Validation Report

Webheath/Foxlydiate, Redditch Development Assessment

Prepared for

Worcestershire County Council

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CH2MHILL®

304, Bridgewater Place
Birchwood Park
Warrington, WA3 6XG
tel 01925 867 500 fax 01925 867 600

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SECTION 1

Introduction

The Redditch Development Model (RDM) is a spreadsheet based facility enabling the assessment of traffic impact arising from a number of development sites within Redditch. The RDM is one of a series of Models developed by CH2M HILL on behalf of Worcestershire County Council (WCC). These models have been produced to assist WCC in assessing the traffic impact and mitigation process resulting from proposed future residential, employment and other development sites throughout Worcestershire.

The RDM shows the uplift in total traffic flow through a number of key road links and junctions in Redditch as a result of new vehicle trips generated by proposed development sites. The analysis of the traffic impact informs subsequent recommendations as to which junctions require further junction specific assessments using appropriate junction modelling software. This Report presents and discusses the assessment of the Webheath/Foxlydiate development in Redditch using the RDM.

The Webheath/Foxlydiate development is a large multifaceted development site located on the western side of Redditch approximately 1.7km from the town centre. Initial development proposals are for 2800 houses plus a primary school and a local amenity centre. The site is located to the south of the A448 at its junction with Brockhill Drive / Birchfield Road while Foxlydiate Lane borders the site to the east. The development also encompasses part of Cur Lane and continues to the south of Cur Lane adjacent to the Great Hockings Lane residential area.

There will be a number of access points to the development. To the north there will be a new junction provided on the A448 Brockhill junction overbridge connecting link. There will also be a new arm added to the existing Foxlydiate Lane, Church Road and Cur Lane Roundabout. Cur Lane itself will run across the centre of the site and provide and additional access route to the southern half of the Webheath/Foxlydiate development.

WCC have provided information relating to the quantum, type and phasing of the development as well as internal road layout schematics which have informed the access arrangements stated above. The development quantum will be split into two predominant areas; 1800 dwellings to the northern segment and 1000 dwellings to the south of Cur Lane. In the absence of developer trip rates, Halcrow has sourced representative trip rates for the development (and all other Redditch developments) using the TRICS database. It has been assumed that any trips associated with the primary school and a local amenity centre will be internal trips within the development area and so will not have an impact on the wider Redditch highway network.

Construction of the Redditch development is expected to last for 15 years from 2015, with full build out in 2030. Normally this would define an Assessment Year of 2030, however as Redditch development aspirations are not known beyond 2026, it is not considered suitable or robust to assess future development traffic movements within Redditch beyond this date. Therefore, the Assessment Year will revert to 2026.

The report continues by providing a brief explanation of the development and application of the RDM (Section 2). Relevant background information regarding the development site, including associated generated traffic, is provided (Section 3) before the modelled scenarios are described (Section 4) and their results presented (Sections 5 and 6). A consideration is also given in regards to the schemes identified within the Bromsgrove and Redditch Core Strategy - Infrastructure Delivery Plan (B&R-IDP) (Section 7). Finally, a summary of the results are provided alongside recommendations as to which, if any, junctions require further, junction specific assessments using appropriate junction modelling software (Section 8).

SECTION 2

The Redditch Development Model

The Redditch Development Model (RDM) uses a variety of data sources to model new development traffic through the Redditch road network. The RDM allows for traffic impact assessments in the AM (08:00-09:00) and PM (17:00-18:00) Peak hours.

2.1 RDM Junctions

Within the RDM, a number of junctions have been identified that are either likely to incur a high proportion of new development traffic or are strategically significant within the Redditch road network. These junctions are typically in close proximity to a development site or are a major network junction within or surrounding the town.

The original RDM network model has been updated to include new traffic count data and future development aspirations in the area which was received from Redditch Borough Council (RBC) and Worcestershire County Council (WWC) in October 2013. This has improved the understanding and geographic scope of the traffic impacts of any development; in turn enabling more informed recommendations.

The current version of the RDM contains a total of 67 junctions, the details of which are provided in Table 2.1 below and shown within Figure 2.1 overleaf.

Table 2.1 Redditch Development Model Study Junctions

Junction	Arms
1	Moons Moat Drive / Ravensbank Drive / Coventry Hwy East / Far Moon Lane / Alders Drive / Coventry Hwy West
2	A435 North / A435 South / Coventry Hwy West
3	A435 North / Henley Road / A435 South / Warwick Hwy
4	Alders Drive North / Far Moor Lane / Alders Drive South
5	Alders Drive / Warwick Hwy East / Claybrook Drive / Warwick Hwy West
6	Battens Drive / Warwick Hwy East / Icknield Street Drive / Warwick Hwy West
7	Icknield Street Drive North / Claybrook Drive / Icknield Street Drive South / Washford Drive
8	Birmingham Road North / Birmingham Road South / Icknield Street Drive
9	Studley Road North / Washford Drive / Studley Road South / Woodrow Drive
10	Studley Road / Redditch Road / Green Lane
11	Birmingham Road / Alcester Road / High Street
12	Bromsgrove Rd / Alcester Road North / Alcester Road South
13	Station Road / Bromsgrove Road East / Bromsgrove Road West
14	The Slough West / The Slough East / Jill Lane
15a	Evesham Road North / Rough Hill Drive / The Slough / Evesham Road South / Windmill Dive
15b	Alcester Hwy / Rough Hill Drive North / Grangers Lane / Rough Hill Drive South / Coldfield Drive
16	Woodrow Drive North / Woodrow Drive East / Rough Hill Drive / Greenlands Drive
17	Windmill Drive North / Middle Piece Drive East / Windmill Drive South / Middle Piece Drive West

Table 2.1 Redditch Development Model Study Junctions

Junction	Arms
18	Bromsgrove Hwy East / Windmill Drive / Bromsgrove Hwy West
19	Church Road / Heathfield Road / Blackstitch Lane / Green Lane
20	Birchfield Road North / Birchfield Road South / Foxlydiate Lane
21	Birchfield Road East / Birchfield Road South / Birchfield Road West
22	Brockhill Drive North / Lily Green Lane East / Brookhill Drive South / Lily Green Lane West
23	Butler's Hill Lane / Hewell Road / Salter's Lane / Brockhill Drive
24	Windsors Road / Hewell Road East / Hewell Road West
25	Birmingham Road North / Middlehouse Lane / Birmingham Road South / Windsor Road
26	Alvechurch Hwy North / Millrace Road / Alvechurch Hwy South / Alvechurch Hwy Retail Entrance / Middlehouse Lane
27	Birmingham Road North / Dagnell End Road / Birmingham Road South
28	Icknield Street North / Church Hill / Icknield Street South / Dagnell End Road
29	Paper Mill Drive / Moons Moat Drive / Coventry Hwy East / Battens Drive / Coventry Hwy West
30	Brockhill Drive / Birchfield Rd / Bromsgrove Hwy South / Bromsgrove Hwy North / Hewell Lane
31	Church Road North / Church Road South / Pumphouse Lane North
32	Blackwell Lane / Brockhill Drive East / Aldborough Lane / Brockhill Drive West
33	Apple Tree Lane North / Brockhill Drive East / Apple Tree Lane South / Brockhill Drive West
34	Birchfield Road West / Birchfield Road East / Tynsall Ave
35	Birmingham Road North / Birmingham Road South / Weights Lane
36	Foxlydiate Lane / Church Road / Great Hockings Lane / Cur Lane / Development Access
37	Birchfield Road West / Birchfield Road East / Heathfield Road
38	Bromsgrove Road / Birchfield Road East / Birchfield Road West
39	Heathfield Road North / Middle Piece Drive / Heathfield Road South
40	Poplar Road / Bromsgrove Road East / Bromsgrove Road West
41	Hewell Road North / Hewell Road East / Cedar Road
42	Prospect Hill North / Redditch Ringway East / Prospect Hill South / Redditch Ringway West /
43	Alvechurch Hwy North / Alvechurch Hwy South / Redditch Ringway
44	Alvechurch North / Coventry Hwy East / Alvechurch Hwy South / Coventry Hwy West
45	Grove Street / Coventry Hwy / St Georges Road / Other Road / Redditch Ringway
46	Other Road / Holloway Lane / Trescott Road / Ipsley Street
47	Tunnel Drive / Coldfield Drive East / Coldfield Drive South
48	Alvechurch Hwy North / Holloway Drive / Greenlands Drive / Alvechurch Hwy South / Coldfield Drive
49	Evesham Road North / Headless Cross Drive East / Evesham Road South / Headless Cross Drive West

Table 2.1 Redditch Development Model Study Junctions

Junction	Arms
50	Coldfield Drive North / Coldfield Drive South / Headless Cross Drive
51	Alvechurch Hwy North / Warwick Hwy East / Alcester Hwy South / Bromsgrove Hwy West
52	Windmill Drive North / Windmill Drive South. Callow Hill Lane
53	Studley Road North / Warwick Hwy East / Studley Road South / Warwick Hwy West
54	Holloway Drive / Warwick Hwy East / Old Forge Drive South / Warwick Hwy West
55	Woodrow Drive West / Woodrow Drive East / Nine Days Lane
56	Woodrow Drive East / Quinneys Lane / Woodrow Drive West
57	Green Lane North / Brickyard Lane / Green Lane West
58	Old Forge Drive / Washford Drive East / Washford Drive West
59	Icknield Street Drive North / Matchborough Way / Icknield Street Drive South
60	Winyates Way / Warwick Hwy East of Matchborough Way / Matchborough Way South Warwick Hwy East of bridge over Matchborough Way
61	Green Lane / Callow Hill Lane / Brookhouse Lane / Sillins Lane
62	Willow Way / Bromsgrove Road North / Bromsgrove Road South
63	Icknield Street / Ravensbank Drive/ Paper Mill Drive
64	Birmingham Road North / Birmingham Road South / Redditch Road
65	Gypsy Lane / Cur Lane South / Cur Lane West
66	Heathfield Road North / Heathfield Road South / Downsell Road

SECTION 2

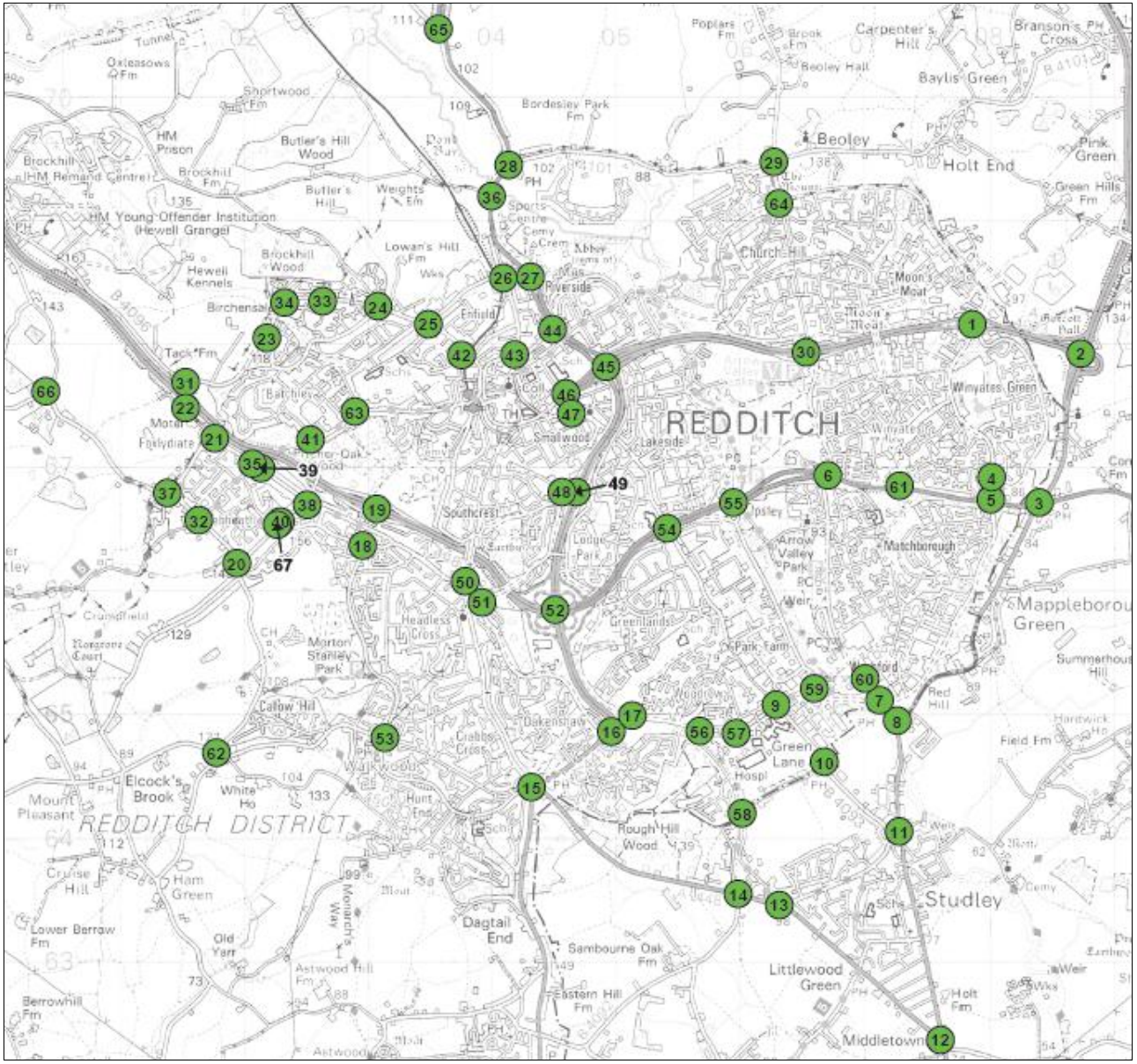


Figure 2.1 RDM Junctions

SECTION 2

2.2 RDM Developments

The purpose of the RDM is to assess the impact of new development traffic on the local network, subsequently advising which junctions should be subject to further, more detailed assessment using appropriate specialised junction modelling software such as ARCADY, PICADY or LINSIG. It is important to note that the RDM is for indicative purposes only, and is only suitable for use as a filtering tool to identify specific junctions requiring further investigation and more detailed analysis.

In addition to the Webheath/Foxlydiate development, the RDM also includes other employment and residential sites, as detailed in Table 2.2 and shown within Figure 2.2. These developments are considered to constitute the majority of growth within Redditch to 2026.

Table 2.2 RBC Development Aspirations

Site Name	Type	Quantum
LP02 - Brush factory, Evesham Road, Crabbs Cross (LP124)	Residential	4 Dwellings
LP03 - Rear of 144-162 Easemore Road (LP135)	Residential	19 Dwellings
RO Windsor Road Gas Works	Residential	42 Dwellings
LP06 - Mayfield Works	Residential	23 Dwellings
Park House, Town Centre	Residential	14 Dwellings
LPX02 - Adjacent Castleditch Lane / Pheasant Lane	Residential	16 Dwellings
LPX04 - Former Claybook School, Matchborough	Residential	36 Dwellings
LPX05 - Land at Millfields, Fire Station & RO Fire Station	Residential	35 Dwellings
LPX06 - Former Ipsley School Playing Field	Residential	31 Dwellings
LPX07 - South of Scout Hut, Oakenshaw Road	Residential	32 Dwellings
CS01 - Church Hill Borough Centre	Residential	57 Dwellings
CS03 - Matchborough Borough Centre	Residential	17 Dwellings
WYG04 - Marlfield Farm School	Residential	79 Dwellings
RB03 - Widney House, Bromsgrove Road	Residential	58 Dwellings
L4L02 - Land off Wirehill Drive (08/305)	Residential	15 Dwellings
UCS 2.16 - Rear of Sandygate Close	Residential	8 Dwellings
UCS 8.38 - Dingleside Middle School & Playing Field & Land to the rear of 1-11 Auxerre Avenue	Residential	220 Dwellings
2010/03 - Loxley Close	Residential	10 Dwellings
2010/05 - Clifton Close	Residential	6 Dwellings
2010/07 - Prospect Hill	Residential	71 Dwellings
2010/09 - Rear of Alexandra Hospital	Residential	145 Dwellings
2010/10 - A435 ADR	Residential	92 Dwellings
2010/10 - A435 ADR	Residential	92 Dwellings
2010/11 - Brockhill ADR	Residential	582 Dwellings
2010/12 - Webheath ADR	Residential	600 Dwellings

Table 2.2 RBC Development Aspirations

Site Name	Type	Quantum
2010/13 - Brockhill Green Belt	Residential	400 Dwellings
2010/27 - Sandycroft, West Avenue	Residential	10 Dwellings
2011/03 - Brockhill East	Residential	14 Dwellings
2011/04 - Dorothy Terry House	Residential	41 Dwellings
2011/05 - Wellington Works	Residential	7 Dwellings
2011/06 - Birchfield Road	Residential	22 Dwellings
2012/01 - Hewell Road Baths	Residential	14 Dwellings
2012/02 Lowan's Hill Farm	Residential	6 Dwellings
Studley Road / Green Lane	Residential	12 Dwellings
IN 15	Employment	0.4 Ha
IN 19	Employment	1.44 Ha
IN 20	Employment	1.32 Ha
IN 24	Employment	0.9 Ha
IN 34	Employment	0.65 Ha
IN 37	Employment	0.62 Ha
IN 38	Employment	0.22 Ha
IN 52	Employment	1.03 Ha
IN 54	Employment	0.29 Ha
IN 58	Employment	1.1 Ha
IN 59	Employment	0.38 Ha
IN 67	Employment	6.6 Ha
IN 69	Employment	2 Ha
IN 80	Employment	0.64 Ha
IN 81	Employment	3.5 Ha
IN 82	Employment	10.44 Ha
IN 83	Employment	0.19 Ha
IN 84	Employment	0.22 Ha
Winyates Green Triangle	Employment	12 Ha
Land at Gorcott	Employment	7.47 Ha
RA1	Employment	0.026 Ha
RA2	Employment	0.1778 Ha
RA3	Employment	0.1562 Ha

Table 2.2 RBC Development Aspirations

Site Name	Type	Quantum
RA4	Employment	0.0053 Ha
RA5	Employment	0.3508 Ha
RA6	Employment	3 Dwellings
Abbey Windfall	Residential	0 Dwellings
Astwood Bank and Feckenham Windfall	Residential	18 Dwellings
Batchley & Brockhill Windfall	Residential	18 Dwellings
Central Windfall	Residential	18 Dwellings
Church Hill Windfall	Residential	18 Dwellings
Crabbs Cross Windfall	Residential	18 Dwellings
Greenlands Windfall	Residential	18 Dwellings
Headless Cross and Oakenshaw Windfall	Residential	18 Dwellings
Lodge Park Windfall	Residential	18 Dwellings
Matchborough Windfall	Residential	18 Dwellings
West Windfall	Residential	18 Dwellings
Winyates Windfall	Residential	18 Dwellings
Cross Boundary Site 6	Residential	600 Dwellings

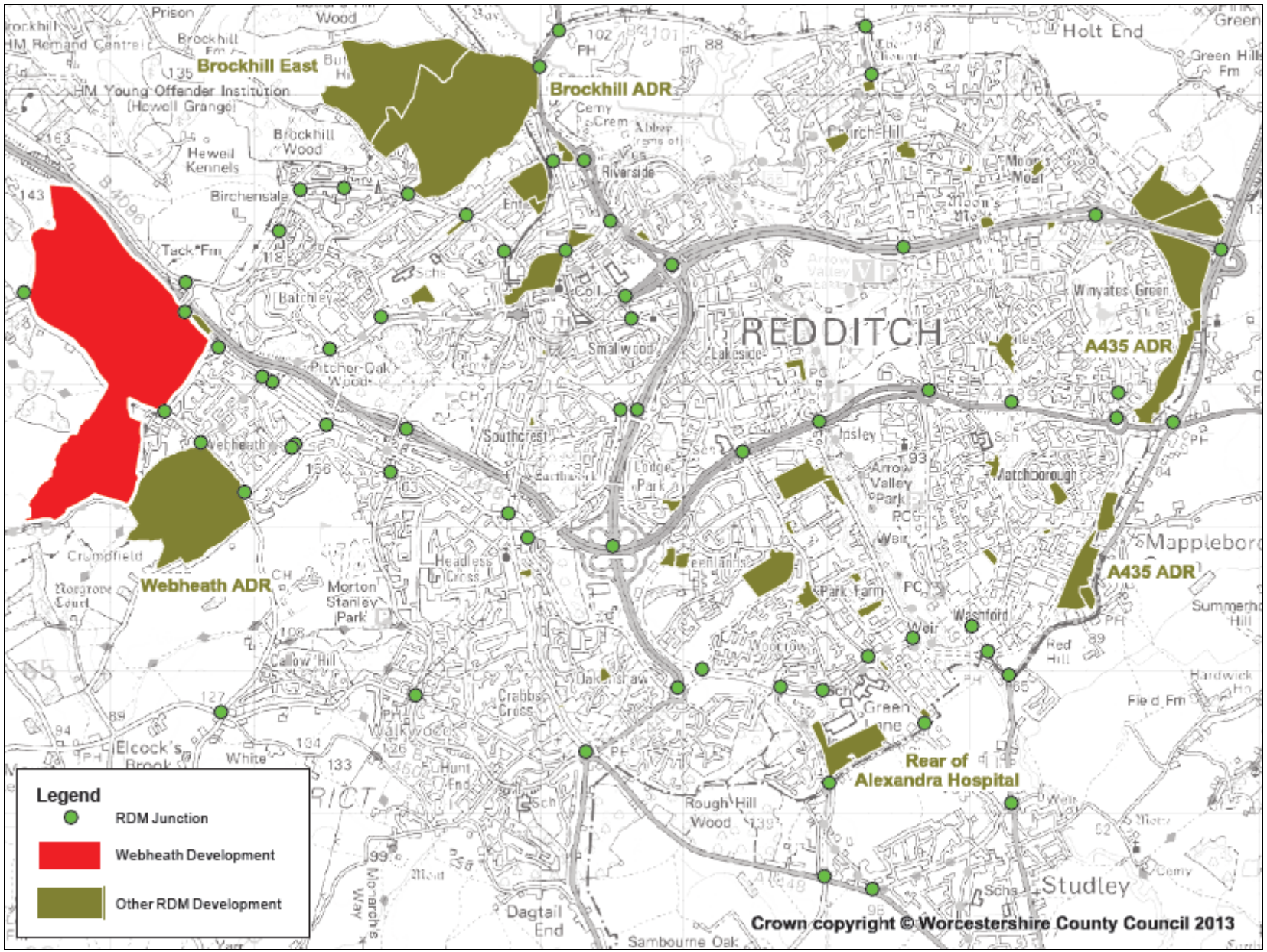


Figure 2.2 RDM Junctions and Developments (selected developments labeled)

A number of developments considered in the RDM have multiple points of access. For the purposes of this study development traffic is split evenly between these accesses with onward trip distribution remaining the same.

The RDM allows the assessment of any development either in isolation or collectively along with other future sites. This facility has been used as part of this traffic impact assessment of the Webheath/Foxlydiate development.

The RDM does not take into account the potential for internalisation of trips or the potential for trips directly between future development sites.

2.3 Wider Worcestershire Development Impacts

The RDM does not directly consider any development allocations outside of Redditch, such as those in Bromsgrove or Worcester. It is however important to consider these developments as they will have an impact on junctions and links within Redditch, particularly on more strategic routes such as the A441 and A448.

Although it is not possible to quantify these wider Worcestershire development impacts within the RDM, analysis can be drawn based on the *Bromsgrove and Redditch Core Strategy - Infrastructure Delivery Plan (B&R-IDP)*. This study's methodology is largely similar to the RDM but for a much wider geographic area so therefore considers only the key strategic routes within and between the towns of Worcestershire.

The outputs of the B&R-IDP are a series of proposed transport infrastructure and schemes and services aimed at mitigating and managing the modelled impact from development traffic in the future. RDM junctions also covered within the B&R IDP study for which junction amelioration schemes have been identified are detailed within Table 2.3.

Table 2.3 B&R IDP Junction Scheme List

B&R Junction	RDM Junction	Scheme
Icknield St Dr (B4497) / Washford Drive / Claybrook Drive	7	Signing and lining improvement
Woodrow Drive / Washford Drive / Studley Road	9	40m additional approach lane on south and eastern approach arm
Rough Hill Drive / Woodrow Drive / Greenlands Drive	17	Additional approach lane on main 3 approaches (not Woodrow North)
Birchfield Lane / Foxlydiate Lane	21	TRO to protect the junction
Brockhill Drive Corridor	23, 24, 25, 31, 33, 34	Replace 4 existing Roundabout Junctions with Signalised Junctions all operating using MOVA
Brockhill Drive (B4184) / Hewell Road (B4184) / Brockhill Lane	24	Additional lane on west and north approaches
Hewell Road / Windsor Road (B4184)	25	Convert to a 4 arm signal junction
Alvechurch Highway (A441) / Middlehouse Lane (B4184)	27	Signalise approaches from north, south and west
A441 / B4101 Dagnall End Road	28	Add additional approach lane on the eastern arm and put on MOVA
Bromsgrove Highway / Brockhill Drive	31	Add Additional lane approach lane on Brockhill Drive

Table 2.3 B&R IDP Junction Scheme List

B&R Junction	RDM Junction	Scheme
Alvechurch Highway (A441) / Redditch Ringway (B4160)	44	Install MOVA
Headless Cross Drive / Evesham Road	50	Install MOVA
Woodrow Drive / Quinneys Lane (hospital access)	57	50m additional approach lane on western arm - right turn into the hospital
Washford Drive / Old Forge Drive	59	Signing and lining improvement

This assessment of the Webheath/Foxlydiate development will therefore also include a specific qualitative consideration of the impact of wider Worcestershire development allocations (Section 7). This process will ensure that this report covers the traffic impacts from the Webheath development, other Redditch development sites and wider Worcestershire development sites.

2.4 Base Traffic Data Information

RDM Junctions use a combination of actual count data and 2001 Census Journey to Work (JtW) data to determine representative Do-Minimum traffic flows. Ideally, all junction do-minimum flows should be based on actual count data but this is not always possible.

The assumption that all traffic will use the quickest route between origins and destinations when using Census JtW data in an All-or-Nothing assignment means that this method is not as accurate as count data. This methodology has the tendency therefore to overstate Do-Minimum flows on more strategic routes thereby overstating a developments impact on these routes.

2.5 Background Traffic Growth and Do-Minimum Traffic Flows

As discussed above, a variety of data sources have been used to create a 'Base' level of traffic representing existing traffic flows and turning movements.

Base traffic flows have been factored using TEMPRO NTM (version 6.2, AF09 Redditch) local growth rates to create traffic flows for the 2013 Existing Year and 2026 Assessment Year Do-Minimums. These traffic flows are therefore representative of the traffic using the junctions in 2013 and 2026 assuming the Webheath/Foxlydiate development does not occur.

2.6 Distribution and Assignment

Journey to Work Census data has provided the likely origin and destination points for any residential or employment trips within Redditch. This has been used to inform the distribution and assignment of new development trips through the RDM network.

Development traffic is then manually assigned to the RDM network with the resulting traffic flows and turning movements recorded. The assignment of development traffic creates the 2026 Do-Something scenarios. By comparing traffic flows in the Do-Minimum and Do-Something, both the number of new development trips and the percentage uplift in total traffic at each RDM study junction can be calculated.

It is important to consider both the uplift in total traffic and actual number of development trips through each study junction as low Do-Minimum traffic flows can accentuate percentage uplifts in total traffic.

Conversely, the impact of substantial development traffic can be obscured and understated in areas of high Do-Minimum traffic flows.

SECTION 3

The Webheath/Foxlydiate Development

The Webheath/Foxlydiate development (referred to hereon as the *Webheath development*) is a large multifaceted development site located on the western side of Redditch approximately 1.7km from the town centre. The site is located to the south of the A448 at its junction with Brockhill Drive / Birchfield Road while Foxlydiate Lane borders the site to the east. The development also encompasses part of Cur Lane and continues to the south of Cur Lane adjacent to the Great Hockings Lane residential area.

3.1 Development Quantum and Access

Initial development proposals are for 2800 residential properties plus a primary school and a local amenity centre. WCC have provided information relating to the quantum, type and phasing of the development as well as internal road layout schematics which have informed the access arrangements stated above. The development quantum will be split into two predominant areas; 1800 dwellings to the northern segment and 1000 dwellings to the south of Cur Lane.

There will be a number of access points to the development. To the north there will be a new junction provided on the A448 Brockhill junction overbridge connecting link. There will also be a new arm added to the existing Foxlydiate Lane, Church Road and Cur Lane Roundabout. Cur Lane itself will be severed by the new development road links but will continue to form the primary access route to the southern half of the Webheath/Foxlydiate development.

The above details are graphically presented within Figure 3.1 overleaf. This image is based upon a sketch received by WCC which can be found in Appendix A.

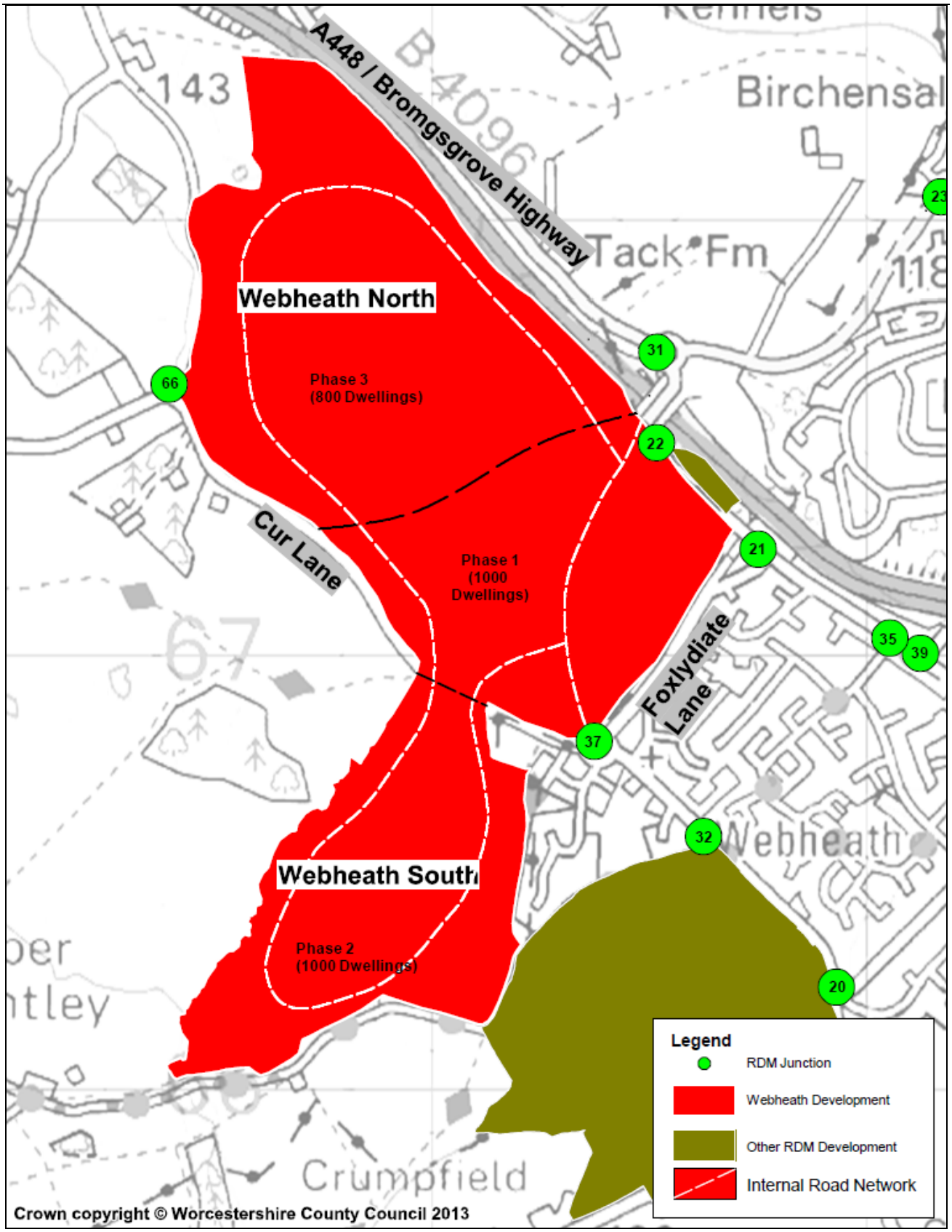


Figure 3.1: Webheath Development

3.2 Trip Rates

In the absence of developer trip rates, Halcrow has sourced representative trip rates using the TRICS database. These trip rates are presented within Table 3.1 by time period, direction and development element.

Table 3.1 Webheath Development Trip Rates by Development Element

Development Element	AM Peak 08:00-09:00			PM Peak 17:00-18:00		
	Arrivals	Departures	Two-Way	Arrivals	Departures	Two-Way
Site Specific Residential	0.164	0.380	0.544	0.351	0.227	0.578

Residential trip rates are per dwelling.

3.3 Vehicle Trips

The number of external vehicle trips generated by the Webheath development is the product of the trip rates stated within Table 3.1 and the respective development quantum.

Based on the information outlined in section 3.1, the RDM has been set up to allocate 1800 dwellings to the northern portion of the Webheath development and 1000 dwellings to the southern portion. Subsequently, the total vehicle trips associated with these separate development portions will be 'loaded' onto the network at two separate points to the north and south of the existing Cur Lane link.

The resulting external vehicle trips generated by the two portions of the Webheath development are presented in Table 3.2.

Table 3.2 Webheath Development Trips by Development Segment

Development Segment	Quantum	AM Peak 08:00-09:00			PM Peak 17:00-18:00		
		Arrivals	Departures	Two-Way	Arrivals	Departures	Two-Way
Webheath North	1800 Dwellings	295	684	979	632	409	1040
Webheath South	1000 Dwellings	164	380	544	351	227	578

Note this assessment is only concerned with the impact of the development on the local highway network, therefore only vehicle trips are modelled within the RDM.

It has been assumed that any trips associated with the primary school and a local amenity centre will be internal trips within the development area and so will not have an impact on the wider Redditch highway network.

2001 Census JtW data will define the distribution and routing of development trips through the wider Redditch and Worcestershire road network. It is important to note that while the distribution of the vehicle trips generated by the northern and southern portions of the Webheath development will be the same, the assignment of these trips to the RDM network will be different due to the different 'loading' points and access options for the two development portions.

SECTION 4

Assessment Scenarios

The traffic impact of the Webheath development will be considered in an Assessment Year of 2026. Two scenarios are to be tested in order to assess the traffic impact of the Webheath development site on the junctions previously identified in Table 2.1 and displayed in Figure 2.1.

The Scenarios tested and analysed using the RDM are as follows:

- **Scenario One** – Traffic impact assessment of the Webheath development only in the 2026 Assessment Year.
- **Scenario Two** – Traffic impact assessment of the Webheath development and all other RDM development aspirations in the 2026 Assessment Year.

4.1 Scenario One

Scenario One assigns the trips generated by the development through the RDM network in 2026. Appropriate TEMPRO growth rates have been used to provide the Do-Minimum traffic for that year. The results of Scenario One will demonstrate the distribution of the Webheath development trips and will provide an initial indication of the RDM junctions that will be used by development traffic in 2026.

4.2 Scenario Two

Scenario Two assigns the trips generated by the Webheath development together with all other Redditch development sites through the RDM network in the 2026 Assessment Year. The sites included within the RDM represent the major residential/employment projections within Redditch (to 2026) and therefore constitute the majority of traffic growth within the RDM study area. This Scenario therefore provides an indication of the potential total traffic increase in Redditch in the event that all proposed development sites come forward.

4.3 Do-Minimum Traffic Growth Utilising TEMPRO

Within scenario one, future background traffic growth is accounted for by TEMPRO factors. In scenario two, all RDM development trips associated with Redditch development aspirations to 2026 are assigned to the highway network. It is therefore considered appropriate to remove TEMPRO factors from scenario two to ensure that traffic growth is not double counted.

Do-Minimum flows in scenario two will therefore revert to the existing base year (2013) as this will be representative of traffic levels prior to any Redditch development aspiration traffic being generated and impacting upon the network.

4.4 Other Aspects for Consideration

The RDM only considers development within the town of Redditch. Other Worcestershire developments, which may have an impact on the A441, A448, A4023 or other roads in the RDM are not assessed. This is because the RDM is designed to allow an indicative analysis of the affects of a *specific* development within Redditch rather than the wider Worcester area.

Whilst it is not possible to quantify wider Worcestershire development impacts within the RDM, an indicative analysis can be drawn based on the B&R IDP work which is being completed by Halcrow. The output of the B&R IDP is a series of multi-modal transport infrastructure schemes and services aimed at mitigating and managing the modelled impact from development traffic in the future. Therefore this assessment of the Webheath development will also include consideration of wider Worcestershire

development aspirations and their impact on areas within Redditch drawing on a combination of the results from this RDM assessment and the B&R IDP work. Further details were provided within section 2.3.

Also, local knowledge relating to the current operating conditions at the studied junctions will be considered within the conclusions of this report. Therefore, due to local knowledge of capacity issues, junctions may be suggested for further assessment based on these factors alone and not solely based on the results of the RDM model.

The aim of this report is to recommend those junctions that require a more comprehensive analysis and not to analyse the detailed operating conditions unique to each junction. The recommendations of this report will inform which junctions should undergo a more detailed level of junction modelling and assessment.

SECTION 5

Scenario One

Scenario One assesses the impact of the Webheath development traffic in the 2026 Assessment Year against 2026 Do-Minimum traffic flows on RDM junctions. The development trips outlined in Table 3.2 have been assigned to the RDM. Traffic generated by all other RDM developments has been excluded from this scenario.

The results tables discussed in subsequent sections have been colour coded to illustrate the degree of impact for both the raw increase in trip numbers and the associated percentage uplift in traffic. The colour thresholds are as follows:

Development Trips	Less than 20	20 to 50	50 to 100	More than 100
Percentage Uplifts	Less than 5%	5% to 10%	10% to 50%	Greater than 50%

5.1 Headline Results and Analysis

Table 5.1 below presents the 2026 Do-Minimum traffic flows and the traffic generated by the Webheath development through RDM study junctions.

Table 5.1 Webheath Development Traffic Impact through RDM Junctions by Peak Hour

RDM Junction	2026 Do-Minimum		Development Traffic		Traffic Uplift	
	AM	PM	AM	PM	AM	PM
RDM Network	**402293**	**293652**	**10699**	**11254**	**2.7%**	**3.8%**
1	11367	8132	8	10	0.1%	0.1%
2	12538	8969	0	0	0.0%	0.0%
3	14700	10516	12	9	0.1%	0.1%
4	3221	2304	17	16	0.5%	0.7%
5	13366	9562	37	33	0.3%	0.3%
6	19249	13770	109	94	0.6%	0.7%
7	11430	8177	31	29	0.3%	0.4%
8	9682	6926	0	0	0.0%	0.0%
9	2447	1750	7	14	0.3%	0.8%
10	1152	824	0	0	0.0%	0.0%
11	9065	6485	0	0	0.0%	0.0%
12	9293	6648	12	17	0.1%	0.2%
13	653	467	12	17	1.8%	3.5%
14	653	467	12	17	1.8%	3.5%
15	11074	7922	100	121	0.9%	1.5%
16	12395	8867	35	63	0.3%	0.7%

Table 5.1 Webheath Development Traffic Impact through RDM Junctions by Peak Hour

RDM Junction	2026 Do-Minimum		Development Traffic		Traffic Uplift	
	AM	PM	AM	PM	AM	PM
17	6437	4605	16	26	0.3%	0.6%
18	1221	1349	227	239	18.6%	17.8%
19	10610	7590	408	425	3.8%	5.6%
20	791	729	182	202	23.0%	27.7%
21	1260	1176	461	447	36.6%	38.0%
22	797	1104	510	575	63.9%	52.1%
23	659	990	551	593	83.7%	59.9%
24	935	1088	537	578	57.5%	53.1%
25	9662	6912	532	573	5.5%	8.3%
26	1601	1770	430	466	26.9%	26.3%
27	16903	12092	430	466	2.5%	3.9%
28	2549	2747	359	395	14.1%	14.4%
29	6777	4848	10	12	0.2%	0.3%
30	9497	6794	22	47	0.2%	0.7%
31	1173	1739	871	907	74.3%	52.2%
32	351	251	182	202	52.0%	80.4%
33	601	707	537	578	89.4%	81.9%
34	641	690	544	585	85.0%	84.9%
35	3066	2193	225	199	7.3%	9.1%
36	12712	9094	359	395	2.8%	4.3%
37	760	803	559	594	73.5%	73.9%
38	1113	1051	34	22	3.0%	2.1%
39	3573	2556	212	185	5.9%	7.2%
40	2395	1714	155	159	6.5%	9.3%
41	3380	2418	178	163	5.3%	6.7%
42	4723	3379	12	26	0.3%	0.8%
43	3284	2350	33	20	1.0%	0.8%
44	7556	5405	86	72	1.1%	1.3%
45	15713	11241	98	97	0.6%	0.9%
46	4432	3170	6	14	0.1%	0.4%
47	1490	1066	0	0	0.0%	0.0%

Table 5.1 Webheath Development Traffic Impact through RDM Junctions by Peak Hour

RDM Junction	2026 Do-Minimum		Development Traffic		Traffic Uplift	
	AM	PM	AM	PM	AM	PM
48	2676	1914	3	6	0.1%	0.3%
49	7213	5160	31	19	0.4%	0.4%
50	10868	7775	34	37	0.3%	0.5%
51	1655	1184	23	21	1.4%	1.8%
52	9975	7136	328	340	3.3%	4.8%
53	10147	7259	89	85	0.9%	1.2%
54	16330	11682	257	240	1.6%	2.1%
55	465	333	0	0	0.0%	0.0%
56	4544	3251	7	14	0.1%	0.4%
57	3783	2706	0	0	0.0%	0.0%
58	0	0	0	0	-	-
59	9539	6824	7	14	0.1%	0.2%
60	5034	3602	24	15	0.5%	0.4%
61	8216	5878	37	33	0.4%	0.6%
62	4298	3075	7	8	0.2%	0.2%
63	2686	1921	173	156	6.4%	8.1%
64	6786	4855	3	4	0.0%	0.1%
65	15781	11289	349	382	2.2%	3.4%
66	9	6	15	21	171.3%	326.5%
67	3343	2392	155	159	4.6%	6.7%

Across the whole network, the Webheath development generates uplifts of 2.7% and 3.8% during the AM and PM peaks respectively. The difference in uplift between these peak hours is due to a lower level of Do-Minimum traffic in the PM peak than the AM but a higher level of Development traffic in the PM peak than the AM.

The RDM indicates a diverse severity range of junction impacts across the Redditch highway network. Some junctions incur significant numbers of new development trips, while others very few, if any.

Caution should be used when considering the uplifts in total traffic. As noted earlier, low Do-Minimum traffic flows can accentuate percentage uplifts in total traffic. Conversely, the impact of substantial development traffic can be obscured and understated in areas of high Do-Minimum traffic flows. The highest proportional uplifts in total traffic are seen at junction 66. Although close to the Webheath development, these uplifts are accentuated by a very low level of do-minimum traffic.

Recall also that there are a number of junctions for which actual traffic counts are not available. Therefore, at these junctions the analysis focus should be placed on the development trip numbers and distribution through the junction. If any junction is deemed to warrant further assessment and do-minimum flows are unavailable then it will be imperative that actual traffic counts are collected prior to assessment.

The highest number of development trips impacting upon a single junction is at junction 31. Junction 31 is the closest A448 junction to the development, and one of the access points to the northern portion of the development is located immediately to the south of junction 31. Junction 31 will be forming part of a number of key routes to and from both the northern and southern portions of the Webheath development.

As would be expected, a number of junctions surrounding the development incur a high number of Webheath development trips. Of note, all junctions in the Webheath ward incur over 100 development trips in each peak hour while those junctions on key local routes incur over 400 vehicles in each peak hour (junctions 21, 22 and 37).

Due to their nature, strategic junctions also incur high numbers of Webheath development trips (junctions 19, 27, 31 and 52). There is also a clear group of junctions incurring a significant proportion of Webheath development trips along the Brockhill Drive link between the A448 at junction 31 and the A441 at junction 27.

In order to further establish the specific impact of the Webheath development on RDM junctions, it is possible to calculate the proportion of all trips generated by the development which pass through each RDM junction. This also provides an indication as to the distribution and routing of Webheath development trips through the RDM. This information is visually presented within Figure 5.1.

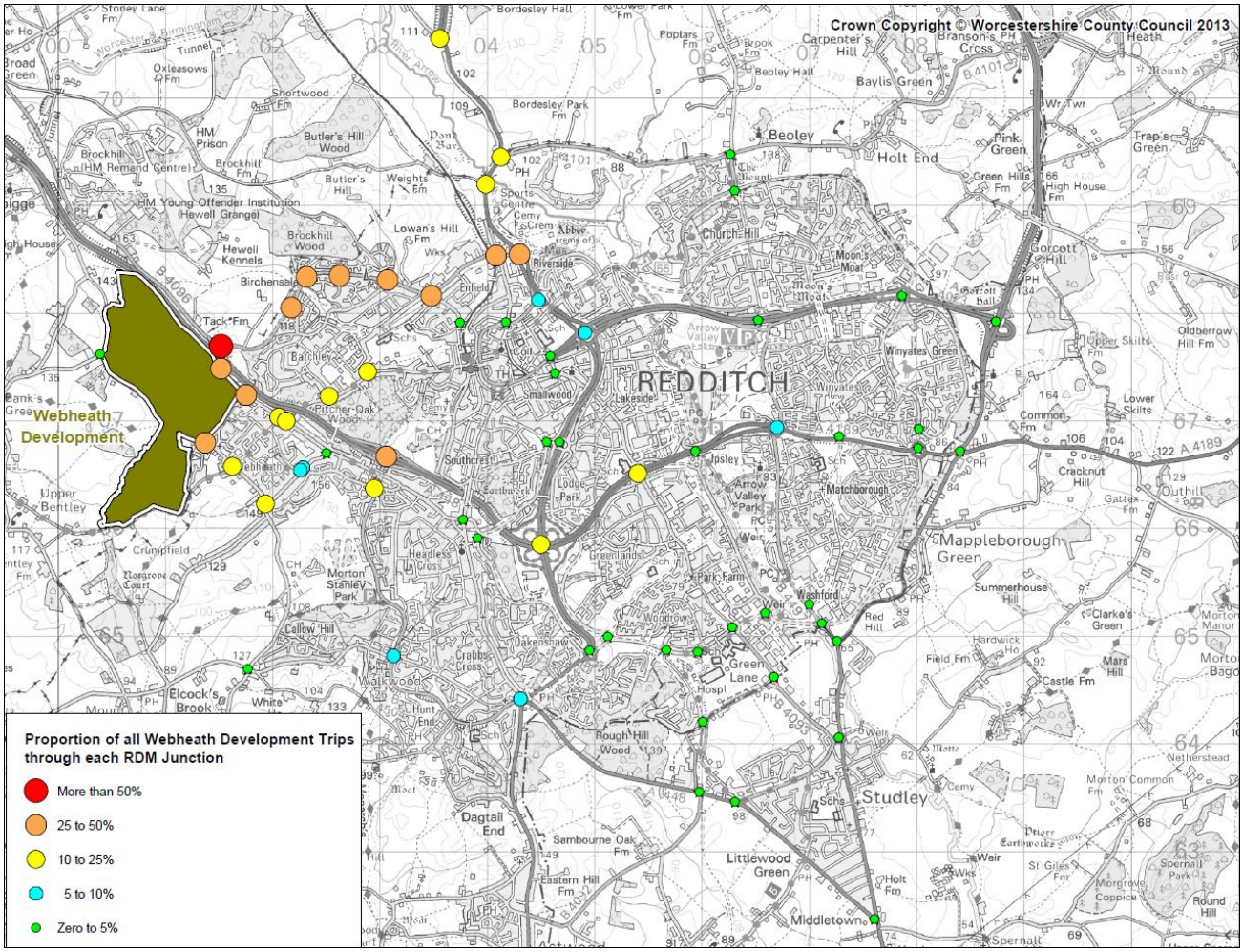


Figure 5.1 Proportion of all Webheath development trips through each RDM junction

Junction 31 incurs 57% of all Webheath development trips as this junction forms part of a number of key routes to/from the development including the M5, Redditch town centre, the Brockhill Drive corridor and the A435. As a result, junction 37 will also be incurring a dual impact from development trips generated by both the northern and southern portions of the Webheath development.

Linked to the above, junctions 37, 22 and 21 also incur high proportions of Webheath development trips. This will also be due to the A448 Foxlydiate junction (junction 31 and 22) forming part of the quickest route between the southern portion of the development site and locations such as those listed above. The importance of the Brockhill corridor can also be seen within Figure 5.1 as this also forms part of a number of key routes to/from the Webheath development. Figure 5.1 also suggests another key route lies along the route including junctions 35, 39, 41 and 63, potentially for trips to/from the southern Webheath portion and Redditch town centre.

Logically, the further from the development a junction is located, the fewer Webheath development trips pass through it. This can be seen though the lower junction proportion ranges located towards the eastern side of Redditch away from the Webheath site. There are apparent exceptions to this rule however such as at junction 38 where the assignment of Webheath development trips does not require the use of this junction as there is not a high concentration of trip-ends located nearby.

The above can be stated due to the all-or-nothing assignment methodology applied to the RDM. This methodology does not consider driver route choice; therefore all traffic between two locations will travel via the same route.

Figure 5.1 and the comments above suggest there are a number of key routes to/from the development site through the Redditch road network. Table 5.2 below presents a number of routes to and from key trip-end origin/destination zones within the RDM. These exact routes have been extracted from a close interrogation of the RDM assignment process. Combined, the RDM zones presented below in Table 5.2 constitute over half of all non-development trip-ends as defined within the RDM distribution methodology.

Table 5.2 RDM Route Assignments between the Webheath Development and Key Origins/Destinations

Origin/Destination Trip-End	Webheath Portion Generator	
	North	**South**
A441	Junctions 31, 23, 34, 33, 24, 25, 26, 27, 36, 28 and 65 in both directions.	Junctions 37, 22, 21, 31, 23, 34, 33, 24, 25, 26, 27, 36, 28 and 65 in both directions.
Redditch Town Centre	To - Junctions 22, 21, 35,39, 41 and 63 From – 42, 25, 24, 33, 34,23 and 31	Junctions 37, 21, 35,39, 41 and 63 in both directions
M42 North	Junctions 31, 23, 34, 33, 24, 25, 26, 27, 36, 28 and 65 in both directions.	Junctions 37, 22, 21, 31, 23, 34, 33, 24, 25, 26, 27, 36, 28 and 65 in both directions.
Greenlands	To - Junctions 31, 19, 52 and 54 From – Junction 54, 52, 19 and 22.	Junctions 37, 32, 20, 67, 40, 18, 19, 52 and 54 in both directions..
A46 South	To - Junctions 31, 19, 18, 53 and 15 From – Junctions 15, 16, 52, 19 and 22.	Junctions 37, 32, 20, 67, 40, 18, 53 and 15 in both directions.
Bromsgrove	To – Junction 22 From – Junction 31	To – Junctions 37, 21 and 22. From – junctions 31, 22, 21 and 37.
M5 North	To – Junction 22 From – Junction 31	To – Junctions 37, 21 and 22. From – junctions 31, 22, 21 and 37.
A435	Junctions 31, 23, 34, 33, 24, 25, 26, 27, 36, 28 and 65 in both directions.	Junctions 37, 22, 21, 31, 23, 34, 33, 24, 25, 26, 27, 36, 28 and 65 in both directions.

Table 5.2 RDM Route Assignments between the Webheath Development and Key Origins/Destinations

Origin/Destination Trip-End	Webheath Portion Generator	
	North	**South**
Enfield	Junctions 31, 23, 34, 33, 24 and 25 in both directions.	Junctions 37, 22, 21, 31, 23, 34, 33, 24 and 25 in both directions.
M40 South	Junctions 31, 23, 34, 33, 24, 25, 26, 27, 36, 28 and 65 in both directions.	Junctions 37, 22, 21, 31, 23, 34, 33, 24, 25, 26, 27, 36, 28 and 65 in both directions.

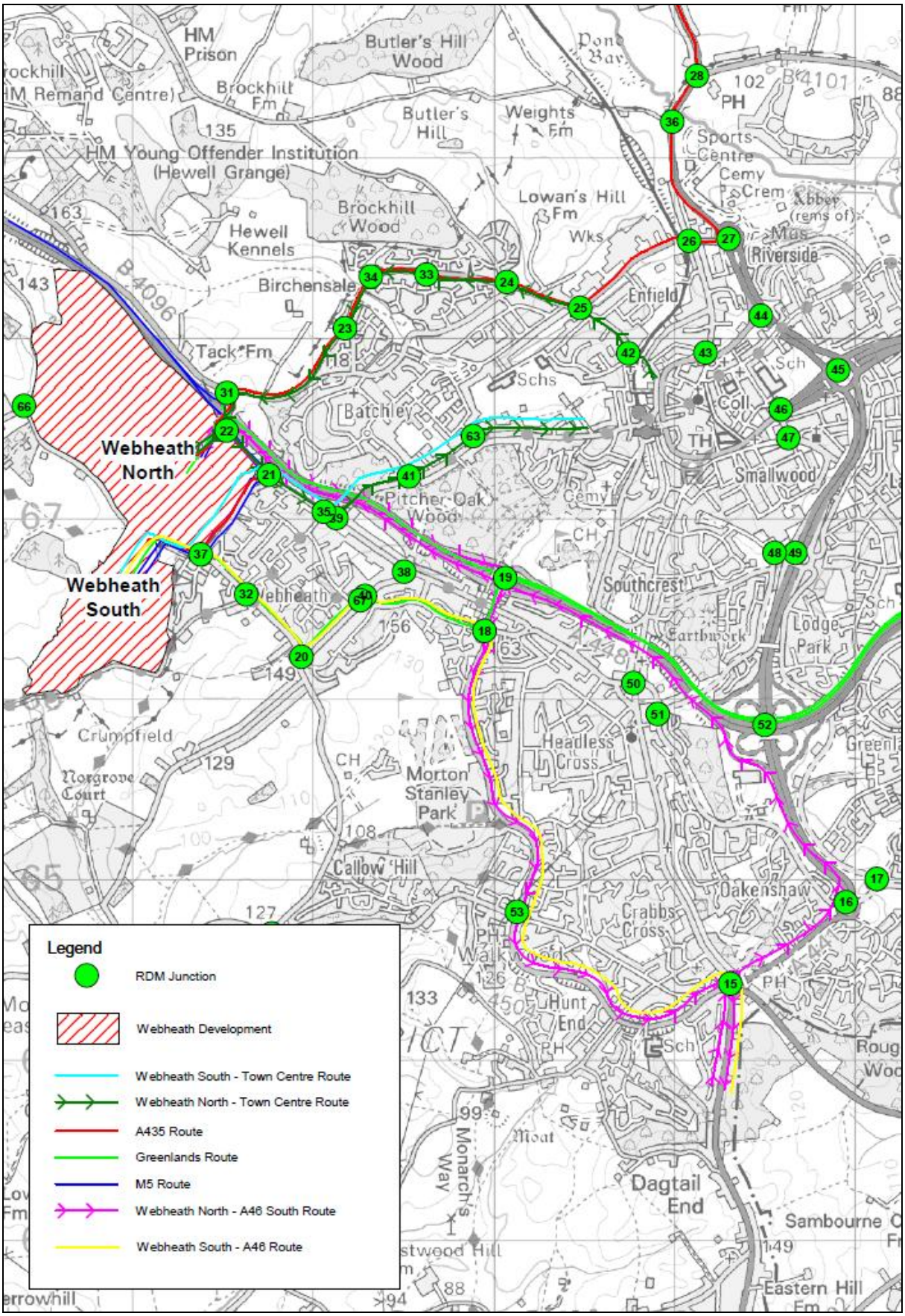


Figure 5.2: Key Webheath Development Trip Routes through the RDM Network

As can be seen above, an added complexity to this development impact analysis is that some key routes can vary depending on whether the vehicle trip is generated by the northern or southern portion of the Webheath development as well as by direction due to existing network parameters such as one way systems and junction layouts.

The aforementioned impact upon the Brockhill Drive link between the A448 at junction 31 and the A441 at junction 27 (junctions 23, 24, 25, 27, 27, 33 and 34) is observed to form part of a number of key routes to/from the Webheath development and trip ends located in a number of prominent RDM zones; namely the A441, M42 North, the A435, Enfield and the M40 South. This correlates with earlier analysis noting the high number and high proportion of Webheath development trips passing through these junctions.

In many cases, there are slight variations in the route depending on the direction of travel. This aspect is most commonly observed at junctions 31 and 22 whereby in order to access/exit the westbound carriageway at the Foxlydiate A448 junction junction 31 must be used while when accessing/exiting the eastbound carriageway it is junction 22. This will result in an uneven distribution of Webheath development trip turning movements at these junctions which could have an adverse impact upon junction performance and operation.

The most apparent directional change is for trips to/from Redditch town centre. This is due to the various one-way systems which are present around and within Redditch town centre which has resulted in different routes being assigned for each direction between the Webheath development and the town centre. Again, this will result in a slightly uneven distribution of Webheath development trip impacts through RDM junctions and will add to the complexity of the impact analysis.

It is also important to note that the assigned route from the town centre to the Webheath north development is along the Brockhill Drive corridor which will also be experiencing impact from development trips travelling to/from other RDM zones as noted earlier. This will add to the overall impact on this corridor arising from the Webheath development. This aspect also highlights the fact that many route sections (and therefore RDM junctions) will be incurring an impact from a number of development trips travelling to/from a range of RDM zones. This comment is more relevant to junctions located in close vicinity to the Webheath development (such as junctions 31, 21 and 22) as well as key strategic junctions located in Redditch (junctions 18, 19 and 52).

The A448 Foxlydiate junction (junction 31) incurs both the highest number and highest proportion (57%) of all Webheath development trips which is a reflection of its close proximity to the Webheath development and key strategic importance within the local highway network. As demonstrated above, junction 31 forms part of a number of key routes between the Webheath development and origins/destinations throughout Redditch and beyond. Further, if it is considered that junction 22 provides access to/from the westbound carriageway of the A448 (with junction 31 providing access to/from the eastbound carriageway) then it can be seen that the number of development trips passing through these junctions and corresponding uplift in total traffic will result in a significantly increased intensity of traffic flows in this area.

For the northern portion of the Webheath development, junction 22 or 31 is often the first/last junction for Webheath trips. For the southern portion however, it is necessary to navigate through junctions 37 and 21 to reach the A448 Foxlydiate junction. Alternatively, several different routes to/from the southern portion make use of the local Webheath highway network and therefore impacting upon junctions 35, 39, 32, 20, 40, 67, 38 and 18.

Finally, there are a number of key routes travelling to/from areas in southern (or south of) Redditch. Again, the assigned route will depend upon which portion of the Webheath development generates the development trip. For origins/destinations in southern areas of Redditch, as a *general* rule trips generated by the northern portion of the Webheath development tend to utilise the A448 via junctions 22 and 31 while trips generated by the southern portion will travel through the Webheath and Headless Cross areas.

Taking into account the analysis of the assigned routes through the RDM network, it should be noted that there is a higher number of development trips generated by the northern portion of the Webheath development due to the larger development quantum. This will result in routes associated with the northern portion to naturally incur a higher number of Webheath development trips and resulting impacts upon junction performance and operation.

5.2 Junction Specific Analysis

As established above, junctions 22 and 31 are clearly key junctions within the RDM network and incur a high number and proportion of development trips from both portions of the Webheath development. In addition, junctions 37 and 21 form the most direct route between the southern portion of the Webheath development and junctions 22 and 31. Therefore, these four junctions will be analysed in detail below before more high level analysis of other junctions located on the key routes outlined in the previous section is completed.

Full junction turning movement counts for junctions 31, 22, 21 and 37 are provided within Appendix B with corresponding arm labels diagrams provided in Appendix C. Note that in Appendix B do-minimum flows are only provided for those junctions where actual traffic counts are available.

5.2.1 Junction 31

Junction 31 incurs both the highest number and highest proportion of Webheath development trips. This is a direct result of being in close proximity to the Webheath development and forming part of a number of key assigned Webheath development trip routes. The latter point also highlights the strategic importance of the junction within the Redditch highway network.

All movements through junction 31 pass to/from the Birchfield Road arm which is intuitively correct given this arm provides direct access to the northern portion of the Webheath development and forms part of the quickest route to the southern portion via junctions 22, 21 and 37.

The majority of development trips pass between the Birchfield Road and Brockhill Drive arms. This turning movements forms part of the Brockhill Drive and A435 key route which has been highlighted within earlier analysis and will be discussed further within section 5.3.1.

A substantial proportion of turning movements also pass between the Birchfield Road and A448 East. The A448 East will be forming part of the quickest route for a range of destinations located throughout eastern and southern areas of Redditch. Note that for origin trips from these areas, junction 22 will be used to exit the A448 at the A448 Foxlydiate junction.

Finally, a small proportion of trips pass between Birchfield Drive and Hewell Lane as a result of origins/destinations located in the rural Tardebigge area.

The residential quantum of the Webheath development can also be seen in the development trip movements through junction 31 as there is a greater flow of traffic away from the development in the AM peak (as people travel to work) followed by a more dominant flow of traffic towards the development in the PM peak (as people travel home).

Junction 31 is an unsignallised roundabout forming part of the strategically importance A448 Foxlydiate junction. The RDM has modelled Webheath development traffic to result in a 63.2% uplift in total traffic through this junction across the peak hours. This increase in traffic and uneven distribution of development turning movements through the junction within the peak hours could have a substantial and significant impact on the junction's performance and operation. It is essential that further assessments are undertaken using specialised modelling software and suitable mitigation measures are identified if required.

5.2.2 Junction 22

Junction 22 provides access to/from the A448 westbound carriageway as well as the northern portion of the Webheath development (via the A448 Overpass arm) and the southern portion of the Webheath

development (via junctions 21 and 37). Junction 22 will incur 35% of all Webheath development trips and the RDM has modelled uplifts in total traffic of 58% across the peak hours.

A range of development trip movements are observed at junction 22 although zero development trips are modelled as travelling from the A448 to Birchfield Road. This is because any movement from the A448 to the northern Webheath portion will travel to the A448 Overpass arm from which the northern portion may be accessed directly, while any movement from the A448 to the southern Webheath portion will be assigned to exit the A448 at RDM junction 19 and travel through the local Webheath highway network.

Taking the above into account, all movements between the A448 and the A448 Overpass can be directly attributed to the northern portion of the Webheath development. Movements between the A448 Overpass and Birchfield road will contain trips from both development portions.

Junction 22 is an unsignallised priority junction which will incur both a significant proportion of Webheath development trips and substantial increase in total traffic. The potential therefore for turning movement conflicts and delay, particularly on the A448 Overpass and Birchfield Road approaches, is high. Given also the role of junction 22 in forming part of the strategically important A448 Foxlydiate junction it is essential that further assessments are undertaken using specialised modelling software and suitable mitigation measures are identified if required.

5.2.3 Junction 21

Junction 21 is located in a predominately residential area and is a standard three arm priority junction. The Foxlydiate Lane arm provides access to/from the southern portion of the Webheath development via junction 37. All movements therefore passing between the major Birchfield Road arms can be directly attributed to the northern Webheath portion.

Junction 21 is modelled to incur 29% of all Webheath development trips, the majority of which will be generated by the southern portion of the development. Given its existing residential location, do-minimum traffic flows are low compared to the key strategic junctions of 22 and 31. In turn, this will result in uplifts in total traffic just under 40% in the peak hours.

These uplifts fall mainly on movements into and out of the minor Foxlydiate Lane arm with a marginally higher proportion turning to/from the Birchfield Road North arm than the South arm. The Foxlydiate Lane to/from Birchfield Road North movement forms part of the quickest route between the Webheath southern portion and the A448 Foxlydiate junction (junctions 22 and 31) from which a number of key routes continue on from.

The substantial uplifts in total traffic coupled with the majority of traffic passing to/from the minor Foxlydiate arm of the junction significantly increases the likelihood of increased turning movement conflicts and delay. This is particularly true for right hand turning movements at the junction to/from Foxlydiate Lane. Given also the role of junction 21 in forming part of the quickest route between the southern portion of the Webheath development and the strategically important A448 Foxlydiate junction it is essential that further assessments are undertaken using specialised modelling software and suitable mitigation measures are identified if required.

5.2.4 Junction 37

Junction 37 is located in the southwestern area of the Webheath neighbourhood of Redditch. As part of the Webheath development, it is proposed that a new junction arm will be added which will provide access to and from the northern portion of the development. Within the RDM, any movement passing to/from this new development access arm can be directly attributed to the northern portion of the Webheath development while any movement to/from the Cur Lane arm can be attributed to the southern portion.

Junction 37 will incur 37% of all Webheath development trips, the vast majority of which will be generated by the southern portion of the development. In addition, given its existing location on the periphery of the red ditch road network, do-minimum traffic flows are relatively low. The proportional uplifts in total traffic therefore are modelled as being over 70% in both peak hours.

A range of development traffic movements are modelled at junction 37, all of which pass to/from Cur Lane as part of their movement. The majority of movements pass between Cur Lane and Foxlydiate Lane which forms part of the most direct route between the southern portion of the Webheath development and the A448 Foxlydiate junction via junctions 21, 22 and 31.

Most of the remaining movements utilise the Church Road arm which will form part of the most direct route between the southern portion of the Webheath development and the A448 at junction 19 as well as areas in southern Redditch such as Headless Cross, Crabbs Cross and Greenlands.

Where ever new development trip movements fall on junction 37, the corresponding uplift in total traffic is substantial as there is a low level of traffic in the do-minimum. Although junction 37 at present is a relatively large roundabout for the existing level of traffic it is not clear what impact a fifth junction arm will have on the performance and operation of the junction. Given the number of new development trips anticipated also at junction 37 it is essential that that further assessments are undertaken using specialised modelling software and suitable mitigation measures are identified if required.

5.3 Route Impact Analysis

Building on the distribution and routing trends identified in section 5.1, several of the key routes will be assessed in turn. This will allow for a more detailed analysis whilst still providing a clear overview as to the wider impacts of the Webheath development through specific areas of the Redditch network.

In some cases, the key routes presented within Table 5.2 are the same for multiple key origins/destinations. Where this occurs, the route analysis has been combined.

Full junction turning movement counts for the junctions discussed below are provided within Appendix B with corresponding arm labels diagrams provided in Appendix D.

5.3.1 The Brockhill Drive Corridor and A441

The Brockhill Drive corridor constitutes junctions 31, 23, 34, 35, 24 and 25. Extending this route to the A435 junctions 26, 27, 36, 28 and 65 are also covered. Together, these junctions are impacted upon by the key origin/destination RDM zones of the A441, M42 North, Enfield, the A435 and M40 South.

Table 5.3 presents the 2026 Do-Minimum traffic flows and the traffic generated by the Webheath development through RDM study junctions listed above which form the Brockhill Drive Corridor and A435 route.

Table 5.3 Brockhill Drive Corridor, A441 and Enfield RDM Route Junctions

RDM Junction	2026 Do-Minimum		Development Traffic		Traffic Uplift	
	AM	PM	AM	PM	AM	PM
23	659	990	551	593	83.7%	59.9%
24	935	1088	537	578	57.5%	53.1%
25	9662	6912	532	573	5.5%	8.3%
26	1601	1770	430	466	26.9%	26.3%
27	16903	12092	430	466	2.5%	3.9%
28	2549	2747	359	395	14.1%	14.4%

Table 5.3 Brockhill Drive Corridor, A441 and Enfield RDM Route Junctions

RDM Junction	2026 Do-Minimum		Development Traffic		Traffic Uplift	
	AM	PM	AM	PM	AM	PM
31	1173	1739	871	907	74.3%	52.2%
33	601	707	537	578	89.4%	81.9%
34	641	690	544	585	85.0%	84.9%
36	12712	9094	359	395	2.8%	4.3%
65	15781	11289	349	382	2.2%	3.4%

Junction 37 was discussed in detail within section sections 5.2.1 and it was recommended that further assessments were completed at this junction. Part of the reason for the substantial impacts observed at junction 37 was due to a high proportion of the total distribution of Webheath development trips which passed through junction 37 in order to travel along the Brockhill Drive corridor. From the A448 Foxlydiate junction, Brockhill Drive provides access to the Batchley and Brockhill residential areas of Redditch as well as the town centre and the Enfield industrial zone. A continuation of this route forms part of the quickest route between the Webheath development and key strategic routes including the A441, M42, A435 and M40.

From **junction 23** (36%) to **junction 25** (35%) there is a 1% reduction in the proportion of all Webheath development trips which pass through each junction along this section. This is a reflection of a low concentration of trip-end along this route and a higher concentration of trip-ends beyond junction 25. This also indicates (as supported by the junction movement counts presented in Appendix B), that the development trip movements through each of the junctions will be straight over the roundabout circulatories (junctions 23, 24, 33 and 34 are all roundabouts).

The number of Webheath development trips travelling along the Brockhill Drive Corridor is substantial and where actual traffic counts are available (**junctions 24, 26, 33 and 34**), total junction traffic flows are modelled as increasing from 29% (junction 26) to almost doubling (junctions 33 and 34). If the available traffic counts are assumed to be similar for the other junctions on this route (junctions 23 and 25) then proportional uplifts in total can also be anticipated to be in the same region. Given the anticipated increase in traffic along this corridor therefore, it is essential to understand how much spare capacity the junctions and links along Brockhill Drive have and whether suitable mitigation measures are required.

The proportion of Webheath development trips drops noticeably between junctions 25 (35%) and 26 (29%). This is a result of the Enfield industrial zone being located between these two junctions and therefore containing a high concentration of non-residential trip-ends. In contrast, no trips are lost/gained between junctions 26 and 27. At junction 27, the vast majority of Webheath development trips pass between the Middlehouse Lane and A441 North arms which then also pass through junctions 36 and 28 in the majority of cases.

Although no actual development trip turning movements occur at **junction 26**, this is currently a signallised junction. The RDM indicates that traffic flows approaching these signals will increase by up to 62%. Further assessment is essential therefore using specialised modelling software to understand whether the approach links and signals can be optimized to accommodate the increased traffic flow arising from the Webheath development.

The same level of development traffic is modelled to impact upon **junction 27**, which is a strategically important junction within Redditch as it provides access to the Enfield industrial zone and the A441. Junction 27 is a large unsignalised roundabout and while the movement from Middlehouse Lane to the A441

North is between two adjacent arms the reverse journey requires the whole circulatory to be navigated. This movement will see an additional 250 vehicles in the PM peak hour which will restrict access to the circulatory from the other arms. Taking the above into account, it is also recommended that junction 27 is subject to detailed assessment using specialised modelling software.

All movements through **junction 36** are between the two major arms of the A441 so no actual turning movements are completed. Therefore no further junction assessments are considered necessary.

At **junctions 28 and 65** the vast majority of Webheath development trips pass directly between the two A441 arms. The proportion of development trips which do pass to/from the minor arms at these junctions is considered negligible and will not impact upon the performance and operation of either junction.

5.3.2 Bromsgrove / M5 North

The Bromsgrove / M5 North route constitutes some or all of junctions 37, 21, 22 and 31 depending on whether the trip is generated by the northern or southern portion of the Webheath development. All these junctions were assessed in detail within sections 5.2.1 to 5.2.4.

Specifically in regards to the Bromsgrove / M5 North route, all development trip movements will access the A448 westbound carriageway at junction 22 and exit the eastbound carriageway at junction 31. At junction 21, all movements associated with this route will be between the Foxlydiate Lane and Birchfield Road North arms while at junction 37 the movements will be between Cur Lane and Foxlydiate Lane.

Trips generated by the northern portion of the Webheath development will only impact upon junctions 22 and 31. However, trips generated by the southern portion will impact upon junction 22 twice and across two different turning movements (Foxlydiate Lane arm to the A448 arm when departing from the development and from the A448 Overpass arm to Foxlydiate Lane arm when arriving). This serves as an example where some junctions will be incurring a dual impact from both portions of the Webheath development but not necessarily with equal weighting due to routing requirement defined by the local highway network itself.

As discussed within sections 5.2.1 to 5.2.4, it is essential that junctions 37, 21, 22 and 31 are subject to further detailed assessments using specialised modelling software.

5.3.3 Redditch Town Centre

Table 5.4 presents the 2026 Do-Minimum traffic flows and the traffic generated by the Webheath development through the RDM study junctions which form the Redditch Town Centre route.

Table 5.4 Redditch Town Centre Route Junctions

RDM Junction	2026 Do-Minimum		Development Traffic		Traffic Uplift	
	AM	PM	AM	PM	AM	PM
21	1260	1176	461	447	36.6%	38.0%
22	797	1104	510	575	63.9%	52.1%
35	3066	2193	225	199	7.3%	9.1%
37	760	803	559	594	73.5%	73.9%
39	3573	2556	212	185	5.9%	7.2%
41	3380	2418	178	163	5.3%	6.7%
63	2686	1921	173	156	6.4%	8.1%

The quickest route to and from Redditch town centre as defined within the RDM varies both by portion of the Webheath development and direction. For the southern portion, the quickest route is via junctions 37, 21, 35, 39, 41 and 63 in both directions. This is also true for outbound trips from the northern Webheath

portion (with junction 22 replacing 37), but for the return journey an entirely different route is used via the Brockhill corridor (junctions 42, 25, 24, 33, 34, 23 and 31.

The different routing used by outbound and inbound trips generated by the northern Webheath portion is due to a combination of one way systems within the town centre itself alongside a marginally longer outbound trip if the route via junction 31 was used because of the requirement to almost fully circle the roundabout circulatory. This extra distance (and therefore travel time) results in the alternative route to be quicker for trips from the northern portion to the town centre and hence all trips associated within this origin/destination pair are assigned to that route.

The impact upon junctions within the Brockhill corridor were discussed within section 5.2.1 while the impacts at junctions 22, 21 and 37 were discussed within sections 5.2.2, 5.2.3 and 5.2.4.

14% and 13% of all Webheath development trips pass through **junctions 35 and 39** respectively. All development traffic through junction 35 passes to/from the Birchfield Road West arm, with the vast majority of traffic travelling directly between the two Birchfield Road arms and hence not actually performing a turning movement at this junction. At junction 39, all movements use the Birchfield Road West arm also, but the majority of trips do turn into and out of the minor Bromsgrove Road arm.

11% and 10% of all Webheath development trips pass through **junctions 41 and 63** respectively. At both these junctions the vast majority of development trips travel directly between the two major arms of the junction (Bromsgrove Road) and therefore do not perform a turning movement. The RDM models a negligible number of development trips which do turn into and out of the minor arms of these junctions.

At these four junctions it is interesting to note the higher number of development trips travelling away from the Webheath development than towards it. This will be a reflection of the alternative return route used for trips generated by the northern portion of the Webheath development.

Traffic counts are not available at any of the four junctions discussed above, therefore caution should be used when interpreting uplifts in total traffic and impacts on particular turning movements. The RDM suggests in the region of 13% of all Webheath development trips will pass through junction 39 of which the majority will turn into and out of the minor arm. This increases the likelihood of increased turning movement conflicts and delay at this location, particularly true for right hand turning movements from the minor arm. This coupled with the uncertainty regarding the existing level of traffic and distribution of traffic movements at this junction constitutes the recommendation that traffic counts are recorded for junction 39 and an additional assessment is considered using accurate do-minimum flows and the development trips assigned by the RDM.

At junctions, 35, 41 and 63 the RDM indicates that very few turning movements will actually be completed at these junctions. Further, the minor arms of these junctions only provide access to residential areas and would not be deemed a vital link between different areas of Redditch. It is therefore anticipated that actual turning movements at these junctions will be low and therefore the Webheath development would have a minimal impact on their performance and operation.

5.3.4 Greenlands

Table 5.4 presents the 2026 Do-Minimum traffic flows and the traffic generated by the Webheath development through the RDM study junctions which form the Greenlands route.

Table 5.5 The Greenlands Route Junctions

RDM Junction	2026 Do-Minimum		Development Traffic		Traffic Uplift	
	AM	PM	AM	PM	AM	PM

Table 5.5 The Greenlands Route Junctions

RDM Junction	2026 Do-Minimum		Development Traffic		Traffic Uplift	
	AM	PM	AM	PM	AM	PM
18	1221	1349	227	239	18.6%	17.8%
19	10610	7590	408	425	3.8%	5.6%
20	791	729	182	202	23.0%	27.7%
31	1173	1739	871	907	74.3%	52.2%
32	351	251	182	202	52.0%	80.4%
37	760	803	559	594	73.5%	73.9%
40	2395	1714	155	159	6.5%	9.3%
52	9975	7136	328	340	3.3%	4.8%
54	16330	11682	257	240	1.6%	2.1%
67	3343	2392	155	159	4.6%	6.7%

The impact of Webheath development traffic on junction 31, 22 and 37 was assessed in detailed within sections 5.2.1, 5.2.2 and 5.2.4 respectively.

The assigned routes between the Webheath development and the Greenlands industrial area of Redditch is different for each of the Webheath development portions. For the northern portion, the quickest route is directly via the A448 between RDM junctions 31/22 and 54. In between these lie RDM junctions 19 and 52, but no actual turning movement associated with trips generated by the northern portion of the Webheath development will be being completed at these two junctions. For the southern portion, trips pass through junctions 37, 32, 20, 67, 40 and 18 on their way to/from the A448 at RDM junction 19 from where they combine with trips from the northern portion of Webheath for the remainder of the route. This route is the quickest route to/from the A441 and the southern Webheath portion.

At **junction 32**, all Webheath development trips pass between the major Church Road arms, so no actual turning movement is made.

Junction 20 is anticipated to incur 12% of all Webheath development trips, all of which can be directly attributed to the southern portion of the development. The vast majority of development trips turn between the Church Road and Heathfield Road arms, which forms part of the quickest route between the southern portion of the Webheath development and the A448 at junction 19. As the location of junction 20 is on the periphery of the Redditch road network, do-minimum traffic flows are relatively low. Uplifts in total traffic are anticipated to be between 20% and 30% in the peak hours while on the Church Road and Heathfield Road arms the uplifts will be between 52% and 134% depending on the direction and time period. The level of traffic will clearly be increasing considerably at junction 20 and it is unknown whether the existing roundabout geometries are acceptable for the increased traffic flow. Further assessments using specialized modelling software are therefore recommended.

At **junction 67**, all Webheath development trips pass between the major Heathfield Road arms, so no actual turning movement is made.

10% of all Webheath development trips will impact upon **junction 40** which is a small priority junction a predominately residential area. Traffic counts are not available for junction 40, therefore caution should be used when interpreting uplifts in total traffic and impacts on particular turning movements. All development trips turn between the Heathfield Road South and minor Middle Piece Drive arm. This increases the likelihood of increased turning movement conflicts and delay at this location, particularly for right hand

turning movements attempting to enter the minor arm. This coupled with the uncertainty regarding the existing level of traffic and distribution of traffic movements at this junction constitutes the recommendation that traffic counts are recorded for junction 40 and an additional assessment is considered using accurate do-minimum flows and the development trips assigned by the RDM.

15% of all Webheath development trips will impact upon **junction 18**. These trips will be generated by both portions of the Webheath development and therefore this junction will experience a dual impact from Webheath development trips. The location of junction 18 also results in there to be a range of development trip turning movements through this junction which combine to generate uplifts in total traffic of around 18% in both peak hours. Given the uneven distribution of development trips at junction 18, some arms are modelled as incurring more significant uplifts in total traffic than others which also vary by time period. Junction 18 is also located close to the important strategic A448 RDM junction 19 and turning movement at junction 19 will also have to pass through junction 18. Taking the above into account, it is essential that junction 18 is assessed using specialized modelling software in order to fully understand the operating capacity of the junction and whether there is a risk of congestion backing-up to junction 19.

Junction 19 is a key strategic junction within the Redditch highway network and like junction 18 will incur a dual impact from both portions of the Webheath development. Junction 19 will experience 27% of all development trips, of which just under half will be entering/exiting the A448 via Windmill Drive. Traffic counts are not available for junction 19, therefore caution should be used when interpreting uplifts in total traffic and impacts on particular turning movements. It is also not known whether there is any existing congestion at junction 19 on the A448 mainline which may be exacerbated by the increased level of traffic. Consideration therefore should be given to further assessment of junction 19, possibly alongside junction 18 as part of a micro-simulation model, to fully understand the existing and future operation of the junction.

At **junction 52**, the vast majority of Webheath development trips pass directly between the A448 and A4189. A small proportion of trips pass between the A448 and A441 south as a result of origins/destinations in southern areas and areas south of Redditch. As this is a large grade separated junction, it is not anticipated that the level of development traffic will impact upon the performance and operation of the junction.

Junction 54 incurs 16% of all Webheath development traffic, and like junction 18 and 19 will incur a dual impact from both portions of the development. All development trips at junction 54 pass to/from the A4189 East arm, with the majority continuing straight through to the A4189 West arm. These movements will be due to trip-ends in eastern areas of Redditch. Those associated with the Greenlands area will turn to/from the Studley Road South arm which equates to approximately 35% of all Webheath development traffic passing through junction 54. Again, as traffic counts are not available at junction 54 caution should be used when interpreting uplifts in total traffic and impacts on particular turning movements. It is therefore recommended that traffic counts are recorded for junction 54 and an additional assessment is considered using accurate do-minimum flows and the development trips assigned by the RDM.

5.3.5 A46 South

Table 5.4 presents the 2026 Do-Minimum traffic flows and the traffic generated by the Webheath development through the RDM study junctions which form the A46 South route.

Table 5.6 The A46 South Route Junctions

RDM Junction	2026 Do-Minimum		Development Traffic		Traffic Uplift	
	AM	PM	AM	PM	AM	PM
15	11074	7922	100	121	0.9%	1.5%
16	12395	8867	35	63	0.3%	0.7%

Table 5.6 The A46 South Route Junctions

RDM Junction	2026 Do-Minimum		Development Traffic		Traffic Uplift	
	AM	PM	AM	PM	AM	PM
18	1221	1349	227	239	18.6%	17.8%
19	10610	7590	408	425	3.8%	5.6%
20	791	729	182	202	23.0%	27.7%
22	797	1104	510	575	63.9%	52.1%
31	1173	1739	871	907	74.3%	52.2%
32	351	251	182	202	52.0%	80.4%
37	760	803	559	594	73.5%	73.9%
40	2395	1714	155	159	6.5%	9.3%
52	9975	7136	328	340	3.3%	4.8%
53	10147	7259	89	85	0.9%	1.2%
54	16330	11682	257	240	1.6%	2.1%
67	3343	2392	155	159	4.6%	6.7%

The impact of Webheath development traffic on junction 31, 22 and 37 was assessed in detailed within sections 5.2.1, 5.2.2 and 5.2.4 respectively. In addition, junctions 32, 20, 67, 40, 18, 19, 52 and 54 were analysed within the Greenlands route assessment within section 5.3.4. The assigned route for trips to/from the A46 is similar to the Greenlands route but with the additional impact upon junctions 15, 16 and 53.

Junction 15 is a five arm roundabout in the southern area of Redditch and is modelled as incurring 7% of all Webheath development trips. These development trips pass through a number of different arms as trips from both portions of the development will be impacting upon junction 15. As traffic counts are not available at junction 15, caution should be used when interpreting uplifts in total traffic and impacts on particular turning movements. As junction 15 is located in a key position in the Redditch local road network, it is recommended that traffic counts are recorded for each junction and an additional assessment is considered using accurate do-minimum flows and the development trips assigned by the RDM.

At **junction 53**, all development trips involve a movement into or out of Windmill Drive North with the vast majority passing directly between this arm and Windmill Drive South, therefore not actually performing a turning movement. As junction 53 only incurs 6% of all Webheath development traffic and only a handful of trips turn into or out of the minor arm of this junction it is not considered that further assessment is necessary.

Junction 16 is a large five arm junction at the southern end of the A441 grade separated carriageway. Despite its size and key location only 3% of Webheath development trips will impact upon the junction. Although no traffic counts are available at this junction, the low number of development trips passing through the junction will have a negligible impact upon the performance and operation of the junction. No further assessment is necessary.

SECTION 6

Scenario Two

Scenario Two assesses the impact of all RDM development traffic in the 2026 Assessment Year against 2026 Do-Minimum traffic flows on RDM junctions. The Webheath development trips outlined in Table 3.2 along with traffic generated by all other RDM developments has been be assigned to the RDM.

As all Redditch future development aspirations are taken into account by the sites featured within the RDM, TEMPRO 2026 growth factors for the Do-Minimum have not been applied. The do-minimum flows within Scenario Two therefore reflect the 2013 existing year but are also representative of the 2026 Assessment Year if no development aspirations in Redditch were to come to fruition.

The impact of wider growth throughout North Worcestershire has not been considered within the model. However, the likely impact on specific junctions throughout the town has been commented on where relevant and where further assessment is likely to be required due to the wider development impact on the town. This will include reference to the B&R IDP.

The quantifiable results tables discussed in subsequent sections have been colour coded to illustrate the degree of impact for both the raw increase in trip numbers and the associated percentage uplift in traffic. The colour thresholds are as follows:

Development Trips	Less than 20	20 to 50	50 to 100	More than 100
Percentage Uplifts	Less than 5%	5% to 10%	10% to 50%	Greater than 50%

6.1 Headline Results and Analysis

Table 6.1 below presents the 2026 Do-Minimum traffic flows and the traffic generated by all developments through RDM study junctions.

Table 6.1 RDM Development Traffic Impact through RDM Junctions by Peak Hour

RDM Junction	2026 Do-Minimum		Development Traffic		Traffic Uplift	
	AM	PM	AM	PM	AM	PM
RDM Network	**364206**	**264294**	**34595**	**32247**	**9.5%**	**12.2%**
1	10291	7319	1023	941	9.9%	12.9%
2	11351	8073	817	673	7.2%	8.3%
3	13308	9465	727	610	5.5%	6.5%
4	2916	2074	316	289	10.8%	13.9%
5	12101	8606	861	788	7.1%	9.2%
6	17426	12394	863	869	5.0%	7.0%
7	10348	7359	870	797	8.4%	10.8%
8	8765	6234	409	320	4.7%	5.1%
9	2215	1575	164	342	7.4%	21.7%
10	1042	741	192	179	18.4%	24.2%
11	8207	5837	376	294	4.6%	5.0%

Table 6.1 RDM Development Traffic Impact through RDM Junctions by Peak Hour

RDM Junction	2026 Do-Minimum		Development Traffic		Traffic Uplift	
	AM	PM	AM	PM	AM	PM
12	8413	5983	325	260	3.9%	4.3%
13	591	420	38	40	6.4%	9.5%
14	591	420	52	47	8.8%	11.3%
15	10025	7130	485	386	4.8%	5.4%
16	11222	7981	471	415	4.2%	5.2%
17	5827	4144	387	305	6.6%	7.4%
18	1105	1214	402	436	36.4%	35.9%
19	9606	6831	683	652	7.1%	9.5%
20	716	656	433	469	60.4%	71.5%
21	1140	1059	500	494	43.8%	46.7%
22	722	993	599	699	83.0%	70.4%
23	596	891	867	815	145.3%	91.4%
24	846	979	1287	1224	152.1%	125.0%
25	8748	6221	1673	1640	19.1%	26.4%
26	1449	1593	1245	1267	85.9%	79.5%
27	15303	10883	1456	1444	9.5%	13.3%
28	2308	2473	958	873	41.5%	35.3%
29	6135	4364	111	110	1.8%	2.5%
30	8598	6115	393	362	4.6%	5.9%
31	1062	1565	1328	1198	125.1%	76.6%
32	317	226	214	236	67.3%	104.7%
33	544	636	899	841	165.3%	132.2%
34	580	621	857	804	147.8%	129.4%
35	2776	1974	371	358	13.4%	18.1%
36	11509	8185	1085	1015	9.4%	12.4%
37	688	723	592	631	86.1%	87.3%
38	1007	946	46	36	4.6%	3.8%
39	3235	2301	366	354	11.3%	15.4%
40	2169	1542	309	330	14.2%	21.4%
41	3060	2176	332	332	10.8%	15.2%
42	4276	3041	494	481	11.6%	15.8%

Table 6.1 RDM Development Traffic Impact through RDM Junctions by Peak Hour

RDM Junction	2026 Do-Minimum		Development Traffic		Traffic Uplift	
	AM	PM	AM	PM	AM	PM
43	2973	2115	202	149	6.8%	7.1%
44	6841	4865	713	580	10.4%	11.9%
45	14226	10117	974	939	6.8%	9.3%
46	4012	2853	320	266	8.0%	9.3%
47	1349	960	76	14	5.7%	1.5%
48	2422	1723	64	35	2.7%	2.0%
49	6530	4644	245	192	3.8%	4.1%
50	9839	6998	410	387	4.2%	5.5%
51	1498	1065	75	74	5.0%	6.9%
52	9031	6423	664	583	7.4%	9.1%
53	9186	6533	353	268	3.8%	4.1%
54	14784	10514	891	886	6.0%	8.4%
55	421	299	36	50	8.5%	16.7%
56	4114	2926	312	221	7.6%	7.6%
57	3425	2436	266	57	7.8%	2.3%
58	0	0	31	23	-	-
59	8636	6142	543	518	6.3%	8.4%
60	4558	3241	333	273	7.3%	8.4%
61	7438	5290	361	359	4.9%	6.8%
62	3891	2767	134	65	3.4%	2.4%
63	2432	1729	299	292	12.3%	16.9%
64	6143	4369	99	96	1.6%	2.2%
65	14287	10161	900	813	6.3%	8.0%
66	8	6	15	21	189.2%	362.7%
67	3027	2152	404	427	13.4%	19.8%

With all other Redditch development sites applied to the RDM, there are extensive and significant traffic impacts at highway junctions throughout Redditch. Across all RDM junctions, uplifts in total traffic of 9.5% and 12.2% are modelled in the AM and PM Peaks respectively. Recall from scenario one that these figures were 2.7% and 3.8% in regards to only the Webheath site.

Compared to scenario one, there is a greater spread of development trips and associated impacts across the network as only a handful of junctions now incur less than 100 trips in either of the peak hours. That said, there is also a further increase in development trips at junctions which were already heavily impacted upon from the Webheath development. Typically, these junctions will be located on key routes which would

naturally incur traffic movements completed as part of a longer distance strategic journey. Such examples include junctions 6, 15, 19, 52, 27, 36, 28 and 65

Other junction impacts can be more easily attributed to individual RDM development sites located in the immediate vicinity of the junction. Examples include:

- **Webheath ADR**– Junction 20 and 31;
- **Brockhill Green Belt and Brockhill ADR**– Junctions 24 and 25;
- **Rear of Alexandra Hospital** – Junction 10;
- **A435 ADR**– Junctions 1, 4, 5 and 7;

In terms of actual uplifts in total traffic, aside from a few notable exceptions these largely remain below 50% despite actual development trip numbers usually being over 100 vehicles in each of the peak hours. This will be a reflection of both the strategic importance of these junctions on routes such as the A448, A441 and A4189 (whereby do-minimum flows are comparatively high, thus suppressing proportional uplifts) as well as the overall high junction traffic levels observed throughout Redditch.

Of particular note, those junctions located on the Brockhill Drive corridor experience substantial additional RDM development trips on top of those generated by the Webheath development (junctions 23, 24, 25, 33 and 34). This is anticipated to be a consequence of both the presence of a number of development sites in close proximity to this corridor as well as the strategic importance of this route as part of movements between western and northern areas of Redditch.

Comparing Table 5.1 with Table 6.1 provides an initial indication as to the impact of the Webheath development relative to all other RDM development sites. Further interrogation of the RDM outputs can identify the proportion of all RDM development trips directly attributable to the Webheath development site. As an overhead figure across all junctions, 29% of all RDM development trips impacting upon a RDM junction within the peak hours can be directly attributed to the Webheath development. This information can also be calculated for individual junctions and geographically presented, as displayed within Figure 6.1.

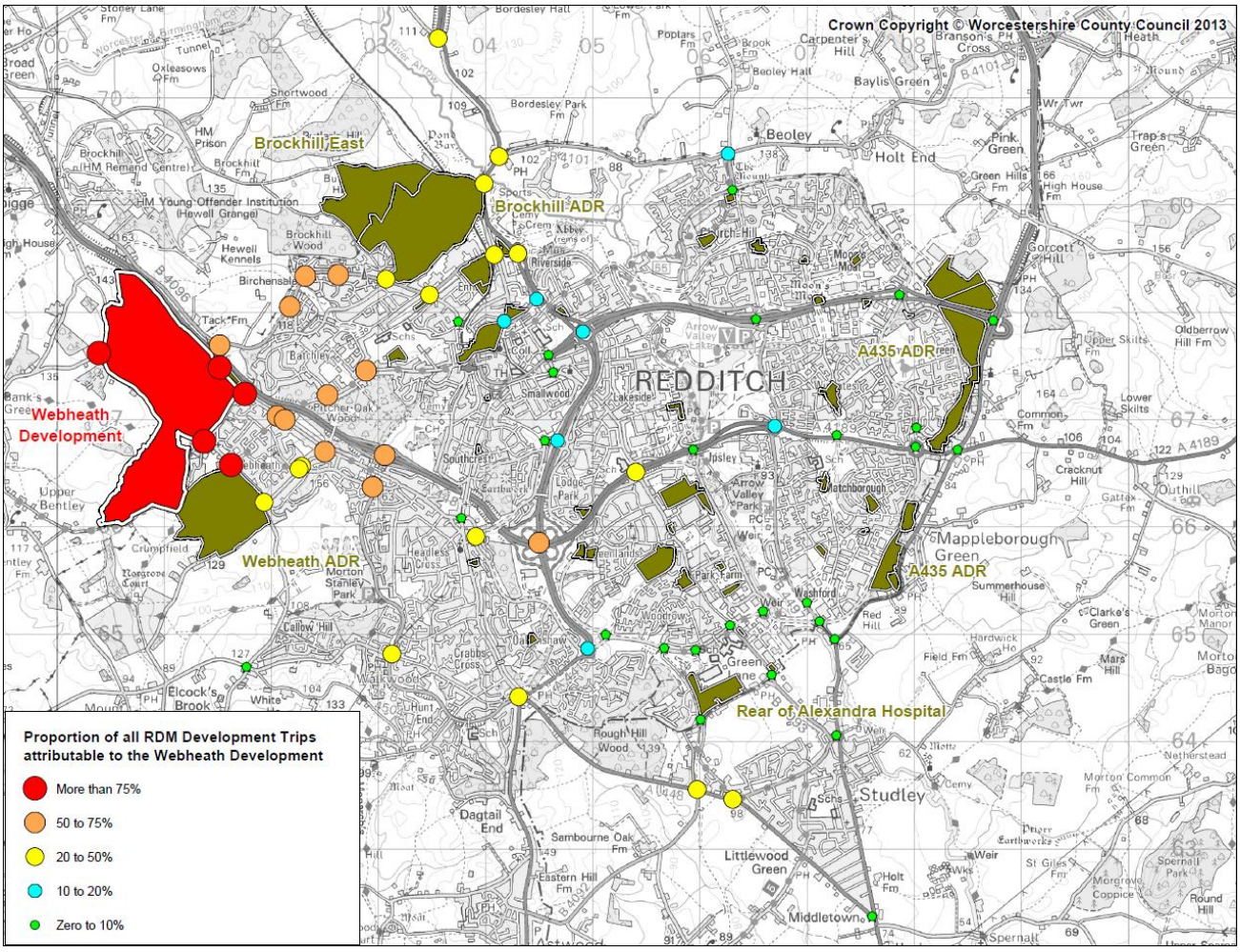


Figure 6.1 Proportion of all RDM Development Trips Attributable to the Webheath Development

It is clear that due to the size of the Webheath development and number of trips generated, there are a number of junctions whereby a substantial proportion of assessment year development trips can be directly attributed to the Webheath development. In correlation with the outputs within scenario one these junctions tend to be in close proximity to the Webheath development and along the key routes previously identified.

As would be expected, at the junctions of 37, 32 and 21 over 75% of all RDM development trips can be directly attributed to the Webheath development. The same is also true from junction 22 (84%) despite being located on a key strategic link within the Bromsgrove highway network (and hence more likely to draw in other RDM development traffic). This is reflected more so at junction 31 whereby the proportion attributable to the Webheath development drops to 70% despite this junction incurring the highest proportion of Webheath development trips.

Beyond the above junctions, the proportion of Webheath development trips reduces with distance from the development along the same distributional routes identified earlier within scenario one. In some cases, other development sites temporarily reduce the proportion of development trips attributable to the Webheath development, before increasing again further on. An example of this is in the Webheath area through junctions 20, 40 and 67 whereby Webheath ADR development trips are heavily impacting upon these junctions before distributed more widely through the RDM network and hence having a reduced proportional impact on each individual junction.

Although the Webheath development site can be attributed to a large proportion of assessment year RDM development trips through RDM junctions, the remaining proportion of development trips can be linked to a number of RDM developments and not because of a single site. This comment will be more relevant to those junctions located on key strategic routes.

For some junctions, zero Webheath development trips were identified as impacting upon the junction within scenario one, but within scenario two a significant number of development trips are modelled. Examples include junctions 2, 8, 10, 11, 57 and 58 which are all located in the south eastern area of Redditch. Likewise, scenario one identified a negligible number of Webheath development trips through junctions 1, 3, 4, 9, 29, 42, 46, 47, 48, 56, 59, 60, 62 and 64. For all these junctions identified, traffic from other RDM development sites should be attributed to the impact at these junctions. Whilst different RDM development sites will impact upon different junctions to varying degrees, understanding the precise impact from each development in isolation is outside of the scope of this report. Therefore, further investigation and assessment of these junctions is suggested as and when these other RDM developments are taken forward.

6.2 Junction Specific Analysis

Building on the analysis within scenario one, the key local junctions to the Webheath development will be revisited to understand how additional RDM development trips (if any) will change the overall traffic impacts on the junctions in the 2026 Assessment Year.

Full junction turning movement counts for junctions 31, 22, 21 and 37 are provided within Appendix B with corresponding arm labels diagrams provided in Appendix C. Note that in Appendix B do-minimum flows are only provided for those junctions where actual traffic counts are available.

6.2.1 Junction 31

Junction 31 incurs both the highest number and highest proportion of Webheath development trips. With the addition of all other RDM development trips, 70% of all development trips can be attributed to the Webheath development.

Scenario one identified that all Webheath development trips will pass to/from the Birchfield Road arm with the majority passing between the Birchfield Road and Brockhill Drive arms as this movement forms part of the key Brockhill Drive and A435 route. With all RDM development trips assigned there is a wider range of development trip turning movements as well as a greater level of traffic passing through junction 31. In addition to the further uplifts in total traffic passing to/from the Birchfield Road arm there are now also substantial trip numbers travelling from the A448 West to the Brockhill Drive arm. All these movements can be attributed to RDM developments other than the Webheath development such as Brockhill Green Belt and Brockhill ADR.

Junction 31 is an unsignallised roundabout forming part of the strategically important A448 Foxlydiate junction. The RDM has modelled future RDM development traffic to result in the total level of traffic to double through this junction across the peak hours. Although the majority of future development trips can be attributed to the Webheath development there are also a substantial number of other RDM development trips passing through this junction which is a reflection of its strategic importance. Taking this into account, it is essential that further assessments are undertaken using specialised modelling software and suitable mitigation measures are identified if required.

6.2.2 Junction 22

Junction 22 provides access to/from the A448 westbound carriageway as well as the northern portion of the Webheath development (via the A448 Overpass arm) and the southern portion of the Webheath development (via junctions 21 and 37). 84% of all RDM development trips in the 2026 Assessment Year can

be directly attributed to the Webheath development. The additional development trips increase the uplifts in total traffic to over 75% in both peak hours.

The majority of additional RDM development trips fall onto the movement between the A448 and A448 Overbridge. These trips will also therefore pass through junction 31 as part of their trip to/from their development site and locations west of Redditch. Drawing upon analysis from the preceding section therefore, these particular trips are likely to be due to the Brockhill Green Belt or Brockhill ADR development sites.

Junction 22 is an unsignallised priority junction which will incur a substantial increase in total traffic in the 2026 assessment year. The potential therefore for turning movement conflicts and delay, particularly on the A448 Overpass and Birchfield Road approaches, is high. Given also the role of junction 22 in forming part of the strategically important A448 Foxlydiate junction it is essential that further assessments are undertaken using specialised modelling software and suitable mitigation measures are identified if required.

6.2.3 Junction 21

Junction 21 is located in a predominately residential area and is a standard three arm priority junction. Despite only incurring 29% of all Webheath development trips, this will account for 91% of all RDM development traffic.

The majority of the additional RDM development trips at junction 21 will involve a movement into/out of the Foxlydiate arm which will be on top of the Webheath development trips which were also concentrated on movements involving this arm. The additional RDM traffic will therefore exacerbate the anticipated impacts identified within scenario one, namely that the substantial uplifts in total traffic coupled with the majority of traffic passing to/from the minor Foxlydiate arm of the junction significantly will increase the likelihood of increased turning movement conflicts and delay. This is particularly true for right hand turning movements at the junction to/from Foxlydiate Lane.

Taking the above into account, given the role of junction 21 in forming part of the quickest route between the southern portion of the Webheath development and the strategically important A448 Foxlydiate junction it is essential that further assessments are undertaken using specialised modelling software and suitable mitigation measures are identified if required.

6.2.4 Junction 37

Within the 2026 Assessment Year Junction 37 is modelled as experiencing a 87% increase in total traffic across the peak hours. Where ever new development trip movements fall on junction 37, the corresponding uplift in total traffic is substantial as there is a low level of traffic in the do-minimum.

94% of this additional traffic can be directly attributed to the Webheath development. The non-Webheath development trips all pass between the Church Road and Foxlydiate Lane arms which suggests these will be generated by the Webheath ADR development located on Church Road.

As there is little change in the impacts on junction 37 between scenarios one and two, the same conclusions and recommendations can be draw, namely that although junction 37 at present is a relatively large roundabout for the existing level of traffic it is not clear what impact a fifth junction arm will have on the performance and operation of the junction. Given the number of new development trips anticipated also at junction 37 it is essential that that further assessments are undertaken using specialised modelling software and suitable mitigation measures are identified if required.

6.3 Route Impact Analysis

The same routes identified within section 5.1 and assessed within section 5.3, will again be reviewed for scenario two. This process will seek to establish the extent of the influence of the Webheath development through the Redditch road network relative to other RDM developments.

Full junction turning movement counts for junctions 31, 22, 21 and 37 are provided within Appendix C with corresponding arm labels diagrams provided in Appendix D.

6.3.1 The Brockhill Drive Corridor and A435

The Brockhill Drive corridor constitutes junctions 31, 23, 34, 35, 24 and 25. Extending this route to the A435 junctions 26, 27, 36, 28 and 65 are also covered. Together, these junctions are impacted upon by the key origin/destination RDM zones of the A441, M42 North, Enfield, the A435 and M40 South.

Table 6.2 presents the 2026 Do-Minimum traffic flows and the traffic generated by the Webheath development through RDM study junctions listed above which form the Brockhill Drive Corridor and A435 route.

Table 6.2 Brockhill Drive and A435 RDM Junctions

RDM Junction	2026 Do-Minimum		Development Traffic		Traffic Uplift	
	AM	PM	AM	PM	AM	PM
23	596	891	867	815	145.3%	91.4%
24	846	979	1287	1224	152.1%	125.0%
25	8748	6221	1673	1640	19.1%	26.4%
26	1449	1593	1245	1267	85.9%	79.5%
27	15303	10883	1456	1444	9.5%	13.3%
28	2308	2473	958	873	41.5%	35.3%
31	1062	1565	1328	1198	125.1%	76.6%
33	544	636	899	841	165.3%	132.2%
34	580	621	857	804	147.8%	129.4%
36	11509	8185	1085	1015	9.4%	12.4%
65	14287	10161	900	813	6.3%	8.0%

Junction 37 was discussed in detail within section 6.2.1. 57% of all Webheath development trips impact upon junction 37 which accounts for 70% of all RDM development trips. The only development trip movements which cannot be attributed to the Webheath development are those directly between the A448 West, Brockhill Drive and Hewell Lane.

Along Brockhill Drive, through **junctions 23, 34 and 33** the Webheath development contributes towards 68%, 68% and 64% of all RDM development trips. Recall from scenario one that these contributions equate to over 500 trips through each junction through each peak hour. This is a significant level of traffic, yet there will also be further increases in traffic in the region of 300 trips per peak hour at each junction with the addition of all RDM development traffic.

Similarly, but more severely, there will be increases of 700 to 1000 vehicles per hour per junction at **junctions 24, 25, 26 and 27** on top of the Webheath development trips. At these four junctions, the contribution of Webheath development trips drops to 44%, 33%, 36% and 31% as a result of several large development sites nearby.

The above paragraph demonstrates that although the Webheath development will have a substantial impact upon these junction (as established within scenario one), there will be significant additional impacts generated by other RDM development sites. This is a result of both the geographical distribution of new

developments as well as the clear strategic importance of the Brockhill Drive corridor in connecting origins and destinations between western and northern areas of Redditch. Assessment of these junctions and the identification of suitable mitigation measures is essential to ensure the long-term operational efficiency of this region of Redditch.

36% and 41% of RDM development traffic at **junctions 36 and 28** can be attributed to the Webheath development. At junction 36, all Webheath development trips pass directly between the two A441 arms, but with the addition of all RDM development trips there will be a substantial increase in the proportion of trips completing a turning movement into and out of the minor Weights Lane arm due to a development site being accessed directly from this link. A similar situation occurs at junction 28 whereby there is an increased level of development traffic turning into and out of the minor Dagnell End Road arm. 24% of all Webheath development traffic passes through junctions 36 and 28 which combined with the increased number of turning movements arising from other RDM developments could have an impact on the operation of a junction located on a key strategic route within Redditch. Further assessment of these junctions is strongly recommended for the 2026 Assessment Year.

At **junction 65** the vast majority of Webheath and other RDM development trips pass directly between the two A441 arms. The proportion of development trips which do pass to/from the minor arms at these junctions is considered negligible and will not impact upon the performance and operation of the junction.

6.3.2 Bromsgrove / M5 North

The Bromsgrove / M5 North route constitutes some or all of junctions 37, 21, 22 and 31 depending on whether the trip is generated by the northern or southern portion of the Webheath development. All these junctions were assessed in detail within sections 6.2.1 to 6.2.4. It is essential that junctions 37, 21, 22 and 31 are subject to further detailed assessments using specialised modelling software.

6.3.3 Redditch Town Centre

Table 5.4 presents the 2026 Do-Minimum traffic flows and the traffic generated by the Webheath development through the RDM study junctions which form the Redditch Town Centre route.

Table 6.3 Redditch Town Centre Route Junctions

RDM Junction	2026 Do-Minimum		Development Traffic		Traffic Uplift	
	AM	PM	AM	PM	AM	PM
21	1140	1059	500	494	43.8%	46.7%
22	722	993	599	699	83.0%	70.4%
35	2776	1974	371	358	13.4%	18.1%
37	688	723	592	631	86.1%	87.3%
39	3235	2301	366	354	11.3%	15.4%
41	3060	2176	332	332	10.8%	15.2%
63	2432	1729	299	292	12.3%	16.9%

Recall the routes to/from Redditch town centre to/from the northern and southern portions of the Webheath development vary for the reasons discussed within section 5.3.3. The impact upon junctions within the Brockhill corridor were discussed within section 6.2.1 while the impacts at junctions 22, 21 and 37 were discussed within sections 6.2.2, 6.2.3 and 6.2.4.

58% of all RDM development trips can be attributed to the Webheath development at **junction 35**. The vast majority of Webheath development trips did not actually complete a turning movement at this junction. However, almost all other RDM development trips do turn into and out of the minor arm at junction 35. At

junction 39, the distribution of additional RDM development trip movements is very similar to those generated by the Webheath development, namely the majority of development trips pass between the Birchfield Road West arm and the minor Bromsgrove Road arm. 55% of all RDM development trips through junction 39 can be attributed to the Webheath development.

At both junctions 35 and 39, traffic counts are not available, therefore caution should be used when interpreting uplifts in total traffic and impacts on particular turning movements. What is clear however is that there will be a substantial increase in the number of development trips turning into and out of the minor arms at these junctions in the 2026 Assessment Year. Further assessment of these junctions is recommended following the collection of traffic counts.

11% and 10% of all Webheath development trips pass through **junctions 41 and 63** respectively with the vast majority of these travelling directly between the two major arms of the junctions (Bromsgrove Road) and therefore do not perform a turning movement. In the 2026 Assessment Year the Webheath development contributes towards 51% and 56% of all RDM development trips through these junctions. Other RDM development trips also predominately travel between the two major arms of the junctions to the extent that there continues to be a negligible number of development trips which complete a turning movement at these junctions. Further assessments are not considered necessary.

6.3.4 Greenlands

Table 5.4 presents the 2026 Do-Minimum traffic flows and the traffic generated by the Webheath development through the RDM study junctions which form the Greenlands route.

Table 6.4 Redditch Town Centre Route Junctions

RDM Junction	2026 Do-Minimum		Development Traffic		Traffic Uplift	
	AM	PM	AM	PM	AM	PM
18	1105	1214	402	436	36.4%	35.9%
19	9606	6831	683	652	7.1%	9.5%
20	716	656	433	469	60.4%	71.5%
31	1062	1565	1328	1198	125.1%	76.6%
32	317	226	214	236	67.3%	104.7%
37	688	723	592	631	86.1%	87.3%
40	2169	1542	309	330	14.2%	21.4%
52	9031	6423	664	583	7.4%	9.1%
54	14784	10514	891	886	6.0%	8.4%
67	3027	2152	404	427	13.4%	19.8%

The impact of Webheath development traffic on junctions 31, 22 and 37 was assessed in detailed within sections 6.2.1, 6.2.2 and 6.2.4 respectively. Similar to the Redditch Town Centre assignment, the routes between the Webheath development and the Greenlands industrial area of Redditch is different for each of the Webheath development portions.

The Webheath development contributes towards 85% of the development trip movements through **junction 32** even though only 12% of all Webheath trips pass through the junction. All Webheath development trips pass between the major Church Road arms, so no actual turning movement is made. This continues to be the case when all RDM development traffic is assigned; therefore no further assessment is necessary.

At **junction 20**, less than half of RDM development trips in the 2026 Assessment Year can be attributed to the Webheath development site. This low contribution is likely to be due to a concentration of Webheath ADR development trips for which the development site is located to the south of Church Road. The distribution of additional RDM development trips through junction 20 is very similar to those generated by Webheath, therefore the Church Road and Heathfield Road arms specifically will incur additional uplifts in total traffic. The RDM indicates that these arms will experience traffic levels 130% to 400% higher than the do-minimum. As within scenario one, the level of traffic will clearly be increasing considerably at junction 20 and it is unknown whether the existing roundabout geometries are acceptable for the increased traffic flow. Further assessments using specialized modelling software are therefore recommended.

At **junction 67**, all Webheath development trips pass between the major Heathfield Road arms, so no actual turning movement is made. However, the Webheath development contributes towards 38% of all RDM development trips at this junction of which approximately ¼ involve a turning movement into or out of the minor Downsell Road arm. As traffic counts are not available at junction 67, it is difficult to ascertain whether the increased number of movements to/from the minor arm is significant considering the existing traffic flows. Given junction 67 is located on a key route for Webheath development traffic yet over half of all future year development trips are generated by other development sites, it is recommended that traffic counts are recorded for junction 67 and an additional assessment is considered using accurate do-minimum flows and the development trips assigned by the RDM.

Similarly at **junction 40**, traffic counts are not available, but the RDM indicates that all RDM development trips will turn into and out of the minor Middle Piece Drive arm to/from Heathfield Road South. As the Webheath development contributes towards 49% of all RDM development trips, there is an increased likelihood of turning movement conflicts and delay at this location, particularly for right hand turning movements attempting to enter the minor arm. This coupled with the uncertainty regarding the existing level of traffic and distribution of traffic movements at this junction constitutes the recommendation that traffic counts are recorded for junction 40 and an additional assessment is considered using accurate do-minimum flows and the development trips assigned by the RDM.

Recall from scenario one that **junction 18** will experience a dual impact from northern and southern generated Webheath development trips. As a result, even with the addition of other RDM development trips, the contribution from the Webheath development stands at 56%. The location of junction 18 also results in there to be a range of development trip turning movements through this junction. The majority of non-Webheath development trips are concentrated on the movements between Middle Piece Drive North and West which forms part of the quickest route between the A448 at junction 19 and the wider Webheath area.

62% of RDM development trips passing through **junction 19** can be attributed to the Webheath development. Similar to junction 18, junction 19 will experience a dual impact from northern and southern generated Webheath development trips. Traffic counts are not available for junction 19, therefore caution should be used when interpreting uplifts in total traffic and impacts on particular turning movements. It is also not known whether there is any existing congestion at junction 19 on the A448 mainline which may be exacerbated by the increased level of traffic.

Junctions 18 and 19 are located in close proximity to one another and any trip entering or exiting the A448 at junction 19 will also pass through junction 18 as part of their route. Given the dual impacts from the Webheath development and range of turning movements through each junction by all RDM development trips it is strongly recommended that further assessments of junctions 18 and 19 are completed using specialist modelling software. Traffic counts will need to be recorded for junction 19 for this assessment to be completed and consideration should also be given towards the development of a micro-simulation model for this area of the Redditch network.

Total traffic flows will increase at **junction 52** with the addition of all RDM development sites. In the 2026 Assessment Year the Webheath development contributes towards 54% of all RDM development trips. The

majority of the additional RDM development trips will be passing directly between the A448 or A411 arms and therefore not completing a turning movement at this junction. As this is a large grade separated junction, it is not anticipated that the level of development traffic will impact upon the performance and operation of the junction.

The Webheath development contributes towards 28% of all RDM development traffic at **junction 54**. Scenario one identified that all Webheath movements will be to/from the A448 East arm. With the assignment of all other RDM development traffic there is a wide range of turning movements at junction 54. In the absence of traffic counts, it is difficult to understand the impact these turning movements may have on the operation of the junction. It is therefore recommended that traffic counts are recorded for junction 54 and an additional assessment is considered using accurate do-minimum flows and the development trips assigned by the RDM.

6.3.5 A46 South

Table 5.4 presents the 2026 Do-Minimum traffic flows and the traffic generated by the Webheath development through the RDM study junctions which form the A46 South route.

Table 6.5 Redditch Town Centre Route Junctions

RDM Junction	2026 Do-Minimum		Development Traffic		Traffic Uplift	
	AM	PM	AM	PM	AM	PM
15	10025	7130	485	386	4.8%	5.4%
16	11222	7981	471	415	4.2%	5.2%
18	1105	1214	402	436	36.4%	35.9%
19	9606	6831	683	652	7.1%	9.5%
20	716	656	433	469	60.4%	71.5%
22	722	993	599	699	83.0%	70.4%
31	1062	1565	1328	1198	125.1%	76.6%
32	317	226	214	236	67.3%	104.7%
37	688	723	592	631	86.1%	87.3%
40	2169	1542	309	330	14.2%	21.4%
52	9031	6423	664	583	7.4%	9.1%
53	9186	6533	353	268	3.8%	4.1%
54	14784	10514	891	886	6.0%	8.4%
67	3027	2152	404	427	13.4%	19.8%

The impact of Webheath development traffic on junction 31, 22 and 37 was assessed in detailed within sections 6.2.1, 6.3.2 and 6.2.4 respectively. In addition, junctions 32, 20, 67, 40, 18, 19, 52 and 54 were analysed within the Greenlands route assessment within section 5.3.4. The assigned Webheath route for trips to/from the A46 is similar to the Greenlands route but with the additional impact upon junctions 15, 16 and 53.

The Webheath development contributes towards 25% of all RDM development traffic at **junction 15**. Scenario one identified that Webheath movements will pass through a number of different arms as trips

from both portions of the development will be impacting upon junction 15. With the assignment of all other RDM development traffic there is an even wider range of turning movements at junction 15, with a particular concentration on movements entering and exiting the Evesham Road South and Windmill Drive arms. In the absence of traffic counts, it is difficult to understand the impact these turning movements may have on the operation of the junction. As junction 15 is located in a key position in the Redditch local road network, it is recommended that traffic counts are recorded for the junction and an additional assessment is considered using accurate do-minimum flows and the development trips assigned by the RDM.

28% of RDM development trip movements through **junction 53** can be attributed to the Webheath development. The vast majority of these pass directly between the arm and Windmill Drive arms so not performing a turning movement. The proportion of movements utilising the minor arm increases substantially however with the addition of all RDM trips. Without traffic counts, it is difficult to ascertain an accurate understanding of the increase in traffic flow and whether the increased number of trips turning into and out of the minor arm will impact upon the performance of the junction. It is recommended that traffic counts are recorded for the junction and an additional assessment is considered using accurate do-minimum flows and the development trips assigned by the RDM.

The Webheath development contributes towards 11% of all RDM development traffic at **junction 16** which in turn equates to 3% of all Webheath development trips. Although no traffic counts are available at this junction, the low number of development trips passing through the junction will have a negligible impact upon the performance and operation of the junction. No further assessment is necessary at this time.

SECTION 7

Wider Worcestershire Development Impacts

There are a number of RDM junctions highlighted within both this RDM assessment and the B&R IDP process completed by CH2M HILL (refer to section 2.3). As these junctions are generally located on key strategic routes within Redditch, the identification and requirement for the schemes identified within the B&R IDP have arisen from the traffic impact of a number of planned development sites throughout Bromsgrove and Redditch. WCC will therefore consider the proportional impact on these junctions from both the Webheath and other Redditch developments in order to understand and quantify any necessary contributions towards the schemes identified.

A consideration of the analysis from scenarios one and two can help to identify and establish the relative impact from the Webheath development in isolation and as part of the wider Redditch development aspirations to 2026. This is presented within Table 7.1.

Table 7.1 B&R IDP Junction Scheme List

RDM Junction	Proportion of All Webheath Development Trips Generated	Proportion of Webheath Development Trips Relative to All RDM Development Traffic	Scheme and Impact Analysis
7	2%	4%	A signing and lining improvement scheme is proposed. This junction will incur over 800 development trips in the peak hours within the 2026 Assessment Year, but the RDM suggests that Webheath development trips will have a negligible impact on this junction.
9	1%	4%	A 40m additional approach lane on the southern and eastern arms is proposed. Over 300 trips are modelled as impacting upon the junction in the PM peak, the Webheath development will contribute towards 4% of these.
17	1%	6%	At junction 17 additional approach lanes are proposed for all arms except Woodrow North. Although over 300 trips are modelled as impacting upon the junction in the peak hours the Webheath development will contribute towards 6% of these and 1% of all Webheath traffic will impact upon the junction.
21	29%	91%	A Traffic Regulation Order has been proposed at junction 21 in order to protect the junction. 29% of all Webheath development trips impact upon this junction which equates to 91% of all RDM development traffic flows. Webheath development trips can therefore be attributed to the requirement for this scheme as well as being the main beneficiaries.
23, 24, 25, 31, 33, 34	35% to 57%	33% to 70%	It is proposed to replace each roundabout along Brockhill Drive with a connected MOVA junction operating system. This will enhance the capacity along this corridor through which a significant proportion of Webheath development trips will pass through. Webheath development trips will greatly benefit from this scheme.
24	36%	44%	Additional lanes are proposed on the west and north approaches at junction 24. Webheath development trips contribute to almost half of all RDM development trips impacting upon junction 24. Almost all of these pass directly between the western and eastern arms, hence will directly benefit from improvements to the western arm and overall improvements in junction operation.

Table 7.1 B&R IDP Junction Scheme List

RDM Junction	Proportion of All Webheath Development Trips Generated	Proportion of Webheath Development Trips Relative to All RDM Development Traffic	Scheme and Impact Analysis
25	35%	33%	It is proposed to convert junction 25 into a four arm signalized junction. The Webheath development contributes towards 33% of all RDM development trips impacting upon this junction so therefore will benefit from any schemes which improve the operational performance of the junction.
27	29%	31%	At the large A441 junction circulatory north of the town centre traffic signals are proposed on the north, south and west approach arms. 29% of all Webheath development trips impact upon junction 27, all of which will enter/exit via the western arm. As Webheath development trips contribute towards 31% of all RDM development trips, the Webheath trips will benefit from the implementation of this scheme.
28	24%	41%	24% of Webheath development trips pass through junction 28 which equates to 41% of all RDM development trips. The vast majority of these trips pass directly between the two A441 North/South arms and therefore will not directly benefit from the increased link capacity proposed for the eastern arm. A MOVA system is also proposed however which will improve the performance of the junction, therefore there will be a benefit for all Webheath trips using this junction.
31	57%	70%	Junction 31 incurs more Webheath development trips than any other within the RDM and 70% of all future RDM development trips can be associated with the Webheath development. It is proposed that an additional approach lane is added to the Brockhill Drive arm. As the Brockhill Drive/Birchfield Road movement is the second most common movement for Webheath development trips, they will directly benefit from this proposed scheme.
44	5%	12%	A MOVA system is proposed for junction 44. This junction incurs a substantial number of development trips in the 2026 Assessment Year with a maximum of 12% of this traffic attributed to the Webheath development which in turn is representative of 5% of all Webheath traffic.
50	2%	9%	A MOVA system is proposed for junction 50. In the 2026 Assessment Year 9% of this traffic can be attributed to the Webheath development which in turn is representative of 2% of all Webheath traffic.
57	0%	0%	A 50m additional approach lane on the western arm is proposed to improve the right-turn movement into the hospital. Over 200 trips are modelled as impacting upon the junction in the AM peak but none of these can be attributed to the Webheath development.
59	1%	2%	A signing and lining improvement scheme is proposed. This junction will incur over 500 development trips in the peak hours within the 2026 Assessment Year, but the RDM suggests that Webheath development trips will have a negligible impact on this junction.

The value of any contributions requested by WCC will be discussed and specified separately by WCC and will not be covered within this report.

SECTION 8

Summary and Recommendations

This report has presented, analysed and discussed the results of two scenarios in order to assess the impact of the proposed Webheath development on the Redditch road network. Specifically, new development trips have been assigned through the Redditch road network, using the RDM, and the movements have been examined through 67 selected junctions of which two form the proposed primary access junctions to the Webheath development.

8.1 Impact Summary

The proposed Webheath development is a major development site in Redditch which will generate a significant number of new vehicular trips which in turn will result in severe impacts on parts of the Redditch network. The RDM indicates that the traffic generated by the development will have impacts on junctions throughout Redditch and not just those in close proximity to the site. In some cases, these anticipated impacts are seen through the significant number of new development trips modelled as requiring use of the junction/s, whilst at others, their strategic nature and high levels of existing traffic increases the potential for a lower number of new development trips to have a disproportionately detrimental impact on the performance and operation of the junction.

In specific regards to this assessment and the RDM there were a number of junctions where existing traffic counts were not available. At junctions where this is the case, if further assessment is considered necessary then it is imperative that new junction counts are collected prior to any junction specific modelling assessment.

8.1.1 Scenario One

The uplifts in total traffic across the RDM network in the 2026 Assessment Year arising solely from the Webheath development is provided within Table 8.1. Uplifts in total traffic of 2.5% and 3.7% are modelled with the AM and PM peaks.

Table 8.1 Webheath Development Traffic Impact through RDM Junctions by Peak Hour

RDM Junction	2026 Do-Minimum		Webheath Development Traffic		Traffic Uplift	
	AM	PM	AM	PM	AM	PM
RDM Network	420162	306470	10699	11254	2.5%	3.7%

The RDM indicated a diverse severity range of junction impacts across the Redditch highway network. Some junctions incur significant numbers of new development trips, whilst others very few, if any.

As would be expected, a number of junctions surrounding the development incur a high number of Webheath development trips. Of note, all junctions in the Webheath ward incur over 100 development trips in each peak hour while those junctions on key local routes incur over 400 vehicles in each peak hour (junctions 21, 22, 31 and 37).

The highest number of development trips were modelled through junction 31 which was found to incur 57% of all Webheath development trips. Junction 31 is the closest A448 junction to the development, and one of the access points to the northern portion of the development is located immediately to the south of junction 31. Junction 31 will be forming part of a number of key routes to and from both the northern and southern portions of the Webheath development. Nearby, junction 22 incurred 35% of all development trips as this junction provides access to/from the A448 westbound carriageway, while junction 21 incurred 29% of all Webheath development trips. Junction 37 incurred 37% of all Webheath development trips, the vast majority of which were attributable to the southern portion of the development.

Each of the junctions highlighted above incurred development trips from both portions of the Webheath development, but not necessarily on the same arm. This therefore results in a dual impact from Webheath development trips, which in turn will multiply any detrimental impacts on junction performance and operation.

Due to their nature, strategic junctions also incur high numbers of Webheath development trips (junctions 19, 27, 31 and 52). There is also a clear group of junctions incurring a significant proportion of Webheath development trips along the Brockhill Drive link between the A448 at junction 31 and the A441 at junction 27.

In terms of the proportion of Webheath development trips impacting upon each junction, junction 31 incurs 57% of all Webheath development trips as this junction forms part of a number of key routes to/from the development including the M5, Redditch town centre, the Brockhill Drive corridor and the A435. High proportions were also modelled through junctions 37, 22 and 21. These proportions remain high along several key routes to/from the Webheath development including Brockhill Drive, the route to/from the town centre and to/from the A448 at RDM junction 19.

As summary of the key junctions which are impacted upon specifically by the Webheath development are listed below along with a brief description of the impact:

- Junction 21 – 29% of forecast trips on this junction generated by the Webheath development (total trips = 907)
- Junction 31 – 57% of forecast trips on this junction generated by the Webheath development (total trips = 1778)
- Junction 22 – 35% of forecast trips on this junction generated by the Webheath development (total trips = 1084)
- Junction 37 – 37% of forecast trips on this junction generated by the Webheath development (total trips = 1153)
- Junctions 23, 34, 33, 24 and 25 – 36% of forecast trips on this junction generated by the Webheath development (total trips varies between each junction, highest being 1145)
- Junction 26 and 27 – 29% of forecast trips on this junction generated by the Webheath development (total trips = 896)
- Junction 39 –13% of forecast trips on this junction generated by the Webheath development (total trips = 397)
- Junction 20 – 12% of forecast trips on this junction generated by the Webheath development (total trips = 384)
- Junction 40 – 10% of forecast trips on this junction generated by the Webheath development (total trips = 314)
- Junction 18 – 15% of forecast trips on this junction generated by the Webheath development (total trips = 467)
- Junction 19 – 27% of forecast trips on this junction generated by the Webheath development (total trips = 834)
- Junction 54 – 16% of forecast trips on this junction generated by the Webheath development (total trips = 497)

- Junction 15 – 7% of forecast trips on this junction generated by the Webheath development (total trips = 221)

8.1.2 Scenario Two

The uplifts in total traffic across the RDM network in the 2026 Assessment Year arising from the assignment of all RDM development trips is provided within Table 8.2. Uplifts in total traffic of 9.5% and 12.2% are modelled with the AM and PM peaks.

Table 8.2 Webheath Development Traffic Impact through RDM Junctions by Peak Hour

RDM Junction	2026 Do-Minimum		All RDM Development Traffic		Traffic Uplift	
	AM	PM	AM	PM	AM	PM
RDM Network	364206	264294	34595	32247	9.5%	12.2%

With all other Redditch development sites applied to the RDM, there are extensive and significant traffic impacts at highway junctions throughout Redditch.

Compared to scenario one, there is a greater spread of development trips and associated impacts across the network as only a handful of junctions now incur less than 100 trips in either of the peak hours. That said, there is also a further increase in development trips at junctions which were already heavily impacted upon from the Webheath development. Typically, these junctions will be located on key routes which would naturally incur traffic movements completed as part of a longer distance strategic journey. Such examples include junctions 6, 15, 19, 52, 27, 36, 28 and 65

Other junction impacts can be more easily attributed to individual RDM development sites located in the immediate vicinity of the junction. Examples include:

- **Webheath ADR**– Junction 20 and 31;
- **Brockhill Green Belt and Brockhill ADR**– Junctions 24 and 25;
- **Rear of Alexandra Hospital** – Junction 10;
- **A435 ADR**– Junctions 1, 4, 5 and 7;

Of particular note, those junctions located on the Brockhill Drive corridor experience substantial additional RDM development trips on top of those generated by the Webheath development (junctions 23, 24, 25, 33 and 34). This is anticipated to be a consequence of both the presence of a number of development sites in close proximity to this corridor as well as the strategic importance of this route as part of movements between western and northern areas of Redditch.

Further interrogation of the RDM outputs identified the proportion of all RDM development trips directly attributable to the Webheath development site. As an overhead figure across all junctions, 29% of all RDM development trips impacting upon a RDM junction within the peak hours can be directly attributed to the Webheath development.

As would be expected, at the junctions of 37, 32 and 21 over 75% of all RDM development trips can be directly attributed to the Webheath development. The same is also true from junction 22 (84%) despite being located on a key strategic link within the Bromsgrove highway network (and hence more likely to draw in other RDM development traffic). Beyond the above junctions, the proportion of Webheath development trips reduces with distance from the development along the same distributional routes identified earlier within scenario one. In some cases, other development sites temporarily reduce the proportion of development trips attributable to the Webheath development, before increasing again further on.

8.2 Junction Impact Summary and Recommendations

An analysis of the proportional distribution of Webheath development trips through RDM junctions saw the identification of several key routes through the highway network between the Webheath development and a number of key RDM zones. Due to the position of the Webheath development and north/south development portions, these key routes varied by development portion as well as direction in some cases.

Junctions on these key routes were analysed in turn to help the analytical process. A summary of the analysis relating to both scenarios and subsequent recommendations are presented within Table 8.3 below. It is also stated where new traffic counts are required prior to any further assessments taking place. The junctions are listed in the order they are covered within the report to assist readability.

It is also stated where new traffic counts are required prior to any further assessments taking place. These requirements are stated as follows:

- ✓ new traffic counts are required,
- ✖ new traffic counts are not required.

Table 8.3 Impact Summary and Recommendations

RDM Junction	Webheath Development Impact Summary	All RDM Development Impact Summary	Recommendation	Traffic Count Required?
31	Junction 31 incurs both the highest number and highest proportion of Webheath development trips. All movements through junction 31 pass to/from the Birchfield Road arm.	With the addition of all other RDM development trips, 70% of all development trips can be attributed to the Webheath development. There is a greater range of development traffic movements in scenario two.	Junction 31 incurs both the highest number and highest proportion of Webheath development trips. With all other RDM developments assigned the total level of traffic will double through this junction across the peak hours. It is essential that further assessments are undertaken using specialised modelling software and suitable mitigation measures are identified if required.	✖
22	Junction 22 will incur 35% of all Webheath development trips and the RDM has modelled uplifts in total traffic of 58% across the peak hours. A range of development trip movements are observed at junction 22 due to trips impacting from both portions of the Webheath development.	84% of all RDM development trips in the 2026 Assessment Year can be directly attributed to the Webheath development. The additional development trips increase the uplifts in total traffic to over 75% in both peak hours.	Junction 21 forms part of the strategically important A448 Foxlydiate junction. It is essential that further assessments are undertaken using specialised modelling software and suitable mitigation measures are identified if required.	✖

Table 8.3 Impact Summary and Recommendations

RDM Junction	Webheath Development Impact Summary	All RDM Development Impact Summary	Recommendation	Traffic Count Required?
21	Junction 21 is modelled to incur 29% of all Webheath development trips. Do-minimum traffic flows are comparatively low compared others nearby which results in uplifts in total traffic just under 40% in the peak hours.	Webheath development trips will account for 91% of all RDM development trips in the 2026 Assessment Year. The majority of the additional RDM development trips at junction 21 will involve a movement into/out of the Foxlydiate arm which will be on top of the Webheath development trips which were also concentrated on movements involving this arm.	Given the role of junction 21 in forming part of the quickest route between the southern portion of the Webheath development and the strategically important A448 Foxlydiate junction it is essential that further assessments are undertaken using specialised modelling software and suitable mitigation measures are identified if required.	✖
37	A new junction arm will be added which will provide access to and from the northern portion of the development. Junction 37 will incur 37% of all Webheath development trips which will generate uplifts in total traffic of over 70% across the peak periods.	Within the 2026 Assessment Year Junction 37 is modelled as experiencing a 87% increase in total traffic across the peak hours. 94% of this additional traffic can be directly attributed to the Webheath development.	It is not clear what impact a fifth junction arm will have on the performance and operation of the junction. Given the number of new development trips anticipated also at junction 37 it is essential that further assessments are undertaken using specialised modelling software and suitable mitigation measures are identified if required.	✖
23	From junction 23 (36%) to junction 25 (35%) there is only a 1% reduction in the proportion of all Webheath development trips which pass through each junction along this section. These proportions equate to over 500 vehicle trips in each of the peak hours.	Further increases in traffic in the region of 300 trips per peak hour at junction 23, 34 and 33 and 700 to 1000 vehicles at junctions 24 and 25.	Given the anticipated increase in traffic along the Brockhill corridor, it is essential to understand how much spare capacity the junctions and links along Brockhill Drive have and whether suitable mitigation measures are required.	✖
34				✖
33				✖
24				✖
25				✓
26	No actual development trip turning movements occur. Peak hour approach arm traffic flows increase by up to 62%.	There will be increases of 700 to 1000 vehicles per hour per on top of the Webheath development trips due to the close proximity of several large development sites nearby.	Further assessment is essential to understand whether the approach links and signals can be optimised to accommodate the increased traffic flow arising from the Webheath development.	✖
27	The movement from the A441 North to Middlehouse Lane requires the whole circulatory to be navigated. This movement will see an additional 250 vehicles in the PM peak hour which will restrict access to the circulatory from the other arms.	There will be increases of 700 to 1000 vehicles per hour per on top of the Webheath development trips due to the close proximity of several large development sites nearby.	As junction 27 is a strategically important junction, it is recommended that junction 27 is subject to detailed assessment using specialised modelling software.	✓

Table 8.3 Impact Summary and Recommendations

RDM Junction	Webheath Development Impact Summary	All RDM Development Impact Summary	Recommendation	Traffic Count Required?
36	All movements through junction 36 are between the two major arms of the A441 so no actual turning movements are completed.	Substantial increase in movements to/from the minor Windsor Road arm due to a local development site with the potential to impact upon junction performance.	Further assessment is recommended for the 2026 Assessment Year.	✓
28	The vast majority of Webheath development trips pass directly between the two A441 arms.	Substantial increase in movements to/from the minor Dagnell End Road arm with the potential to impact upon junction performance.	Further assessment is recommended for the 2026 Assessment Year.	✖
65	The vast majority of Webheath development trips pass directly between the two A441 arms.	The vast majority of RDM development trips pass directly between the two A441 arms.	No further assessment is necessary.	n/a
35	The vast majority of traffic passes directly between the two Birchfield Road arms and hence not actually performing a turning movement.	The majority of non-Webheath development trips turn into or out of the minor arm.	Further assessment is recommended following the collection of traffic counts.	✓
39	All movements use the Birchfield Road West arm with the majority of trips turning into and out of the minor Bromsgrove Road arm.	Further concentration of RDM development trips turning into and out of the minor Bromsgrove Road arm.	Further assessment is recommended following the collection of traffic counts.	✓
41	At both these junctions the vast majority of development trips do not perform a turning movement.	Further concentration of RDM development trips passing between the two major arms of the junctions.	No further assessment is necessary.	n/a
63			No further assessment is necessary.	n/a
32	All Webheath development trips pass between the major Church Road arms, so no actual turning movement is made.	All RDM development trips pass between the major Church Road arms, so no actual turning movement is made.	No further assessment is necessary.	n/a
20	Substantial uplifts in total traffic are modelled on the Church Road and Heathfield Road arms (52% to 134%) within the peak hours.	Further uplift in total traffic due to the close proximity of the Webheath ADR site. The Church Road and Heathfield Road arms will incur uplifts of up to 400% within the peak hours.	It is unknown whether the existing roundabout geometries are acceptable for the increased traffic flow. Further assessments using specialised modelling software is recommended.	✖
67	All Webheath development trips pass between the major Heathfield Road arms, so no actual turning movement is made.	Further uplift in total traffic due to the close proximity of the Webheath ADR site. A quarter of additional RDM development trips turn into or out of the minor Downsell Road arm.	Further assessment is recommended following the collection of traffic counts.	✓

Table 8.3 Impact Summary and Recommendations

RDM Junction	Webheath Development Impact Summary	All RDM Development Impact Summary	Recommendation	Traffic Count Required?
40	All development trips turn between the Heathfield Road South and minor Middle Piece Drive arm.	Further uplift in total traffic due to the close proximity of the Webheath ADR site. All RDM development trips will turn into and out of the minor Middle Piece Drive arm to/from Heathfield Road South.	Further assessment is recommended for the 2026 Assessment Year.	✓
18	Dual impact from the northern and southern portions of the Webheath development. A range of development trip turning movements through this junction which combine to generate uplifts in total traffic of around 18% in both peak hours.	The location of junction 18 results in there to be a range of development trip turning movements through this junction. The majority of non-Webheath development trips are concentrated on the movements between Middle Piece Drive North and West.	Junctions 18 and 19 are located in close proximity to one another and any trip entering or exiting the A448 at junction 19 will also pass through junction 18 as part of their route. Given the dual impacts from the Webheath development and range of turning movements through each junction by all RDM development trips it is strongly recommended that further assessments of junctions 18 and 19 are completed using specialist modelling software. A micro-simulation model for this area of the Redditch road network should also be considered.	✗
19	Dual impact from the northern and southern portions of the Webheath development. Key strategic junction within the Redditch highway network.	Further uplifts in total traffic following the assignment of all RDM development trips. It is not known whether there is any existing congestion at junction 19 on the A448 mainline which may be exacerbated by the increased level of traffic.		✓
52	The vast majority of Webheath development trips pass directly between the A448 and A4189.	The majority of the additional RDM development trips will be passing directly between the A448 or A411 arms and therefore not completing a turning movement at this junction.	As this is a large grade separated junction, it is not anticipated that the level of development traffic will impact upon the performance and operation of the junction.	n/a
54	Dual impact from the northern and southern portions of the Webheath development. 35% of all Webheath development traffic passes through junction 54.	With the assignment of all other RDM development traffic there is a wide range of turning movements at junction 54.	Further assessment is recommended following the collection of traffic counts.	✓
15	Development trips pass through a number of different arms as trips from both portions of the development will be impacting upon junction 15.	With the assignment of all other RDM development traffic there is an even wider range of turning movements at junction 15, with a concentration on movements entering and exiting the Evesham Road South and Windmill Drive arms.	Further assessment is recommended following the collection of traffic counts.	✓
53	The vast majority of traffic passes directly between the two Windmill Drive arms and hence does not actually performing a turning movement.	The proportion of movements utilising the minor arm increases substantially with the addition of all RDM trips.	Further assessment is recommended following the collection of traffic counts.	✓

Table 8.3 Impact Summary and Recommendations

RDM Junction	Webheath Development Impact Summary	All RDM Development Impact Summary	Recommendation	Traffic Count Required?
16	3% of Webheath development trips will impact upon the junction.	The low number of development trips passing through the junction will have a negligible impact upon the performance and operation of the junction.	No further assessment is necessary.	✓

It should be highlighted that in two particular cases an alternative to individual junction assessments should be considered. This applies to the Brockhill corridor and junction 18 and 19.

The Brockhill Drive corridor is clearly significantly impacted upon by a number of RDM development sites as well as the Webheath development. The route from junction 31 through junctions 23, 34, 33, 24, 25, 26 to 27 is a key route connecting locations in western and northern areas of Redditch and it has been recommended that further assessments at each of these junctions are completed. Given the modelled intensity of RDM development trips on this corridor, individual junction assessments may not capture the full extent of their impact on the corridor as a whole and therefore limit any suitable mitigation schemes which are identified. It is therefore **recommended that a suitable micro (VISSIM) or mesoscopic (DYNAMEQ) simulation model is considered to accurately and comprehensively model this corridor along with any suitable mitigation or amelioration schemes which are identified**.

In addition, Junctions 18 and 19 are located in close proximity to one another and any trip entering or exiting the A448 at junction 19 will also pass through junction 18 as part of their route. Given the dual impacts from the Webheath development and range of turning movements through each junction by all RDM development trips and unknown existing level of performance at junction 19 **consideration should also be given towards the development of a micro-simulation model (VISSIM) for this area of the Redditch network**.

8.3 Wider Recommendations

It is considered that a number of key strategic junctions and key routes throughout Redditch incur significant increases in total traffic. The substantial uplift in total traffic through these junctions can be linked to a number of RDM developments and not because of a single site, this is the quantified cumulative impact of development on the transport network. It is considered that any impact on these junctions will be attributed to a combination of development sites impact, and any mitigation should be attributed accordingly. This report has begun to set out and establish the relative impact of the Webheath development on the highway network in isolation and in relation to all other RDM development sites.

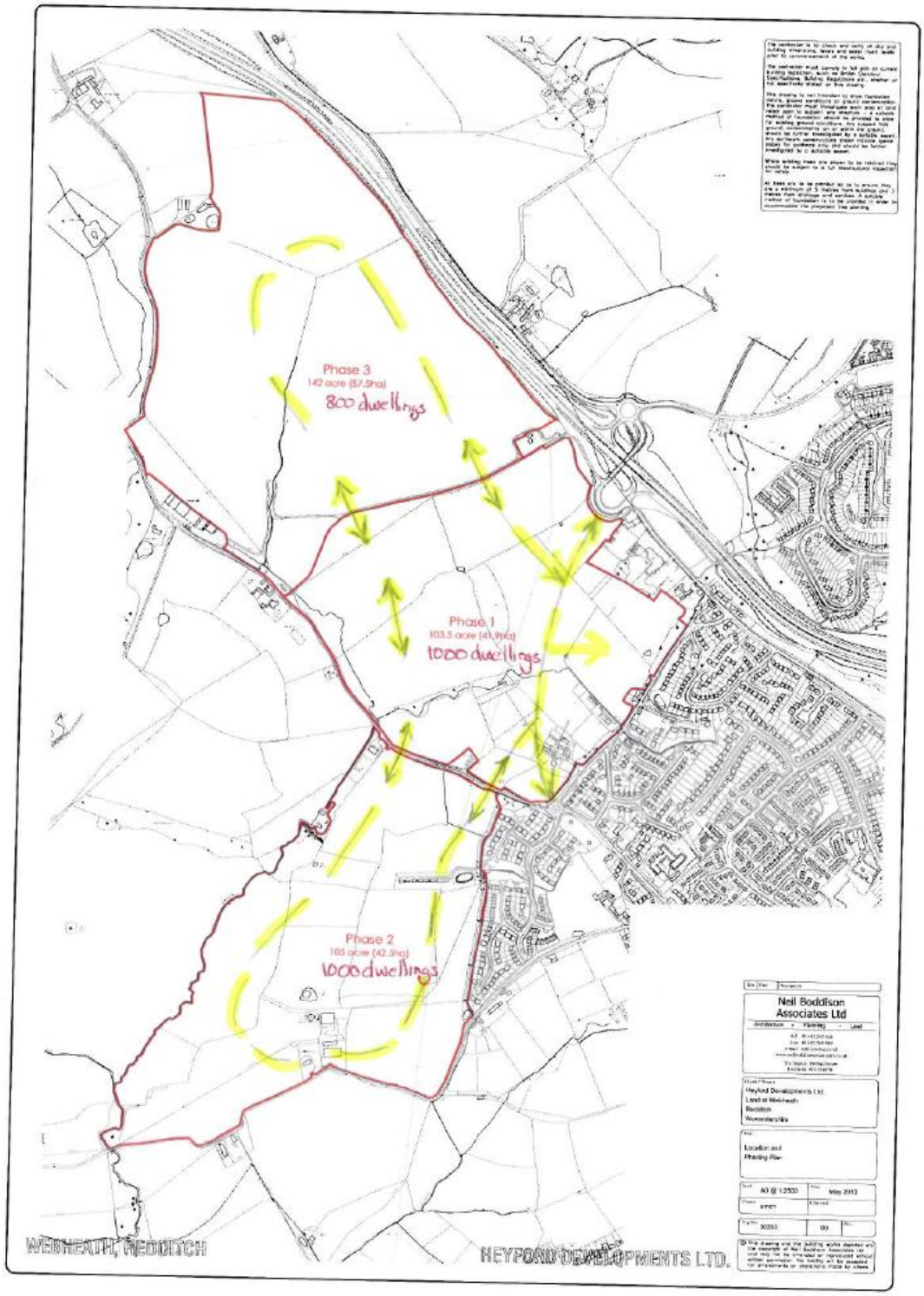
In terms of the wider Worcestershire development impacts, the Webheath development traffic flows have been identified as contributing towards proposed B&R IDP schemes at junctions 25, 27, 28, 31, 44, 50, 57 and 59. The impact of the development on these locations will need to be assessed with the use of appropriate modelling tools. The value of any contributions requested by WCC will be discussed and specified separately by WCC and will not be covered within this report.

This RDM assessment has established that the Webheath development will have a substantial and significant impact on a number of junctions throughout Redditch. Coupled with all other RDM development traffic, it is envisaged that the Redditch road network and its junctions will be under significant stress in the 2026 Assessment Year. In order to fully understand the operation of RDM junctions in the 2026 Assessment Year, a number of recommendations have been identified as stated within the previous section.

Due to the scale of development impact it is important to ensure that any future modelling does not focus solely on a specific junction, but also considers the entirety of the link and the relationship between the junctions along this link. It may be considered appropriate to undertake assessment of a number of combined junctions or a network area to adequately assess the true development impact. This would require the use of micro-simulation modelling tools. The previous section identified two areas where this suggestion is particularly pertinent.

Appendices

Appendix A – Webheath Development Sketch



SECTION 8

Appendix B –Individual Junction Traffic Flow Tables

Junction	Entry Arm	Exit Arm	Scenario One				Scenario Two			
			Do-Minimum		Development Trips		Do-Minimum		Development Trips	
			AM	PM	AM	PM	AM	PM	AM	PM
15	Evesham Road North	Rough Hill Drive	-	-	0	0	-	-	21	6
		The Slough	-	-	0	0	-	-	4	2
		Evesham Road South	-	-	0	0	-	-	37	47
		Windmill Drive	-	-	0	0	-	-	0	0
	Rough Hill Drive	The Slough	-	-	0	0	-	-	0	0
		Evesham Road South	-	-	0	0	-	-	9	5
		Windmill Drive	-	-	0	0	-	-	15	41
		Evesham Road North	-	-	0	0	-	-	6	19
	The Slough	Evesham Road South	-	-	0	0	-	-	0	0
		Windmill Drive	-	-	2	5	-	-	6	12
		Evesham Road North	-	-	0	0	-	-	2	5
		Rough Hill Drive	-	-	4	9	-	-	4	9
	Evesham Road South	Windmill Drive	-	-	11	24	-	-	18	39
		Evesham Road North	-	-	0	0	-	-	60	44
		Rough Hill Drive	-	-	22	47	-	-	39	64
		The Slough	-	-	0	0	-	-	0	0
	Windmill Drive	Evesham Road North	-	-	0	0	-	-	0	0
		Rough Hill Drive	-	-	0	0	-	-	175	44
		The Slough	-	-	5	3	-	-	18	8
		Evesham Road South	-	-	55	33	-	-	70	41

Junction	Entry Arm	Exit Arm	Scenario One				Scenario Two			
			Do-Minimum		Development Trips		Do-Minimum		Development Trips	
			AM	PM	AM	PM	AM	PM	AM	PM
16	Alcester Hwy	Rough Hill Drive North	-	-	6	4	-	-	38	35
		Grangers Lane	-	-	2	1	-	-	11	27
		Rough Hill Drive South	-	-	0	0	-	-	16	42
		Coldfield Drive	-	-	0	0	-	-	13	38
	Rough Hill Drive North	Grangers Lane	-	-	0	0	-	-	0	0
		Rough Hill Drive South	-	-	0	0	-	-	0	0
		Coldfield Drive	-	-	0	0	-	-	0	0
		Alcester Hwy	-	-	0	0	-	-	0	0
	Grangers Lane	Rough Hill Drive South	-	-	0	0	-	-	0	0
		Coldfield Drive	-	-	0	0	-	-	0	0
		Alcester Hwy	-	-	1	2	-	-	22	12
		Rough Hill Drive North	-	-	0	0	-	-	26	19
	Rough Hill Drive South	Coldfield Drive	-	-	0	0	-	-	3	6
		Alcester Hwy	-	-	26	56	-	-	60	68
		Rough Hill Drive North	-	-	0	0	-	-	202	112
		Grangers Lane	-	-	0	0	-	-	0	0
	Coldfield Drive	Alcester Hwy	-	-	0	0	-	-	21	6
		Rough Hill Drive North	-	-	0	0	-	-	59	50
		Grangers Lane	-	-	0	0	-	-	0	0
		Rough Hill Drive South	-	-	0	0	-	-	0	0
18	Windmill	Middle Piece Drive East	43	41	0	0	39	37	2	5

Junction	Entry Arm	Exit Arm	Scenario One				Scenario Two			
			Do-Minimum		Development Trips		Do-Minimum		Development Trips	
			AM	PM	AM	PM	AM	PM	AM	PM
	Drive North	Windmill Drive South	212	296	50	30	192	266	51	31
		Middle Piece Drive West	94	88	19	41	85	79	58	140
	Middle Piece Drive East	Windmill Drive South	83	83	0	0	75	75	0	0
		Middle Piece Drive West	60	56	7	14	54	50	13	27
		Windmill Drive North	84	75	16	35	76	67	19	36
	Windmill Drive South	Middle Piece Drive West	44	59	17	36	40	53	26	56
		Windmill Drive North	260	426	8	17	235	384	10	18
		Middle Piece Drive East	119	58	0	0	108	52	0	0
	Middle Piece Drive West	Windmill Drive North	141	80	63	37	128	72	150	79
		Middle Piece Drive East	54	69	16	10	49	62	23	14
		Windmill Drive South	27	18	31	18	24	16	50	29
19	Bromsgrove Hwy East	Windill Drive	-	-	19	41	-	-	58	140
		Bromsgrove Hwy West	-	-	74	159	-	-	91	198
	Windmill Drive	Bromsgrove Hwy East	-	-	63	37	-	-	151	80
		Bromsgrove Hwy West	-	-	24	52	-	-	27	54
	Bromsgrove Hwy West	Bromsgrove Hwy East	-	-	177	106	-	-	302	144
		Windill Drive	-	-	50	30	-	-	53	35
20	Church Road	Heathfield Road	83	126	111	66	75	113	252	147
		Blackstitch Lane	113	82	0	0	102	74	0	0
		Green Lane	53	71	11	7	48	64	24	15
	Heathfield	Blackstitch Lane	4	7	0	0	4	6	0	0

Junction	Entry Arm Road	Exit Arm	Scenario One				Scenario Two			
			Do-Minimum		Development Trips		Do-Minimum		Development Trips	
			AM	PM	AM	PM	AM	PM	AM	PM
		Green Lane	73	82	0	0	66	74	10	21
		Church Road	51	60	43	93	46	54	101	223
	Blackstitch Lane	Green Lane	67	59	0	0	61	53	0	0
		Church Road	66	90	0	0	60	81	0	0
		Heathfield Road	6	7	0	0	5	6	0	0
	Green Lane	Church Road	134	92	17	36	121	83	24	52
		Heathfield Road	86	27	0	0	78	24	21	12
		Blackstitch Lane	55	26	0	0	50	23	0	0
21	Birchfield Road North	Birchfield Road South	345	477	88	52	312	430	89	54
		Foxlydiate Lane	209	213	69	148	189	191	79	170
	Birchfield Road South	Foxlydiate Lane	57	87	32	69	52	78	33	71
		Birchfield Road North	407	206	8	16	368	185	13	26
	Foxlydiate Lane	Birchfield Road North	176	129	167	100	159	116	188	111
		Birchfield Road South	66	65	98	61	60	58	98	61
22	A448	Birchfield Road	25	94	0	0	23	85	0	0
		A448 Overpass	233	362	98	211	211	325	100	211
	A448 Overpass	A448	131	98	50	30	118	88	73	49
		A448 Overpass	167	167	126	90	151	151	130	92
	Birchfield Road West	A448	110	102	80	48	99	92	130	126
		Birchfield Road	132	281	155	196	119	253	166	220
23	Brockhill	Lily Green Lane East	8	26	0	0	7	23	0	0

Junction	Entry Arm	Exit Arm	Scenario One				Scenario Two			
			Do-Minimum		Development Trips		Do-Minimum		Development Trips	
			AM	PM	AM	PM	AM	PM	AM	PM
	Drive North	Brookhill Drive South	197	347	169	361	178	312	219	440
		Lily Green Lane West	1	3	0	0	1	3	0	0
	Lily Green Lane East	Brookhill Drive South	158	96	3	5	143	87	3	6
		Lily Green Lane West	1	1	0	0	1	1	0	0
		Brockhill Drive North	21	16	0	0	19	14	0	0
	Brookhill Drive South	Lily Green Lane West	1	11	0	0	1	10	0	0
		Brockhill Drive North	216	314	376	224	196	282	638	364
		Lily Green Lane East	38	170	4	3	35	153	6	6
	Lily Green Lane West	Brockhill Drive North	8	3	0	0	7	3	0	0
		Lily Green Lane East	2	1	0	0	2	1	0	0
		Brookhill Drive South	8	2	0	0	7	2	0	0
24	Butler's Hill Lane	Hewell Road	108	59	0	0	98	53	268	145
		Salter's Lane	9	13	0	0	8	12	22	13
		Brockhill Drive	29	12	0	1	26	11	24	14
	Hewell Road	Salter's Lane	59	170	0	0	53	153	0	0
		Brockhill Drive	117	391	165	353	106	352	205	449
		Butler's Hill Lane	36	100	0	0	33	90	89	209
	Salter's Lane	Brockhill Drive	4	4	1	3	4	4	2	3
		Butler's Hill Lane	4	9	0	0	4	8	8	17
		Hewell Road	206	119	0	0	186	107	0	0
	Brockhill	Butler's Hill Lane	12	24	1	1	11	22	27	60

Junction	Entry Arm	Exit Arm	Scenario One				Scenario Two			
			Do-Minimum		Development Trips		Do-Minimum		Development Trips	
	Drive		AM	PM	AM	PM	AM	PM	AM	PM
		Hewell Road	345	181	367	219	312	163	638	312
		Salter's Lane	6	4	3	2	5	4	3	3
25	Windors Road	Hewell Road East	-	-	0	0	-	-	1	4
		Hewell Road West	-	-	153	327	-	-	447	654
	Hewell Road East	Hewell Road West	-	-	12	26	-	-	191	181
		Windors Road	-	-	0	0	-	-	0	0
	Hewell Road West	Windors Road	-	-	367	219	-	-	774	558
		Hewell Road East	-	-	0	0	-	-	259	243
26	Birmingham Road North	Middlehouse Lane	22	21	0	0	20	19	8	5
		Birmingham Road South	13	16	0	0	12	14	1	1
		Windsor Road	6	9	0	0	5	8	1	1
	Middlehouse Lane	Birmingham Road South	320	293	0	0	290	263	34	39
		Windsor Road	512	656	135	290	463	591	483	692
		Birmingham Road North	29	31	0	0	26	28	3	7
	Birmingham Road South	Windsor Road	22	78	0	0	20	70	1	0
		Birmingham Road North	6	18	0	0	5	16	0	1
		Middlehouse Lane	129	220	0	0	117	198	4	2
	Windsor Road	Birmingham Road North	4	9	0	0	4	8	1	2
		Middlehouse Lane	473	354	295	176	428	318	710	517
		Birmingham Road South	65	66	0	0	59	59	0	0
27	Alvechurch	Millrace Road	-	-	0	0	-	-	11	5

Junction	Entry Arm	Exit Arm	Scenario One				Scenario Two			
			Do-Minimum		Development Trips		Do-Minimum		Development Trips	
			AM	PM	AM	PM	AM	PM	AM	PM
	Hwy North	Alvechurch Hwy South	-	-	0	0	-	-	75	109
		Alvechurch Hwy Retail Entrance	-	-	0	0	-	-	5	1
		Middlehouse Lane	-	-	117	250	-	-	361	487
	Millrace Road	Alvechurch Hwy South	-	-	0	0	-	-	2	11
		Alvechurch Hwy Retail Entrance	-	-	0	0	-	-	0	0
		Middlehouse Lane	-	-	5	11	-	-	19	26
		Alvechurch Hwy North	-	-	0	0	-	-	4	4
	Alvechurch Hwy South	Alvechurch Hwy Retail Entrance	-	-	0	0	-	-	4	1
		Middlehouse Lane	-	-	13	28	-	-	143	226
		Alvechurch Hwy North	-	-	0	0	-	-	106	46
		Millrace Road	-	-	0	0	-	-	9	1
	Alvechurch Hwy Retail Entrance	Middlehouse Lane	-	-	0	0	-	-	0	2
		Alvechurch Hwy North	-	-	0	0	-	-	1	3
		Millrace Road	-	-	0	0	-	-	0	0
		Alvechurch Hwy South	-	-	0	0	-	-	1	4
	Middlehouse Lane	Alvechurch Hwy North	-	-	242	145	-	-	403	291
		Millrace Road	-	-	14	8	-	-	28	21
		Alvechurch Hwy South	-	-	39	23	-	-	282	207
		Alvechurch Hwy Retail Entrance	-	-	0	0	-	-	1	0
28	Birmingham Road North	Dagnell End Road	200	136	0	0	181	122	27	15
		Birmingham Road South	841	882	113	241	761	794	496	449

Junction	Entry Arm	Exit Arm	Scenario One				Scenario Two			
			Do-Minimum		Development Trips		Do-Minimum		Development Trips	
			AM	PM	AM	PM	AM	PM	AM	PM
	Dagnell End Road	Birmingham Road South	204	254	4	9	185	228	31	25
		Birmingham Road North	151	260	0	0	137	234	4	7
	Birmingham Road South	Birmingham Road North	905	1017	236	141	819	915	376	345
		Dagnell End Road	247	198	6	4	224	178	23	33
31	Brockhill Dr	Birchfield Rd	117	133	171	366	106	120	222	445
		A448 East	141	126	0	0	127	114	0	0
		A448 West	-	-	0	0	-	-	0	0
		Hewell Ln	92	193	0	0	83	174	0	0
	Birchfield Rd	Brockhill Dr	72	190	380	227	66	171	381	227
		A448 East	55	47	228	136	50	42	228	136
		A448 West	-	-	0	0	-	-	0	0
		Hewell Ln	270	289	12	7	245	261	16	10
	A448 East	Brockhill Dr	-	-	0	0	-	-	0	0
		Birchfield Rd	-	-	0	0	-	-	0	0
		A448 West	-	-	0	0	-	-	0	0
		Hewell Ln	-	-	0	0	-	-	0	0
	A448 West	Brockhill Dr	121	126	0	0	109	114	263	142
		Birchfield Rd	61	114	74	159	56	103	83	179
		A448 East	-	-	0	0	-	-	126	42
		Hewell Ln	16	7	0	0	15	6	0	0
	Hewell Ln	Brockhill Dr	63	146	0	0	57	132	0	0

Junction	Entry Arm	Exit Arm	Scenario One				Scenario Two			
			Do-Minimum		Development Trips		Do-Minimum		Development Trips	
			AM	PM	AM	PM	AM	PM	AM	PM
		Birchfield Rd	49	133	5	12	45	120	7	15
		A448 East	114	234	0	0	103	211	1	1
		A448 West	-	-	0	0	-	-	0	0
32	Church Road North	Chruch Road South	-	-	122	73	-	-	132	95
		Pumphouse Ln North	-	-	0	0	-	-	0	0
	Chruch Road South	Chruch Road North	-	-	60	129	-	-	81	142
		Pumphouse Ln North	-	-	0	0	-	-	0	0
	Pumphouse Ln North	Church Road North	-	-	0	0	-	-	0	0
		Chruch Road South	-	-	0	0	-	-	0	0
33	Blackwell Lane	Brockhill Drive East	28	3	0	0	25	3	0	0
		Aldborough Lane	1	4	0	0	1	4	0	0
		Brockhill Drive West	53	7	0	0	48	6	0	0
	Brockhill Drive East	Aldborough Lane	17	48	0	0	15	43	14	31
		Brockhill Drive West	124	329	167	357	112	296	217	435
		Blackwell Lane	2	27	0	0	2	24	0	0
	Aldborough Lane	Brockhill Drive West	12	7	0	0	11	6	0	0
		Blackwell Lane	2	4	0	0	2	4	0	0
		Brockhill Drive East	44	24	0	0	40	22	35	13
	Brockhill Drive West	Blackwell Lane	14	40	0	0	13	36	0	0
		Brockhill Drive East	299	195	371	221	271	175	633	361
		Aldborough Lane	4	18	0	0	4	16	0	0

Junction	Entry Arm	Exit Arm	Scenario One				Scenario Two			
			Do-Minimum		Development Trips		Do-Minimum		Development Trips	
			AM	PM	AM	PM	AM	PM	AM	PM
34	Apple Tree Lane North	Brockhill Drive East	17	4	0	0	15	4	0	0
		Apple Tree Lane South	1	1	0	0	1	1	0	0
		Brockhill Drive West	35	9	0	0	32	8	0	0
	Brockhill Drive East	Apple Tree Lane South	1	6	0	0	1	5	0	0
		Brockhill Drive West	189	327	167	357	171	294	217	435
		Apple Tree Lane North	3	22	0	0	3	20	0	0
	Apple Tree Lane South	Brockhill Drive West	62	11	2	4	56	10	2	4
		Apple Tree Lane North	0	0	0	0	0	0	0	0
		Brockhill Drive East	12	9	0	0	11	8	0	0
	Brockhill Drive West	Apple Tree Lane North	9	24	0	0	8	22	0	0
		Brockhill Drive East	292	240	371	221	264	216	633	361
		Apple Tree Lane South	20	36	5	3	18	32	5	3
35	Birchfield Road West	Birchfield Rd East	-	-	174	104	-	-	175	104
		Tynsall Ave	-	-	10	6	-	-	10	7
	Birchfield Road East	Birchfield Road West	-	-	38	81	-	-	42	91
		Tynsall Ave	-	-	0	0	-	-	43	93
	Tynsall Ave	Birchfield Rd West	-	-	4	8	-	-	6	10
		Birchfield Rd East	-	-	0	0	-	-	95	53
36	Birmingham Road North	Birmingham Road South	-	-	117	250	-	-	421	458
		Weights Lane	-	-	0	0	-	-	107	16
	Birmingham	Weights Lane	-	-	0	0	-	-	127	20

Junction	Entry Arm	Exit Arm	Scenario One				Scenario Two			
			Do-Minimum		Development Trips		Do-Minimum		Development Trips	
			AM	PM	AM	PM	AM	PM	AM	PM
37	Road South	Birmingham Road North	-	-	242	145	-	-	387	324
	Weights Lane	Birmingham Road North	-	-	0	0	-	-	12	53
		Birmingham Road South	-	-	0	0	-	-	32	144
	Foxlydiate Lane	Church Road	127	136	0	0	115	122	10	22
		Great Hockings Lane	23	33	0	0	21	30	1	2
		Cur Lane	117	131	103	221	106	118	103	221
		Development Access	0	0	0	0	0	0	0	0
	Church Road	Foxlydiate Lane	36	53	0	0	33	48	21	12
		Great Hockings Lane	86	62	0	0	78	56	0	1
		Cur Lane	149	124	58	124	135	111	58	124
		Development Access	0	0	10	9	0	0	10	9
	Great Hockings Lane	Foxlydiate Lane	6	11	0	0	5	10	1	0
		Church Road	32	19	0	0	29	17	1	0
		Cur Lane	46	37	0	0	42	33	0	0
		Development Access	0	0	1	1	0	0	1	1
	Cur Lane	Foxlydiate Lane	62	53	262	157	56	48	262	157
		Church Road	65	122	115	69	59	110	115	69
		Great Hockings Lane	10	21	0	0	9	19	0	0
		Development Access	0	0	5	10	0	0	5	10
	Development Access	Foxlydiate Lane	0	0	0	0	0	0	0	0
		Church Road	0	0	0	0	0	0	0	0

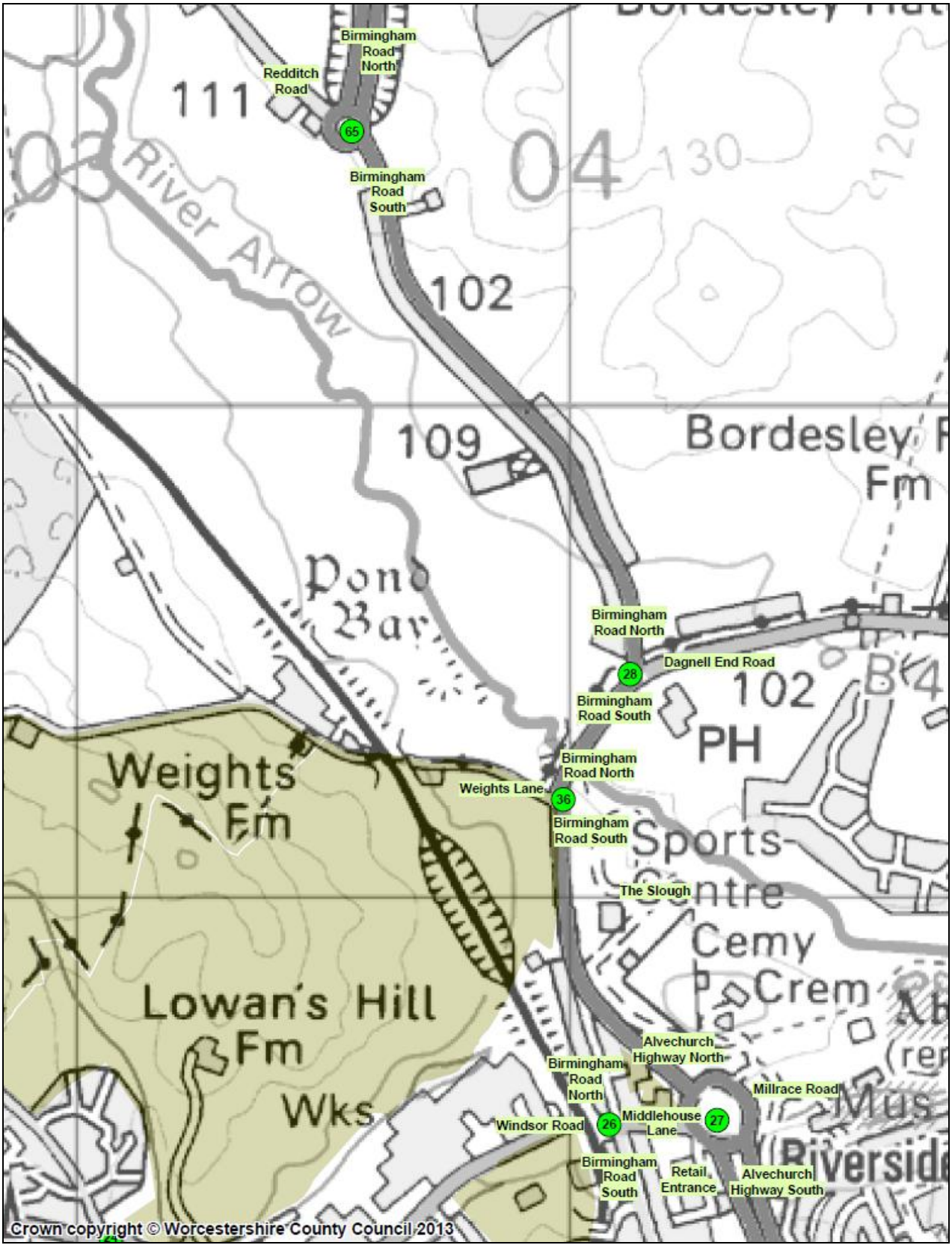
Junction	Entry Arm	Exit Arm	Scenario One				Scenario Two			
			Do-Minimum		Development Trips		Do-Minimum		Development Trips	
			AM	PM	AM	PM	AM	PM	AM	PM
		Great Hockings Lane	0	0	0	0	0	0	0	0
		Cur Lane	0	0	5	3	0	0	5	3
39	Bromsgrove Road	Birchfield Road East	-	-	0	0	-	-	6	9
		Birchfield Road West	-	-	37	79	-	-	86	183
	Birchfield Road East	Birchfield Road West	-	-	1	3	-	-	1	3
		Bromsgrove Road	-	-	0	0	-	-	5	4
	Birchfield Road West	Bromsgrove Road	-	-	141	84	-	-	234	135
		Birchfield Road East	-	-	32	19	-	-	32	19
40	Heathfield Road North	Middle Piece Drive	-	-	0	0	-	-	0	0
		Heathfield Road South	-	-	0	0	-	-	0	0
	Middle Piece Drive	Heathfield Road South	-	-	43	93	-	-	92	209
		Heathfield Road North	-	-	0	0	-	-	0	0
	Heathfield Road South	Heathfield Road North	-	-	0	0	-	-	0	0
		Middle Piece Drive	-	-	111	66	-	-	217	121
41	Poplar Road	Bromsgrove Road East	-	-	0	0	-	-	0	0
		Bromsgrove Road West	-	-	2	4	-	-	4	6
	Bromsgrove Road East	Bromsgrove Road West	-	-	35	75	-	-	89	186
		Poplar Road	-	-	0	0	-	-	0	0
	Bromsgrove Road West	Poplar Road	-	-	3	2	-	-	5	4
		Bromsgrove Road East	-	-	139	83	-	-	234	135
52	Alvechurch	Warwick Hwy E	-	-	0	0	-	-	0	0

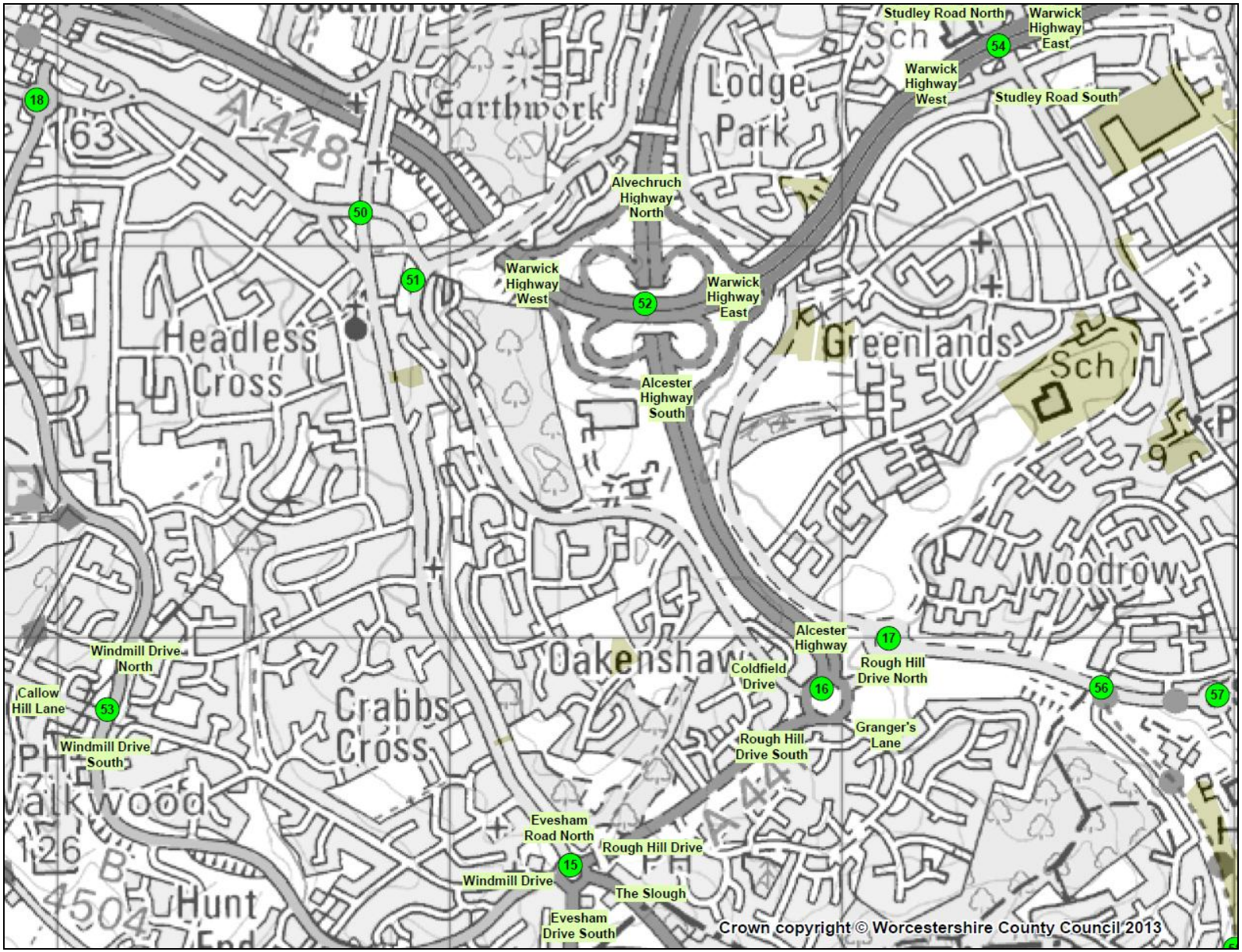
Junction	Entry Arm	Exit Arm	Scenario One				Scenario Two			
			Do-Minimum		Development Trips		Do-Minimum		Development Trips	
			AM	PM	AM	PM	AM	PM	AM	PM
	Hwy N	Alcester Hwy S	-	-	0	0	-	-	1	4
		Bromsgrove Hwy W	-	-	0	0	-	-	0	0
	Warwick Hwy E	Alvechurch Hwy N	-	-	0	0	-	-	0	0
		Alcester Hwy S	-	-	0	0	-	-	0	0
		Bromsgrove Hwy W	-	-	56	120	-	-	94	215
	Alcester Hwy S	Alvechurch Hwy N	-	-	0	0	-	-	84	33
		Warwick Hwy E	-	-	0	0	-	-	7	3
		Bromsgrove Hwy W	-	-	37	80	-	-	55	124
	Bromsgrove Hwy W	Alvechurch Hwy N	-	-	31	19	-	-	38	23
		Warwick Hwy E	-	-	201	120	-	-	380	178
		Alcester Hwy S	-	-	3	2	-	-	4	3
53	Windmill Drive North	Windmill Drive South	-	-	64	39	-	-	83	51
		Callow Hill Lane	-	-	4	3	-	-	22	38
	Windmill Drive South	Callow Hill Lane	-	-	0	0	-	-	20	57
		Windmill Drive North	-	-	16	34	-	-	38	60
	Callow Hill Lane	Windmill Drive North	-	-	4	9	-	-	59	30
		Windmill Drive South	-	-	0	0	-	-	131	33
54	Studley Road North	Warwick Hwy East	-	-	0	0	-	-	117	67
		Studley Road South	-	-	0	0	-	-	90	87
		Warwick Hwy West	-	-	7	15	-	-	8	16
	Warwick	Studley Road South	-	-	0	0	-	-	17	46

Junction	Entry Arm	Exit Arm	Scenario One				Scenario Two			
			Do-Minimum		Development Trips		Do-Minimum		Development Trips	
			AM	PM	AM	PM	AM	PM	AM	PM
	Hwy East	Warwick Hwy West	-	-	28	59	-	-	87	224
		Studley Road North	-	-	0	0	-	-	29	67
	Studley Road South	Warwick Hwy West	-	-	21	46	-	-	29	63
		Studley Road North	-	-	0	0	-	-	76	115
		Warwick Hwy East	-	-	0	0	-	-	49	19
	Warwick Hwy West	Studley Road North	-	-	6	4	-	-	7	4
		Warwick Hwy East	-	-	124	74	-	-	281	123
		Studley Road South	-	-	71	42	-	-	101	54
63	Willow Way	Bromsgrove Rd North	-	-	0	0	-	-	1	2
		Bromsgrove Rd South	-	-	0	0	-	-	1	2
	Bromsgrove Rd North	Bromsgrove Rd South	-	-	34	73	-	-	52	121
		Willow Way	-	-	0	0	-	-	10	31
	Bromsgrove Rd South	Willow Way	-	-	2	1	-	-	54	32
		Bromsgrove Rd North	-	-	137	82	-	-	180	103
65	Birmingham Road North	Birmingham Road South	-	-	110	235	-	-	466	437
		Redditch Road	-	-	0	0	-	-	0	0
	Birmingham Road South	Redditch Road	-	-	8	10	-	-	65	38
		Birmingham Road North	-	-	231	138	-	-	369	339
	Redditch Road	Birmingham Road North	-	-	0	0	-	-	0	0
		Birmingham Road South	-	-	0	0	-	-	0	0
67	Heathfield	Heathfield Road South	-	-	42	91	-	-	84	187

Junction	Entry Arm	Exit Arm	Scenario One				Scenario Two			
			Do-Minimum		Development Trips		Do-Minimum		Development Trips	
			AM	PM	AM	PM	AM	PM	AM	PM
	Rd North	Downsell Rd	-	-	0	0	-	-	7	20
	Heathfield Rd South	Heathfield Road North	-	-	112	69	-	-	205	119
		Downsell Rd	-	-	0	0	-	-	69	43
	Downsell Rd	Heathfield Road North	-	-	0	0	-	-	13	5
		Heathfield Road South	-	-	0	0	-	-	26	54

Appendix D – Junction Arm Label Diagrams

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Warwick Highway East
Warwick Highway West
Studley Road South
Earthwork
Lodge Park
Alvechruch Highway North
Warwick Highway West
Warwick Highway East
Headless Cross
Greenlands
Alcester Highway South
Woodrow
Alcester Highway
Rough Hill Drive North
Coldfield Drive
Windmill Drive North
Callow Hill Lane
Oakenshaw
Crabbs Cross
Granger's Lane
Rough Hill Drive South
Windmill Drive South
Evesham Road North
Rough Hill Drive
Windmill Drive
The Slough
Evesham Drive South
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Blackwell Lane
Apple Tree Lane North
Brockhill Drive East
Brockhill Drive West
33
Brockhill Drive East
Butler's Hill Lane
34
Apple Tree Lane South
Aldborough Lane
Brockhill Drive
24
Brockhill Drive West
Hewell Road
Salter's Lane
Windsor Road
Hewell Road West
25
Lily Green Lane West
Brockhill Drive North
Hewell Road East
23
Lily Green Lane East
Brockhill Drive South
18
Schs
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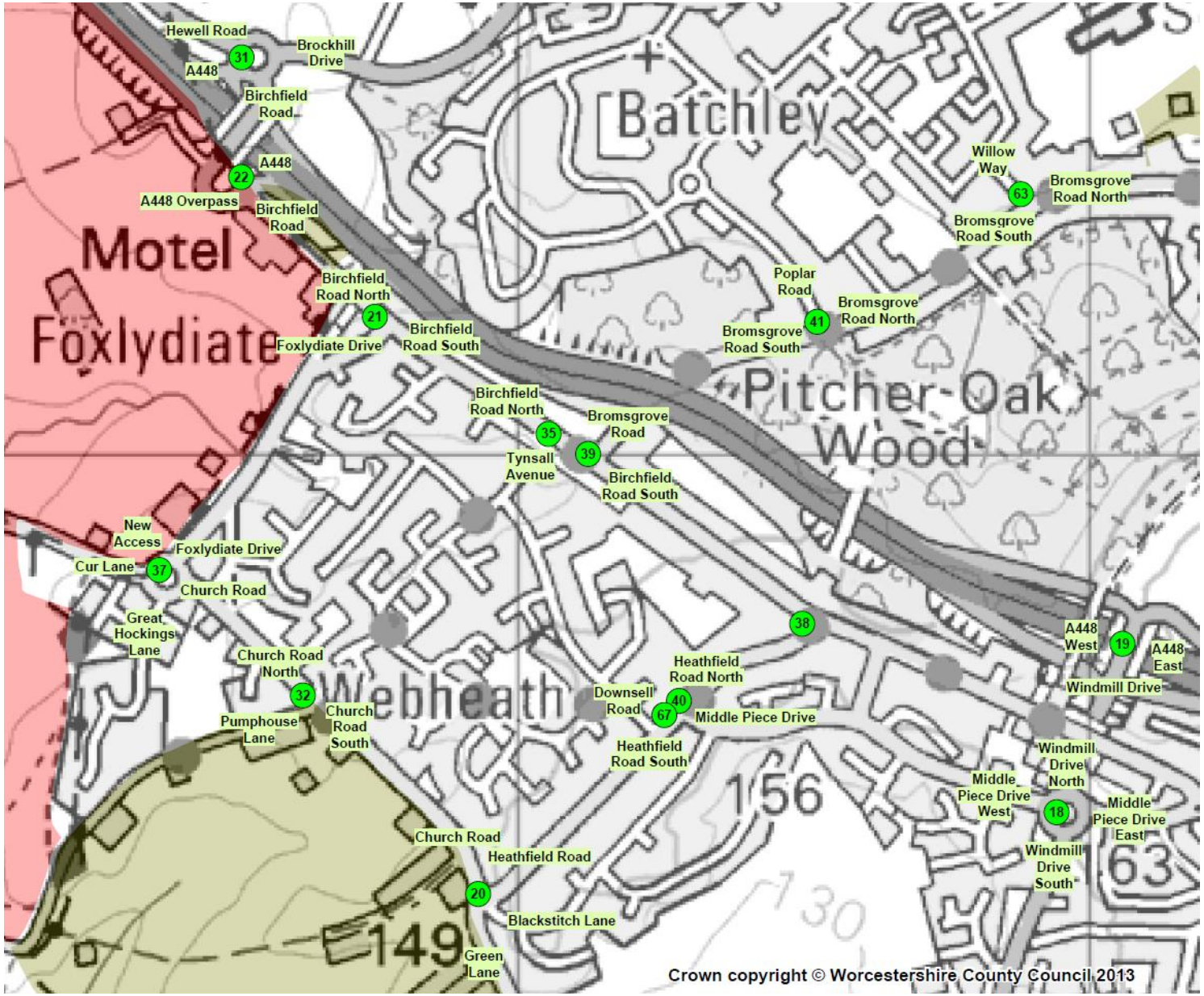
Hewell Road
A448
31
Brockhill Drive
Birchfield Road
Batchley
A448
22
A448 Overpass
Birchfield Road
Motel
Foxlydiate
Birchfield Road North
21
Foxlydiate Drive
Birchfield Road South
Willow Way
63
Bromsgrove Road North
Bromsgrove Road South
Poplar Road
41
Bromsgrove Road North
Bromsgrove Road South
Pitcher Oak Wood
Birchfield Road North
35
Bromsgrove Road
39
Tynsall Avenue
Birchfield Road South
New Access
Foxlydiate Drive
Cur Lane
37
Church Road
Great Hockings Lane
38
A448 West
19
A448 East
Windmill Drive
Church Road North
32
Webheath
Pumphouse Lane
Church Road South
Downsell Road
Heathfield Road North
40
67
Middle Piece Drive
Heathfield Road South
Windmill Drive North
Middle Piece Drive West
18
Middle Piece Drive East
Windmill Drive South
156
163
Church Road
Heathfield Road
20
Blackstitch Lane
149
Green Lane
130
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