through the proposed development. The integration of the new and existing Greenway will create a seamless connection with the existing pedestrian and cycle network, providing an attractive and suitable alternative for accessing local services, employment centres and the town centre. Priority measures and crossing facilities should also be incorporated into the design of the site to provide priority for non-motorised users.

Brockhill Drive

- 5.20 Dependent on the outcome of the on-going consultation with WCC Public Transport Officers, it may be necessary to introduce pedestrian infrastructure improvements on Brockhill Drive in order to facilitate new bus stops on Brockhill Drive. This may include short extensions to the existing footways and crossing facilities to proposed bus stops. This is subject to the preferred route options identified within the PTS following the outcome of discussions with WCC.

Hewell Road / Windsor Road Roundabout

- 5.21 Existing pedestrian and cycle facilities at Hewell Road / Windsor Road roundabout are considered inadequate, particularly as it is likely that this route will form the principal route for pedestrians and cyclists between the proposed development and the town centre. Consideration should therefore be given to introducing controlled or upgraded crossing facilities at the junction.

'Soft' Measures

Residential and Workplace Travel Plans

- 5.22 Travel Plans will be implemented for the residential and employment elements of the site, in order to reduce the reliance on single occupancy vehicle trips and reduce the overall trip generation of the developments. The Travel Plans will promote travel choices and opportunities to residents and employees through a range of Sustainable Travel Initiatives, including Welcome Packs, travel information, public transport season passes, car clubs and car and lift sharing.

Public Transport Strategy

- 5.23 The introduction of new bus routes to serve the proposed development underpins the principle of a Sustainable Urban Extension, providing alternative modes of travel for residents and employees of the site to access essential services and places of employment. The detailed design and specification of proposed bus services for Brockhill West is currently under development, in consultation with WCC and outlined in the Public Transport Strategy.

6 CONCLUSIONS AND RECOMMENDATIONS

- 6.1 This report aims to provide a preliminary assessment of the forecast impact on the existing highway, pedestrian, cycle and public transport networks in the relation to the proposed mixed use Sustainable Urban Extension (SUE) at Brockhill West, Redditch. The report considers the introduction of up to 2,000 residential dwellings and 34,400m² GFA of employment.
- 6.2 The analysis described in this report has been undertaken in advance of the publication of Worcestershire County Councils' traffic model for Redditch and Bromsgrove, which is currently under development. It is therefore recommended that further analysis should be undertaken using traffic data extracted from the forthcoming WCC Redditch (and Bromsgrove) Traffic Model to ensure a robust and comparable assessment.
- 6.3 A qualitative assessment of the likely impact on the highway network has been undertaken, using a systematic approach to provide a 'risk'-based assessment of the likelihood of traffic impact and its severity. The report identifies that some links and junctions are sensitive to additional traffic demand and may operate at or above their design capacity as a result of the development proposals. The following links and junctions are identified as being most at risk from increased traffic demand generated by development at Brockhill West:
- Foxlydiate Interchange (Roundabout)
 - A441 Bordesley Signal Junction
 - Swimming Pool Roundabout
 - Salters Lane Roundabout
 - Middlehouse Lane Junction
 - Riverside Roundabout
 - A441 Bordesley Link
- 6.4 The report has examined the potential for a range of measures to be introduced to mitigate the impact of the additional traffic demand generated by the proposals at Brockhill West. Based on this preliminary analysis, it is considered that a range of engineering solutions and 'soft' travel demand measures will be required in order to accommodate the development. It is recommended that the following mitigation measures are assessed in detail to determine their likely traffic and financial implications:
1. **Capacity improvements** at roundabout junctions including: Foxlydiate; Swimming Pool; Riverside, Salters Lane and Cedar Road roundabouts. Modifications could include increased roundabout size, entry and exit realignments, removal or alteration of central over-run areas or part / full signalisation of junction.
 2. **Safety improvements** at Foxlydiate roundabout.
 3. **Capacity Improvements** along the A441 and the concept of the **Bordesley Bypass**.
 4. Construction of **Weights Lane Link** between Brockhill Drive and A441.
 5. Construction of new facilities and upgrade of existing provision for **pedestrians and cyclists** to encourage modal shift. For example, improved crossing facilities at junctions, the extension and integration of existing and proposed pedestrian and cycle routes, improved access to public transport stops.
 6. Improvements to the geometry of roundabout junctions to facilitate **improved operation of existing and future bus services**. For example, the removal or alteration of central over-

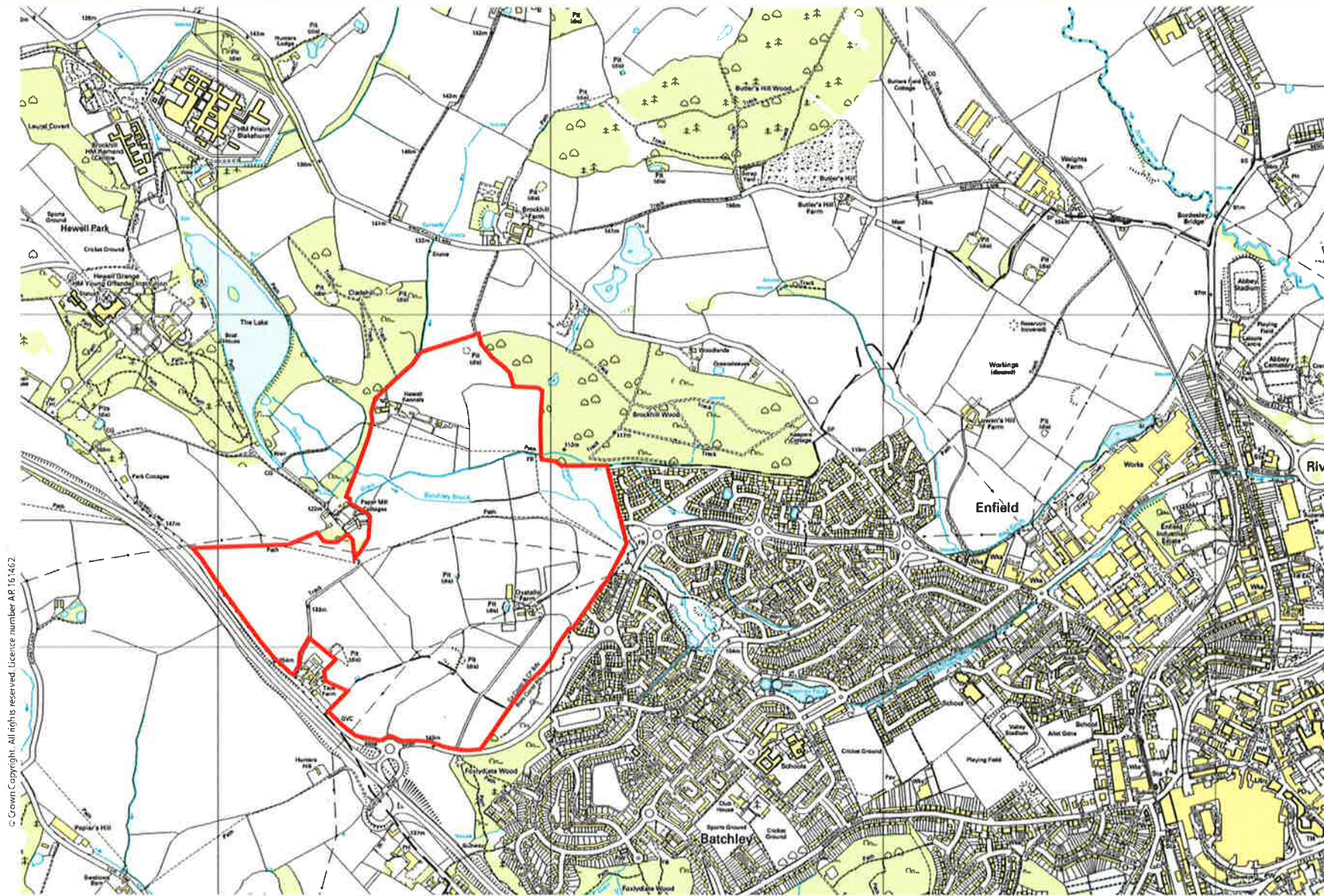
run areas at Swimming Pool and Cedar Road roundabouts to facilitate increased bus service frequencies.

7. **Bus priority measures** including on-site and off-site infrastructure, for example Bus gates, Busways and bus priority / information technologies.
8. **Residential and Workplace Travel Plans**, promoting Travel Demand Measures (TDM) and Sustainable Travel Initiatives.
9. Introduction of dedicated bus services serving Brockhill West, in accordance with the **Public Transport Strategy**.

FIGURES

RPS 1: Site Location

RPS 2: Personal Injury Accident Locations



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SCALE: NTS

REF: JBB7661
 CLIENT: Miller Homes Ltd
 DATE: March 2010
 STATUS: Final

CHECKED BY: MS
 DATE CHECKED: 17/03/10
 REVISION: 00
 PREPARED BY: JP

RPS

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REF: JNW7044
CLIENT: Miller/Persimmon/SRD
DATE: April 2010
STATUS: Final

CHECKED BY:	JR
DATE CHECKED:	23/04/10
REVISION:	00
PREPARED BY:	JP

SCALE: NTS



Highfield House, 5 Ridgeway, Quinton Business Park, Birmingham, B32 1AF
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APPENDICES

APPENDIX A: PRELIMINARY TRAFFIC MODEL

Forecast Trip Generation

Journey to Work Analysis

Trip Distribution Model

Trip Assignment Model

Network Flow Diagrams:

Figure A1: Distribution of Residential Development Traffic

Figure A2: Distribution of Employment Development Traffic

Figure A3: Assignment of Development Traffic – AM Peak

Figure A4: Assignment of Development Traffic – PM Peak

Vehicle Trip Rates

Refer to Table 3.1

Land Use	TRIP RATE					
	AM Peak Hour			PM peak Hour		
	Arr	Dep	Tot	Arr	Dep	Tot
RESIDENTIAL - Houses Privately Owned	0.16	0.49	0.64	0.46	0.24	0.70
EMPLOYMENT - B1 Business Park	1.93	0.32	2.24	0.29	1.65	1.94
EMPLOYMENT - B2 General Industry	0.49	0.19	0.68	0.13	0.41	0.54
EMPLOYMENT - B8 Storage & Distribution	0.15	0.09	0.24	0.12	0.16	0.28

Schedule of Development

Proposed development of: **2,000** dwellings
34,400 sqm total GFA of employment

comprising:

- 2,000** Flats
- 20,640** Houses
- 13,760** sqm GFA of B1 Office Use
- sqm GFA of B2 General Industry Use
- sqm GFA of B8 Storage / Distribution Use

Refer to Table 3.2

Forecast Trip Generation of Proposed Development

Land Use	TRIP GENERATION					
	AM Peak Hour			PM peak Hour		
	Arr	Dep	Tot	Arr	Dep	Tot
RESIDENTIAL - Houses Privately Owned	310	974	1284	914	484	1398
Residential Total	310	974	1284	914	484	1398
EMPLOYMENT - B1 Business Park	398	65	463	60	340	400
EMPLOYMENT - B2 General Industry	68	26	94	18	56	74
EMPLOYMENT - B8 Storage & Distribution	0	0	0	0	0	0
Employment Total	466	91	557	78	397	475
Development Total	776	1065	1841	992	881	1873

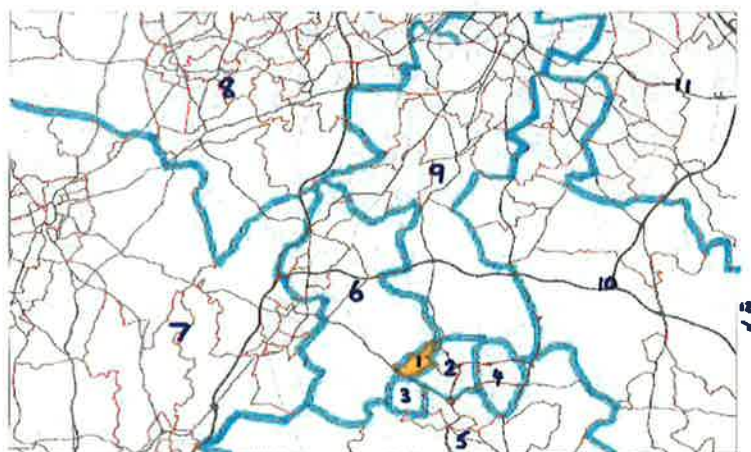
RESIDENTIAL

Journey to Work analysis derived from 2001 Census data.

Analysis below illustrates daily travel flows of residents of Batchley Ward (47UDFP)

Zone	Zone Name Ward or Local Authority Total		All people	Underground, metro, light rail, tram	Train	Bus, minibus or coach	Taxi	Car - driver	Car - passenger	Motorcycle etc	Bicycle	On foot	Other	Car or van pool, sharing driving
1	INTRA-WARD	e.g. Batchley												
	Batchley	47UDFP	403	0	3	13	3	135	12	0	0	84	0	-
	Total		403	0	3	13	3	135	12	0	0	84	0	0
2	TOWN CENTRE	e.g. Abbey, Central, Lodge Park												
	Abbey	47UDFM	420	0	0	49	0	189	24	4	17	137	0	-
	Lodge Park	47UDFW	137	0	0	21	3	83	12	0	6	12	0	-
	Central	47UDFQ	88	0	0	10	3	37	8	0	3	27	0	-
	Total		645	0	0	80	6	309	44	4	26	176	0	0
3	WEBHEATH	e.g. West												
	West	47UDFY	21	0	0	0	0	15	3	0	0	3	0	-
	Total		21	0	0	0	0	15	3	0	0	3	0	0
4	EAST REDDITCH	e.g. Church Hill, Winyates, Matchborough												
	Church Hill	47UDFR	110	0	0	24	0	69	17	0	0	0	0	-
	Winyates	47UDFZ	89	0	0	14	0	53	14	0	4	4	0	-
	Matchborough	47UDFX	72	0	0	21	0	47	4	0	0	0	0	-
	Total		271	0	0	59	0	169	35	0	4	4	0	0
5	SOUTH REDDITCH / STRATFORD	e.g. South Redditch, Alcester, Stratford												
	Greenlands	47UDFT	200	0	0	55	0	113	18	5	5	4	0	-
	Headless Cross and Oakenshaw	47UDFU	52	0	0	14	0	35	3	0	0	0	0	-
	Astwood Bank and Feckenham	47UDFN	37	0	0	0	0	28	6	0	0	3	0	-
	Alcester	44UEGN	23	0	0	0	0	20	0	3	0	0	0	-
	Sambourne	44UEHF	28	0	0	0	0	20	8	0	0	0	0	-
	Studley	44UEHQ	28	0	0	4	0	18	3	0	0	3	0	-
	Stratford Avenue and New Town	44UEHM	18	0	3	0	0	15	0	0	0	0	0	-
	Kinwarton	44UEHB	11	0	0	0	0	11	0	0	0	0	0	-
	Crabbs Cross	47UDFS	17	0	0	0	0	11	3	3	0	0	0	-
	Bidford and Salford	44UEGR	9	0	0	0	0	9	0	0	0	0	0	-
	Evesham North	47UFHF	6	0	0	0	0	6	0	0	0	0	0	-
	Inkberrow	47UFHN	18	0	0	3	0	6	6	0	0	3	0	-
	The Littletons	47UFHX	6	0	0	0	0	3	3	0	0	0	0	-
	Aston Cantlow	44UEGP	6	0	0	0	0	3	3	0	0	0	0	-
	Stratford Mount Pleasant	44UEHP	12	0	0	0	0	3	6	3	0	0	0	-
	Total		471	0	3	76	0	301	59	14	5	13	0	0
6	NORTH BROMSGROVE	e.g. Tardebigge, North Bromsgrove												
	Tardebigge	47UBGR	45	0	0	0	0	28	0	3	3	11	0	-
	Hillside	47UBGF	11	0	0	0	0	11	0	0	0	0	0	-
	Norton	47UBGK	6	0	0	3	0	3	0	0	0	0	0	-
	Total		62	0	0	3	0	42	0	3	3	11	0	0
7	WORCESTERSHIRE	e.g. Bromsgrove, Droitwich, Worcester, M5 Southbound (J5)												
	St Johns	47UBGL	38	0	0	3	0	32	3	0	0	0	0	-
	Worcester	47UE	30	0	0	0	0	27	3	0	0	0	0	-
	Stoke Prior	47UBGQ	20	0	0	0	0	17	3	0	0	0	0	-
	Charford	47UBGB	15	0	0	0	0	12	3	0	0	0	0	-
	Malvern Hills	47UC	15	0	0	0	0	12	0	0	0	3	0	-
	Wyre Forest	47UG	18	0	0	0	0	12	0	3	0	3	0	-
	Droitwich East	47UFGZ	7	0	0	0	0	7	0	0	0	0	0	-
	Droitwich West	47UFHC	7	0	0	0	0	7	0	0	0	0	0	-
	Pershore	47UFHT	6	0	0	0	0	6	0	0	0	0	0	-
	Total		156	0	0	3	0	132	12	3	0	6	0	0
8	BLACK COUNTRY	e.g. Black Country, Halesowen												
	Dudley	00CR	40	0	0	0	0	40	0	0	0	0	0	-
	Sandwell	00CS	19	0	0	0	0	19	0	0	0	0	0	-
	Walsall	00CU	6	0	0	0	0	6	0	0	0	0	0	-
	Total		65	0	0	0	0	65	0	0	0	0	0	0

9	BIRMINGHAM (S & C)	e.g. Alvechurch, SW Birmingham, City Centre											
	Ladywood	00CNFS	83	0	27	3	0	48	5	0	0	0	0
	Nechells	00CNFW	31	0	4	0	0	27	0	0	0	0	0
	Alvechurch	47UBFY	38	0	0	10	0	25	3	0	0	0	0
	Longbridge	00CNFT	27	0	0	0	0	24	0	0	3	0	0
	Edgbaston	00CNFG	25	0	4	0	0	21	0	0	0	0	0
	Bournville	00CNFE	22	0	0	0	0	19	0	3	0	0	0
	Aston	00CNFB	18	0	3	0	0	15	0	0	0	0	0
	Selly Oak	00CNGC	14	0	0	3	0	11	0	0	0	0	0
	Small Heath	00CNGF	10	0	0	0	0	10	0	0	0	0	0
	King's Norton	00CNFQ	8	0	0	0	0	8	0	0	0	0	0
	Sparkbrook	00CNGH	7	0	0	0	0	7	0	0	0	0	0
	Moseley	00CNFU	6	0	0	0	0	6	0	0	0	0	0
	Harborne	00CNFM	4	0	0	0	0	4	0	0	0	0	0
	Weoley	00CNGQ	4	0	0	0	0	4	0	0	0	0	0
	Northfield	00CNFX	6	0	3	0	0	3	0	0	0	0	0
	Total		303	0	41	16	0	232	8	3	3	0	0
10	NORTH EAST	e.g. Wythall, Tanworth, Henley											
	Packwood	00CTFL	11	0	0	0	0	11	0	0	0	0	0
	Wythall South	47UBGX	8	0	0	0	0	8	0	0	0	0	0
	Henley	44UEGZ	6	0	0	0	0	6	0	0	0	0	0
	Shirley West	00CTFP	6	0	0	0	0	6	0	0	0	0	0
	Hall Green	00CNFK	8	0	0	3	0	5	0	0	0	0	0
	Billesley	00CNFD	4	0	0	0	0	4	0	0	0	0	0
	Tanworth	44UEHR	4	0	0	0	0	4	0	0	0	0	0
	Total		47	0	0	3	0	44	0	0	0	0	0
11	SOLIHULL & EAST BIRMINGHAM	e.g. Solihull, Birmingham International Airport, Coventry											
	Bickenhill	00CTFA	37	0	0	0	0	31	3	3	0	0	0
	Coventry	00CQ	27	0	0	0	0	27	0	0	0	0	0
	Shirley South	00CTFP	27	0	0	0	0	24	3	0	0	0	0
	St. Alphege	00CTFM	21	0	0	3	0	15	3	0	0	0	0
	Acock's Green	00CNFA	13	0	0	0	0	13	0	0	0	0	0
	Silhill	00CTFR	15	0	0	0	0	12	3	0	0	0	0
	Elmdon	00CTFD	12	0	0	0	0	9	3	0	0	0	0
	Kingsbury	00CNFP	4	0	0	0	0	4	0	0	0	0	0
	Sheldon	00CNGE	4	0	0	0	0	4	0	0	0	0	0
	Yardley	00CNGR	4	0	0	0	0	4	0	0	0	0	0
	Shirley East	00CTFN	4	0	0	0	0	4	0	0	0	0	0
	Total		168	0	0	3	0	147	15	3	0	0	0
12	WARWICKSHIRE	e.g. Warwick, Banbury											
	Warwick	44UF	31	0	0	0	0	31	0	0	0	0	0
	North Warwickshire	44UB	9	0	0	0	0	9	0	0	0	0	0
	Kineton	44UEHA	5	0	0	0	0	5	0	0	0	0	0
	Total		45	0	0	0	0	45	0	0	0	0	0



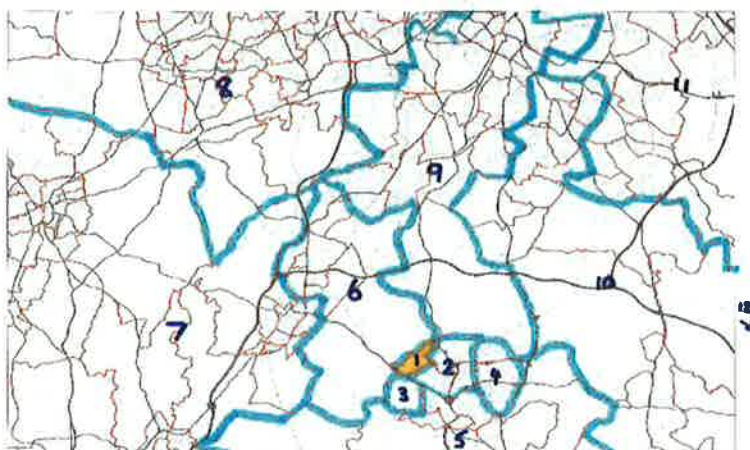
EMPLOYMENT

Journey to Work analysis derived from 2001 Census data.

Analysis below illustrates daily travel flows of employees of Batchley Ward (47UDFP)

Zone	Zone Name Ward or Local Authority Total		All people	Underground, metro, light rail, tram	Train	Bus, minibus or coach	Taxi	Car - driver	Car - passenger	Motorcycle etc	Bicycle	On foot	Other	Car or van pool, sharing driving
1	INTRA-WARD	e.g. Batchley												
	Batchley	47UDFP	403	0	3	13	3	135	12	0	0	84	0	-
	Total		403	0	3	13	3	135	12	0	0	84	0	0
2	TOWN CENTRE	e.g. Abbey, Central, Lodge												
	Central	47UDFQ	36	0	0	3	0	16	3	0	0	14	0	-
	Abbey	47UDFM	21	0	0	0	0	14	0	0	0	7	0	-
	Lodge Park	47UDFW	16	0	0	0	0	12	0	0	0	4	0	-
	Total		73	0	0	3	0	42	3	0	0	25	0	0
3	WEBHEATH	e.g. West ward												
	West	47UDFY	25	0	0	0	0	19	6	0	0	0	0	-
	Total		25	0	0	0	0	19	6	0	0	0	0	0
4	EAST REDDITCH	e.g. Church Hill, Winyates, Matchborough												
	Church Hill	47UDFR	49	0	0	10	0	25	11	0	0	3	0	-
	Winyates	47UDFZ	19	0	0	4	0	12	3	0	0	0	0	-
	Matchborough	47UDFX	16	0	0	3	0	10	3	0	0	0	0	-
	Total		84	0	0	17	0	47	17	0	0	3	0	0
5	SOUTH REDDITCH / STRATFORD	e.g. Astwood Bank, Alcester, Stratford												
	Headless Cross and Oakenshaw	47UDFU	39	0	0	7	0	32	0	0	0	0	0	-
	Greenlands	47UDFT	31	0	0	8	3	17	3	0	0	0	0	-
	Astwood Bank and Feckenham	47UDFN	24	0	0	0	0	21	3	0	0	0	0	-
	Crabbs Cross	47UDFS	20	0	0	3	0	17	0	0	0	0	0	-
	Studley	44UEHQ	17	0	0	0	0	14	3	0	0	0	0	-
	Alcester	44UEGN	7	0	0	0	0	7	0	0	0	0	0	-
	Inkberrow	47UFHN	3	0	0	0	0	3	0	0	0	0	0	-
	Sambourne	44UEHF	3	0	0	0	0	3	0	0	0	0	0	-
	Total		144	0	0	18	3	114	9	0	0	0	0	0
6	NORTH BROMSGROVE	e.g. Tardebigge, North Bromsgrove												
	Catshill	47UBGA	3	0	0	0	0	3	0	0	0	0	0	-
	Hillside	47UBGF	3	0	3	0	0	0	0	0	0	0	0	-
	Linthurst	47UBGH	3	0	0	0	0	3	0	0	0	0	0	-
	Marlbrook	47UBGJ	3	0	0	0	0	3	0	0	0	0	0	-
	Norton	47UBGK	3	0	0	0	0	3	0	0	0	0	0	-
	Total		15	0	3	0	0	12	0	0	0	0	0	0
7	WORCESTERSHIRE	e.g. Bromsgrove Town Centre, Droitwich, Worcester, M5 Southbound (J5)												
	St Johns	47UBGL	10	0	0	0	0	7	3	0	0	0	0	-
	Slideslow	47UBGN	7	0	0	0	0	7	0	0	0	0	0	-
	Sidemoor	47UBGM	4	0	0	0	0	4	0	0	0	0	0	-
	Stoke Heath	47UBGP	4	0	0	0	0	4	0	0	0	0	0	-
	Stoke Prior	47UBGQ	3	0	0	0	0	3	0	0	0	0	0	-
	Droitwich East	47UFGZ	3	0	0	0	0	3	0	0	0	0	0	-
	Lovett and North Claines	47UFHQ	3	0	0	0	0	3	0	0	0	0	0	-
	Upton Snodsbury	47UFHY	3	0	0	0	0	3	0	0	0	0	0	-
	Worcester	47UE	6	0	0	0	0	6	0	0	0	0	0	-
	Wyre Forest	47UG	3	0	0	0	0	3	0	0	0	0	0	-
	Total		46	0	0	0	0	43	3	0	0	0	0	0
8	BLACK COUNTRY	e.g. Black Country, Halesowen												
	Sandwell	00CS	3	0	0	0	0	0	3	0	0	0	0	-
	Total		3	0	0	0	0	0	3	0	0	0	0	0

9	BIRMINGHAM (S & C)	e.g. Alvechurch, SW Birmingham, City Centre												
	Alvechurch	47UBFY	21	0	0	0	0	12	3	3	0	3	0	-
	King's Norton	00CNFQ	3	0	0	0	0	3	0	0	0	0	0	-
	Northfield	00CNFX	3	0	0	0	0	3	0	0	0	0	0	-
	Selly Oak	00CNGC	3	0	0	0	0	3	0	0	0	0	0	-
	Total		30	0	0	0	0	21	3	3	0	3	0	0
10	NORTH EAST	e.g. Wythall, Tanworth, Henley												
	Total													
11	SOLIHULL & EAST BIRMINGHAM	e.g. Solihull, Birmingham International Airport												
	Solihull	00CT	9	0	0	0	0	9	0	0	0	0	0	-
	Total		9	0	0	0	0	9	0	0	0	0	0	0
12	WARWICKSHIRE	e.g. Warwick, Banbury												
	Total													



RESIDENTIAL

Zone	Zone name	Car - driver	% of Total
1	INTRA-WARD	135	8%
2	TOWN CENTRE	309	19%
3	WEBHEATH	15	1%
4	EAST REDDITCH	169	10%
5	SOUTH REDDITCH / STRATFORD	301	18%
6	NORTH BROMSGROVE	42	3%
7	WORCESTERSHIRE	132	8%
8	BLACK COUNTRY	65	4%
9	BIRMINGHAM (S & C)	232	14%
10	NORTH EAST	44	3%
11	SOLIHULL & EAST BIRMINGHAM	147	9%
12	WARWICKSHIRE	45	3%
TOTAL		1,636	100%

EMPLOYMENT

Zone	Zone name	Car - driver	% of Total
1	INTRA-WARD	135	31%
2	TOWN CENTRE	42	10%
3	WEBHEATH	19	4%
4	EAST REDDITCH	47	11%
5	SOUTH REDDITCH / STRATFORD	114	26%
6	NORTH BROMSGROVE	12	3%
7	WORCESTERSHIRE	43	10%
8	BLACK COUNTRY	0	0%
9	BIRMINGHAM (S & C)	21	5%
10	NORTH EAST	0	0%
11	SOLIHULL & EAST BIRMINGHAM	9	2%
12	WARWICKSHIRE	0	0%
TOTAL		442	100%

RESIDENTIAL TRIP ASSIGNMENT

Distribution of Residential Traffic (By Zone)		
Route	Route Description	% of Total
1	INTRA-WARD	8%
2	TOWN CENTRE	19%
3	WEBHEATH	1%
4	EAST REDDITCH	10%
5	SOUTH REDDITCH / STRATFORD	18%
6	NORTH BROMSGROVE	3%
7	WORCESTERSHIRE	8%
8	BLACK COUNTRY	4%
9	BIRMINGHAM (S & C)	14%
10	NORTH EAST	3%
11	SOLIHULL & EAST BIRMINGHAM	9%
12	WARWICKSHIRE	3%
		100%

Distribution of Zone Traffic (By Route)												
A	B	C	D	E	F	G	H	I	J	K	L	
60%	40%											100%
		60%			40%							100%
			100%									100%
				35%	60%					5%	100%	
			25%		75%							100%
						100%						100%
							20%	80%				100%
							30%	50%	20%			100%
									100%			100%
				15%	80%					5%	100%	
					30%					70%	100%	
										100%	100%	

Distribution of Residential Traffic (By Route)												
A	B	C	D	E	F	G	H	I	J	K	L	
5%	3%											
		11%			8%							
			1%		4%	6%					1%	
				5%	14%							
						3%						
							2%	6%				
							1%	2%	1%			
										14%		
					2%							
					3%					6%		
											3%	
5%	3%	11%	6%	4%	32%	5%	8%	1%	14%	9%	1%	

Assignment of Residential Traffic					
		AM PEAK		PM PEAK	
		Arr	Dep	Arr	Dep
A	To / from Lily Green Lane	15	45	45	24
B	To / from Appletree Lane	10	32	30	16
C	To / from Hewell Road	35	110	104	55
D	To / from Birchfield Road	17	54	50	27
E	To / from A441 Alvechurch Highway (south)	11	35	33	17
F	To / from A448 Bromsgrove Highway (south)	100	316	296	157
G	To / from Hewell Lane	17	52	49	26
H	To / from A448 Bromsgrove Highway (north)	28	82	77	41
I	To / from M42 (west)	2	8	7	4
J	To / from A441 (north)	44	139	130	69
K	To / from M42 (east)	28	88	83	44
L	To / from Dagnell End Road	2	5	5	2
		310	974	914	484

EMPLOYMENT TRIP ASSIGNMENT

Distribution of Employment Traffic (By Zone)		
Route	Route Description	% of Total
1	INTRA-WARD	31%
2	TOWN CENTRE	10%
3	WEBHEATH	4%
4	EAST REDDITCH	11%
5	SOUTH REDDITCH / STRATFORD	28%
6	NORTH BROMSGROVE	3%
7	WORCESTERSHIRE	10%
8	BLACK COUNTRY	0%
9	BIRMINGHAM (S & C)	5%
10	NORTH EAST	0%
11	SOLIHULL & EAST BIRMINGHAM	2%
12	WARWICKSHIRE	0%
		100%

Distribution of Zone Traffic (By Route)												
A	B	C	D	E	F	G	H	I	J	K	L	
60%	40%											100%
		60%			40%							100%
			100%									100%
				35%	80%					5%	100%	
			25%		75%							100%
						100%						100%
							20%	80%				100%
							30%	50%	20%			100%
									100%			100%
				15%	80%					5%	100%	
					30%					70%	100%	
										100%	100%	

Distribution of Employment Traffic (By Route)												
A	B	C	D	E	F	G	H	I	J	K	L	
18%	12%											
		6%			4%							
			4%			4%					1%	
				4%	6%							
			6%		19%							
						3%						
							2%	8%				
							%	%	%			
										5%		
					%							
					1%						1%	
18%	12%	6%	11%	4%	30%	5%	8%	0%	5%	1%	1%	

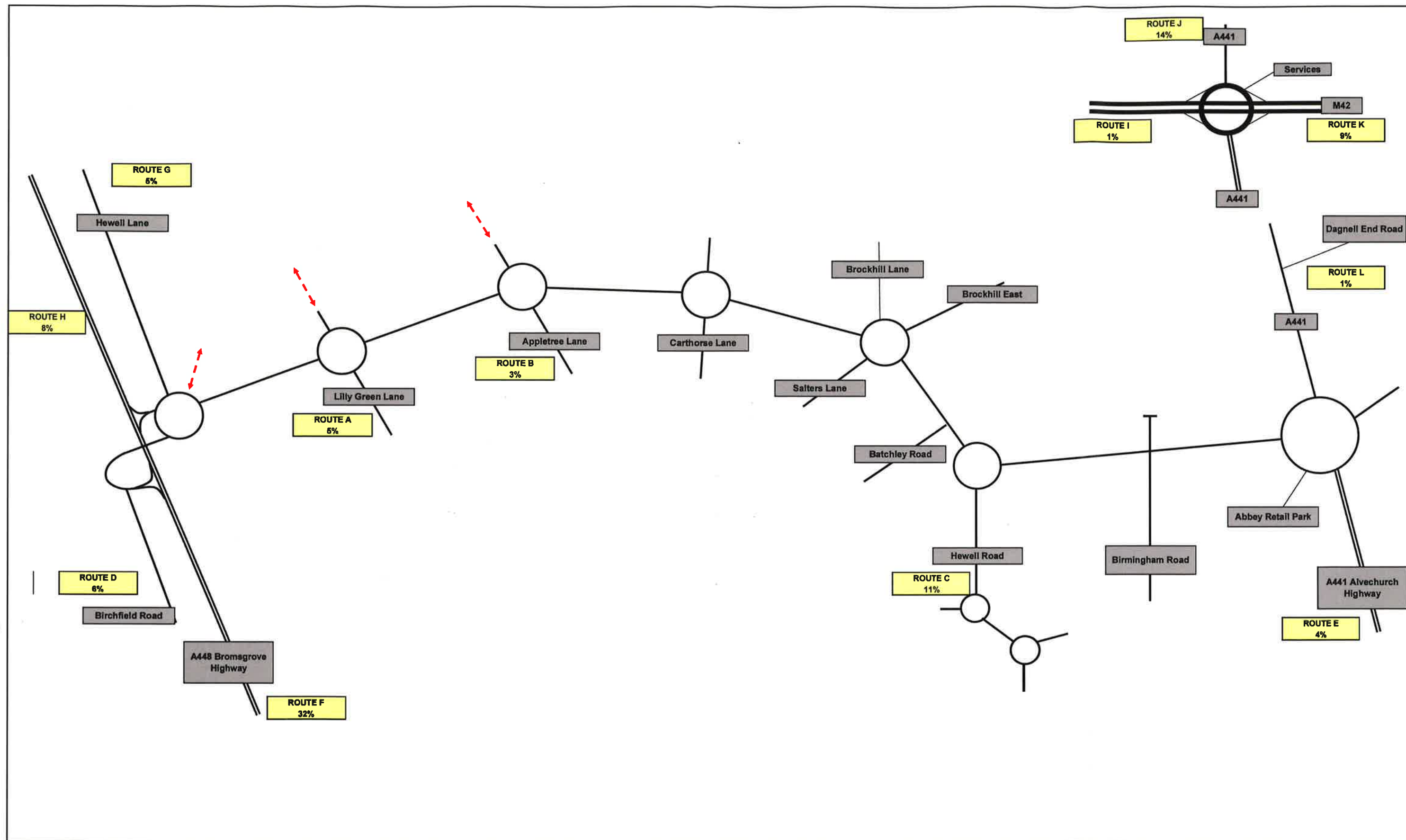
Assignment of Employment Traffic					
		AM PEAK		PM PEAK	
		Arr	Dep	Arr	Dep
A	To / from Lily Green Lane	85	17	14	73
B	To / from Appletree Lane	57	11	10	48
C	To / from Hewell Road	27	5	4	23
D	To / from Birchfield Road	50	10	8	43
E	To / from A441 Alvechurch Highway (south)	17	3	3	15
F	To / from A448 Bromsgrove Highway (south)	140	27	24	120
G	To / from Hewell Lane	22	4	4	18
H	To / from A448 Bromsgrove Highway (north)	36	7	6	31
I	To / from M42 (west)	0	0	0	0
J	To / from A441 (north)	22	4	4	19
K	To / from M42 (east)	7	1	1	6
L	To / from Dagnell End Road	2	0	0	2
		468	81	78	397

ROUTES

Development Traffic Routes	
Route	Route Description
A	To / from Lily Green Lane
B	To / from Appletree Lane
C	To / from Hewell Road
D	To / from Birchfield Road
E	To / from A441 Alvechurch Highway (south)
F	To / from A448 Bromsgrove Highway (south)
G	To / from Hewell Lane
H	To / from A448 Bromsgrove Highway (north)
I	To / from M42 (west)
J	To / from A441 (north)
K	To / from M42 (east)
L	To / from Dagnell End Road

TOTAL DEVELOPMENT TRIP ASSIGNMENT

Assignment of Total Development Traffic					
		AM PEAK		PM PEAK	
		Arr	Dep	Arr	Dep
A	To / from Lily Green Lane	101	55	60	97
B	To / from Appletree Lane	67	43	40	64
C	To / from Hewell Road	62	116	108	77
D	To / from Birchfield Road	67	64	59	69
E	To / from A441 Alvechurch Highway (south)	29	39	36	32
F	To / from A448 Bromsgrove Highway (south)	241	343	320	276
G	To / from Hewell Lane	38	57	53	44
H	To / from A448 Bromsgrove Highway (north)	62	89	83	72
I	To / from M42 (west)	2	8	7	4
J	To / from A441 (north)	66	142	133	87
K	To / from M42 (east)	35	59	84	49
L	To / from Dagnell End Road	4	8	5	5
		776	1056	992	881

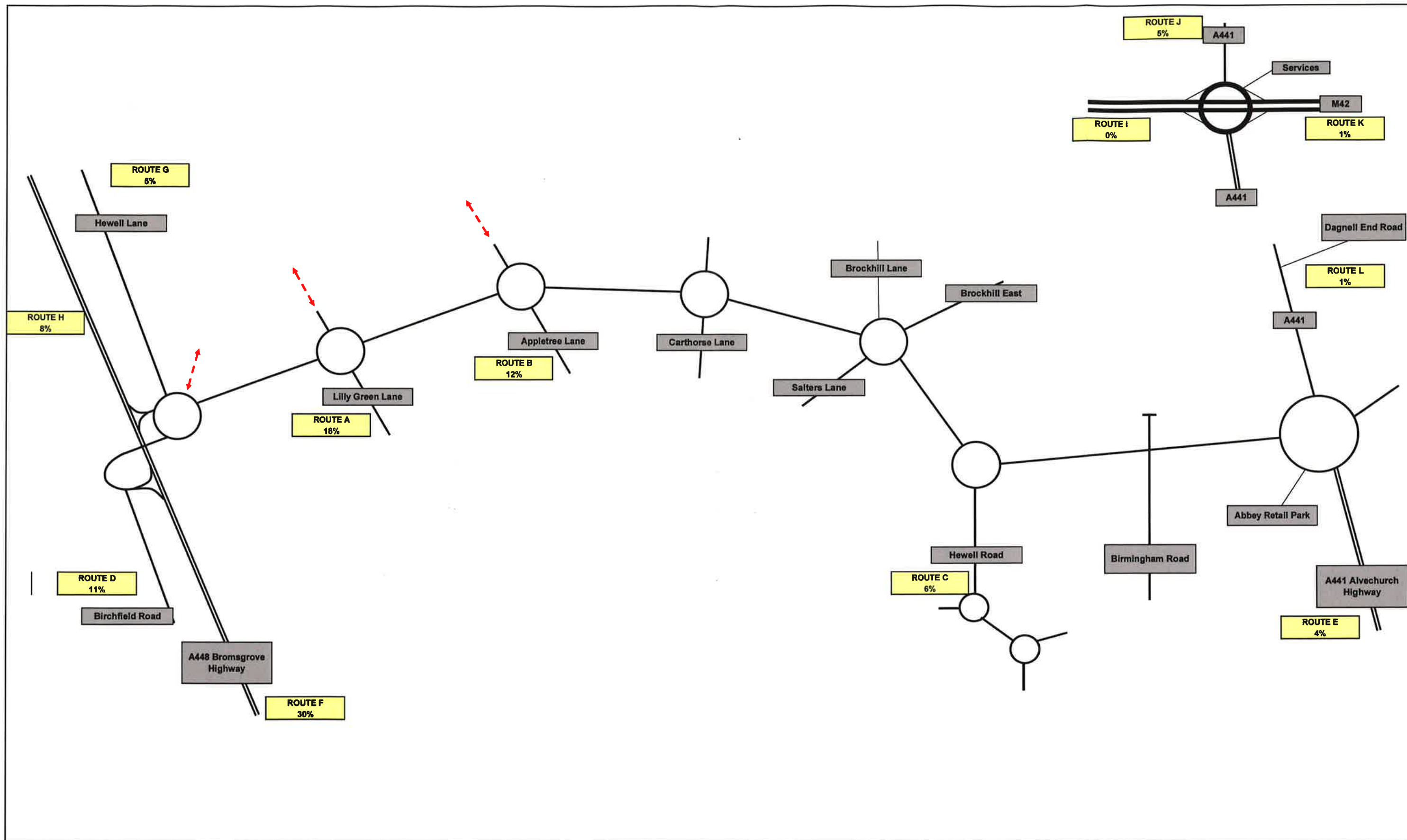


Job no.	JNW7044	Rev:	
Drawing no.		Rev Date:	
Drawn by:	JPR	Authorised	PRELIMINARY

BROCKHILL WEST, REDDITCH

DISTRIBUTION OF RESIDENTIAL DEVELOPMENT TRAFFIC

FIGURE A1



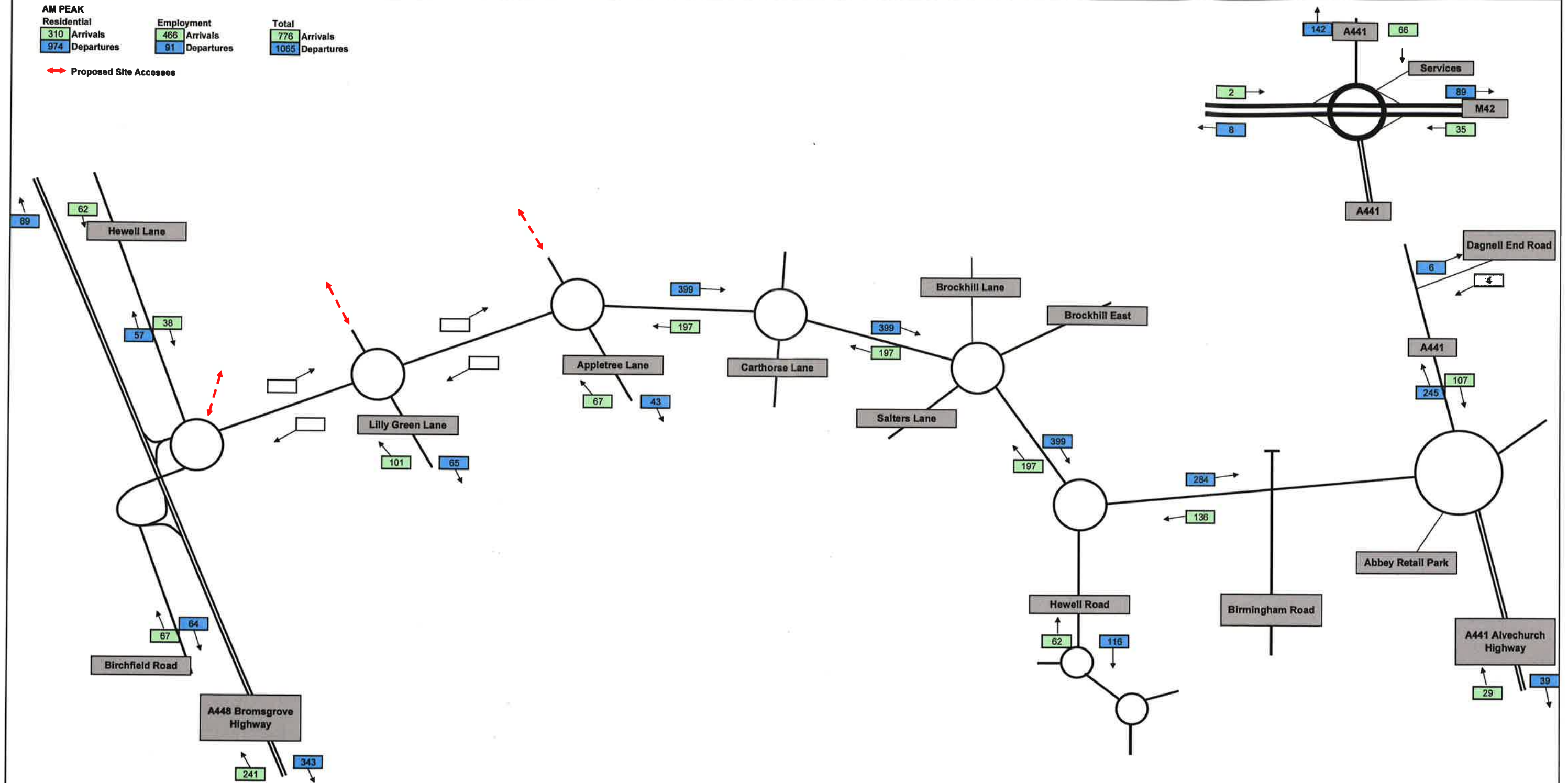
Job no. JNW7044	Rev:
Drawing no.	Rev Date:
Drawn by: JPR	Authorised PRELIMINARY

BROCKHILL WEST, REDDITCH

DISTRIBUTION OF EMPLOYMENT DEVELOPMENT TRAFFIC

FIGURE A2

AM PEAK
 Residential
 310 Arrivals
 974 Departures
 Employment
 466 Arrivals
 91 Departures
 Total
 776 Arrivals
 1065 Departures
 Proposed Site Accesses

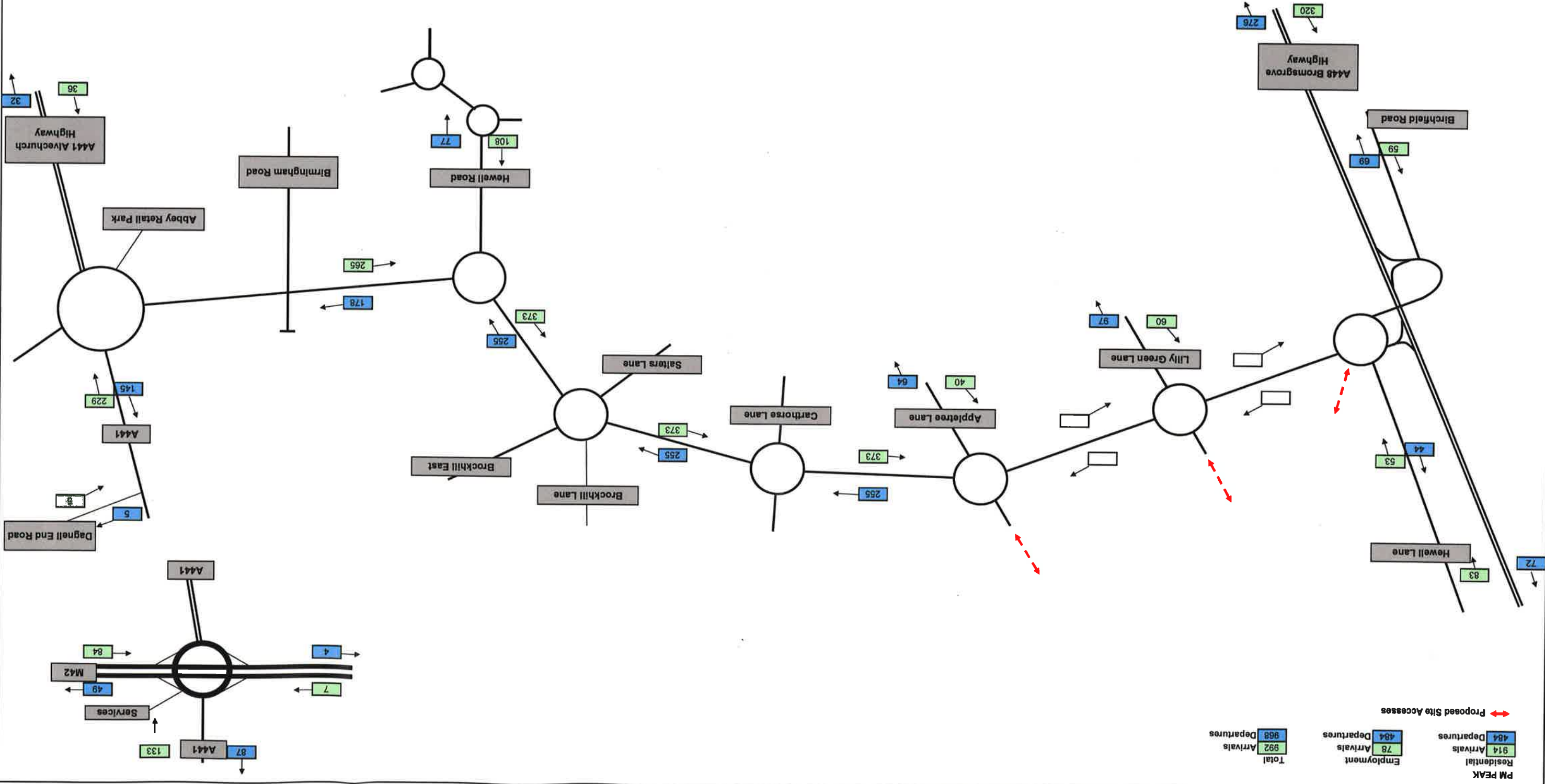


Job no.	JNW7044	Rev:	
Drawing no.		Rev Date:	
Drawn by:	JPR	Authorised	PRELIMINARY

BROCKHILL WEST, REDDITCH

ASSIGNMENT OF DEVELOPMENT TRAFFIC - AM PEAK

FIGURE A3



APPENDIX B: TRAFFIC IMPACT RISK ASSESSMENT

Likelihood of Traffic Impact

The 'Likelihood of Traffic Impact' is based on the forecast assignment of development traffic on to the network and the location of the junctions and links relative to the site. The impact is scored as follows:

- 1 - Highly Unlikely
- 2 - Unlikely
- 3 - Possible
- 4 - Likely
- 5 - Very Likely

Severity of Traffic Impact

The 'Severity of Traffic Impact' is based on attendant traffic conditions* and reserve operational capacity* compared with forecast assignment of development traffic movements to the junction and links. The impact is scored as follows:

- 1 - Negligible Impact
- 2 - Minor Impact
- 3 - Moderate Impact
- 4 - Significant Impact
- 5 - Severe Impact

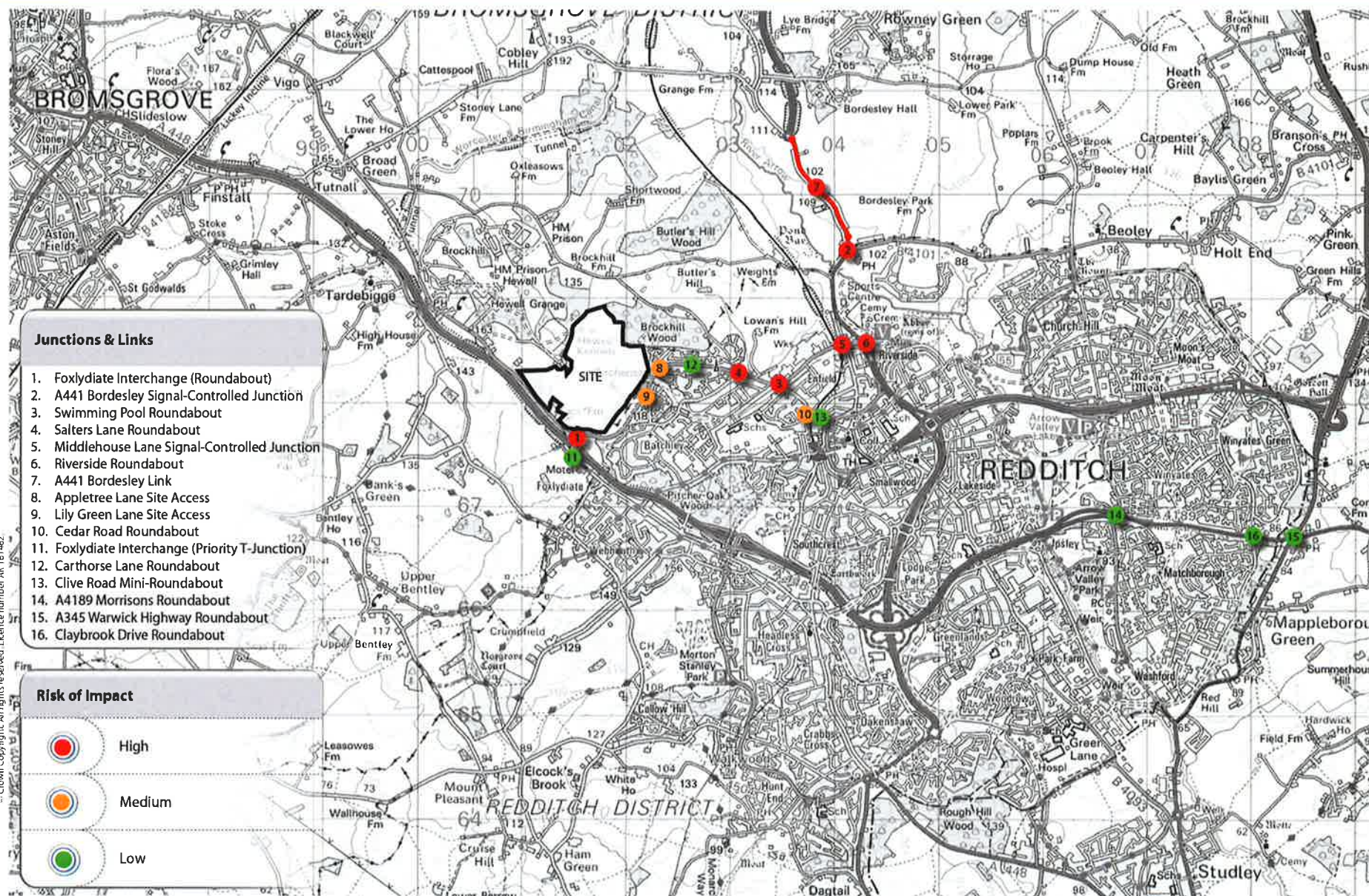
Risk Score

The Risk Score is a product of the Likelihood and Severity Scores. The junctions are ranked in order of 'Risk Score', with the highest scores indicating those which are more likely to require junction modifications / capacity improvements.

Notes:

* Taken from peak period site observations. Detailed operational performance analyses should be undertaken at a later date.

Description	Junction / Link Type	Likelihood of Traffic Impact	Severity of Traffic Impact	Risk Score	Rank	Risk Rating
Foxlydiate Interchange (Roundabout): A448 Bromsgrove Highway / B4069 Hewell Lane / B4164 Brockhill Drive / B4069 Birchfield Road / Site Access	Grade separated interchange (Roundabout only)	5	5	25	1	High
A441 Bordesley Signal Junction A441 Alvechurch Highway / A441 Birmingham Road / Dagnel End Road	Signalised (3 arm T-junction)	4	5	20	2	
Swimming Pool Roundabout: B4164 Hewell Road / B4164 Windsor Road	Roundabout (4 arm)	4	4	16	3	
Salters Lane Roundabout: B4164 Hewell Road / B4164 Brockhill Drive / Salters Lane / Brockhill Lane / (Brockhill East)	Roundabout (4 / 5 arm)	4	4	16	-	
Middlehouse Lane Junction: B4164 Middlehouse Lane / B4164 Windsor Road / Birmingham Road	Signalised (4 arm crossroads)	4	4	16	-	
Riverside Roundabout: A441 Alvechurch Highway / Middlehouse Lane / Millrace Road / Abbey Retail Park	Roundabout (5 arm)	4	4	16	-	
A441 Bordesley Link: A441 Birmingham Road	Single Carriageway Link	4	4	16	-	
Appletree Lane Site Access: B4164 Brockhill Drive / Appletree Lane	Roundabout (4 arm)	5	3	15	8	Medium
Lily Green Lane Site Access: B4164 Brockhill Drive / Lily Green Lane	Roundabout (4 arm)	5	3	15	-	
Cedar Road Roundabout: Hewell Road / Cedar Road	Roundabout (4 arm)	3	3	9	10	
Foxlydiate Interchange (Priority T-Junction): A448 Bromsgrove Highway Slip Road / B4069 Birchfield Road	Grade separated interchange (Priority T-Junction only)	4	2	8	11	Low
Carthorse Lane: B4164 Brockhill Drive / Carthorse Lane	Roundabout (4 arm)	4	2	8	-	
Clive Road Mini-Roundabout Hewell Road / Clive Road	Mini-Roundabout	3	2	6	13	
A4189 Morrisons Roundabout A4189 Warwick Highway / B4497 Battens Drive (Morrisons Store)	Roundabout (4 arm)	3	2	6	-	
A345 Warwick Highway Roundabout A4189 Warwick Highway / A435 Birmingham Road	Roundabout (4 arm)	2	2	4	15	
Claybrook Drive Roundabout A4189 Warwick Highway / Claybrook Drive / Alders Drive	Roundabout (4 arm)	2	2	4	-	



REF: JNW7044
 CLIENT: Miller/Persimmon/SRD
 DATE: April 2010
 STATUS: Final

CHECKED BY: JR
 DATE CHECKED: 16/04/10
 REVISION: 00
 PREPARED BY: JP

SCALE: NTS

RPS

Highfield House, 5 Ridgeway, Quinton Business Park, Birmingham, B32 1AF
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APPENDIX C: POTENTIAL MITIGATION MEASURES

Junction / Link	Potential Mitigation Measures
Foxlydiate Interchange (Roundabout): A448 Bromsgrove Highway / B4069 Hewell Lane / B4164 Brockhill Drive / B4069 Birchfield Road / Site Access	<ul style="list-style-type: none"> ▪ Increase size of roundabout, extending circulatory carriageway into site ▪ Realignment of Brockhill Drive and Hewell Lane entry and exit arms. Position of A448 Bromsgrove Highway and Birchfield Drive arms are likely to remain fixed ▪ Safety improvements (e.g. signing and junction visibility improvements on approach to roundabout)
A441 Bordesley Signal Junction A441 Alvechurch Highway / A441 Birmingham Road / Dagnel End Road	<ul style="list-style-type: none"> ▪ Upgrade signal controller technology e.g. MOVA (dependent on level of technology currently installed) ▪ Bordesley Bypass
Swimming Pool Roundabout: B4164 Hewell Road / B4164 Windsor Road	<ul style="list-style-type: none"> ▪ Remove / redesign central over-run area ▪ Realignment of entry and exit arms ▪ Revised junction arrangement and traffic control (e.g. conversion to a signal controlled cross roads) ▪ Pedestrian and cycle facility improvements ▪ Modifications incorporating bus priority measures ▪ Construction of Weights Lane Link
Salters Lane Roundabout: B4164 Hewell Road / B4164 Brockhill Drive / Salters Lane / Brockhill Lane / (Brockhill East)	<ul style="list-style-type: none"> ▪ Reconfigure junction ▪ Construction of Weights Lane Link
Middlehouse Lane Junction: B4164 Middlehouse Lane / B4164 Windsor Road / Birmingham Road	<ul style="list-style-type: none"> ▪ Reconfigure junction ▪ Modification of signal operation ▪ Construction of Weights Lane Link
Riverside Roundabout: A441 Alvechurch Highway / Middlehouse Lane / Millrace Road / Abbey Retail Park	<ul style="list-style-type: none"> ▪ Increase roundabout diameter ▪ Entry and exit realignments ▪ Part signalisation ▪ Construction of Weights Lane Link
A441 Bordesley Link: A441 Birmingham Road	<ul style="list-style-type: none"> ▪ Re-allocation of road space ▪ Bordesley Bypass
Lily Green Lane Site Access: B4164 Brockhill Drive / Lily Green Lane	<ul style="list-style-type: none"> ▪ Safety improvements, including signing scheme and potential minor carriageway realignment on approach to roundabout
Cedar Road Roundabout: Hewell Road / Cedar Road	<ul style="list-style-type: none"> ▪ Remove / reconfigure central over-run area

Objective	Potential Mitigation Measures
<i>Pedestrian and Cycle Improvements</i>	<ul style="list-style-type: none"> ▪ Extension and integration of new pedestrian and cycle routes with existing provision, including Batchley Brook 'Greenway' ▪ New connections with town centre, rail station & bus station ▪ Improvements to cycle provision on Hewell Lane ▪ Controlled crossing facilities at junctions and route intersections
<i>Public Transport Improvements</i>	<ul style="list-style-type: none"> ▪ Hewell Road / Windsor road roundabout – removal or redesign of central over-run area ▪ Hewell Road / Cedar Road roundabout – removal or redesign of central over-run area ▪ Salters Lane Bus Gate ▪ On-site measures

Project Title: BROCKHILL WEST, REDDITCH
Project No: JNW7044
Document Ref: B8274
Title: Access Strategy - Foxlydiate
Date: 6 October 2010

This Technical Note (TN) considers the potential for vehicular access to the proposed mixed use development at Brockhill West; the TN specifically relates to access in the south of the site from B4164 Brockhill Drive.

Previous access proposals have considered the introduction of a new spur off the existing 'Foxlydiate roundabout' at the junction of B4609 Hewell Lane, B4164 Brockhill Drive, Birchfield Road and A448 Bromsgrove Highway. The original concept involved the creation of a new peripheral distributor road through prospective development in Brockhill West and ultimately around the-west side of Redditch, connecting with development in the north and east of Brockhill near to Weights Lane. Further investigations into the most appropriate transport strategy for phased growth of the town in the north west sector, the level of development required to be allocated in the plan period to 2026, and the availability of an alternative distributor link to Weights Lane using the existing Brockhill Drive (and an extension via Brockhill East ADR and adjoining land) justified reconsideration of the value of that concept.

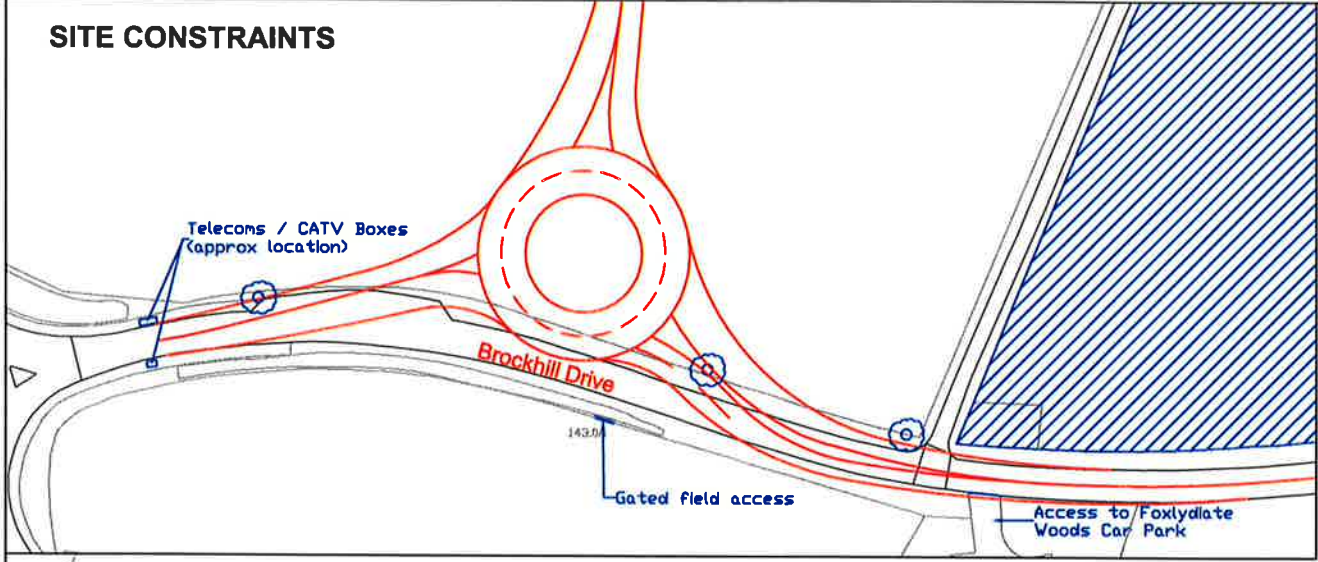
Further consideration of the topography and siting of key infrastructure indicate that an access at the existing Foxlydiate roundabout would require significant earthworks and substantial modification of the junction. Refinement of the Masterplan to reflect the reappraisal of the site and overall transport strategy provides the opportunity to consider the scale, location and status of access required at this location.

An alternative access arrangement has been developed comprising the introduction of an access directly from B4164 Brockhill Drive in the form of a three-arm roundabout junction on the section between Foxlydiate Woods and the existing Foxlydiate roundabout. A roundabout is the most appropriate form of junction to serve the development at this location; providing the opportunity for continuous free-flow of both through traffic and development traffic.

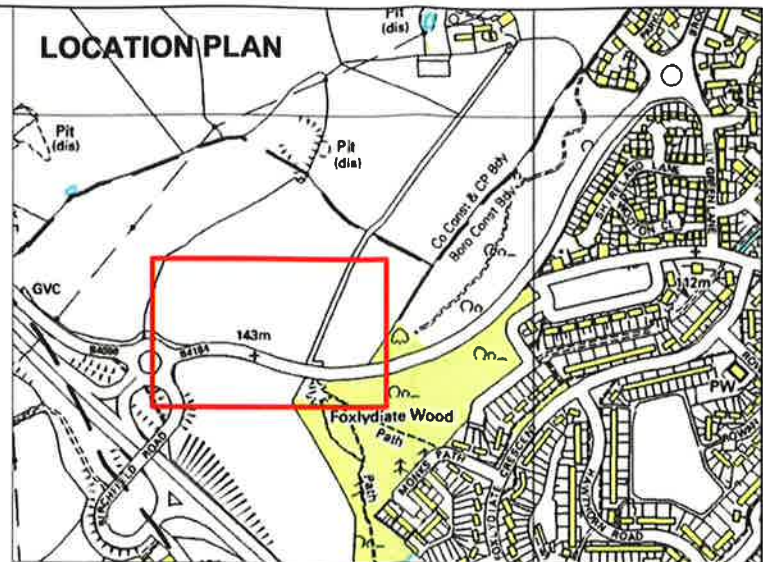
An indicative junction layout is shown in RPS drawing **JNW7044-100** attached to this TN. The proposed layout has taken into account site constraints and provides for an access of an appropriate standard in accordance with DMRB TD16/07 (Geometric Design of Roundabouts) to accommodate forecast traffic demand. The access has also been designed to be accommodated wholly on land controlled by the Consortium to ensure deliverability.

The roundabout junction proposed is consistent in scale and design with existing highway features along the length of Brockhill Drive; additional road safety benefits may be derived from the speed restraining effect of a roundabout junction at this location on the approach to the Foxlydiate junction.

SITE CONSTRAINTS



LOCATION PLAN



Legend

- Mature Tree (approximate location)
- Land in Third Party Control
- Preliminary Kerb Alignment


Notes

The location of all topographical features, boundaries and vegetation are approximate. Exact locations to be determined as part of a measured survey.

Foxlydiate Roundabout

Brockhill Drive

143.0m

Rev:	Date:	Amendment:	Name:	Checked:
■ Drawing Based Upon:- Ordnance Survey MasterMap				
Status: PRELIMINARY				
Notes: Contractors are not to scale from this drawing. All dimensions to be checked on site and any discrepancies, ambiguities and/or omissions between this drawing and information given elsewhere must be reported to this office. If in doubt, ask.				
				
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Project: Brockhill West, Redditch				
Title: Preliminary Access Arrangements				
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