

APPENDICES

APPENDIX 2.1. GROWTH FACTORS

Growth Factors

AM Peak

TEMPRO - National Transport Model Growing to 2014

Tempro selection criteria

Version 6.2

Geographical area 41UD5 Lichfield

Car drivers only

Weekday AM peak period (0700 - 0959)

Origin/ Destination

All trip purposes

2010 - 2014	1.0222
2011 - 2014	1.0130
2012 - 2014	1.0087
2013 - 2014	1.0043
2014 - 2029	1.1017

2014 - 2029

Tempro selection criteria

Version 6.2

Geographical area 41UD5 Lichfield

Car drivers only

Weekday AM peak period (0700 - 0959)

Origin/ Destination

All trip purposes

Alternative Planning Assumptions:

Base HH	13782
Base Jobs	18926
Future HH	13782
Future Jobs	18926

Growth Factors

PM Peak

TEMPRO - National Transport Model

Growth to 2014

Tempo selection criteria

Version 6.2

Geographical area 41UD5 Lichfield

Car drivers only

Weekday PM peak period (1600 - 1859)

Origin/ Destination

All trip purposes

2010 - 2014	1.0270
2011 - 2014	1.0154
2012 - 2014	1.0102
2013 - 2014	1.0050
2014 - 2029	1.1069

2014 - 2029

Tempo selection criteria

Version 6.2

Geographical area 41UD5 Lichfield

Car drivers only

Weekday AM peak period (0700 - 0959)

Origin/ Destination

All trip purposes

Alternative Planning Assumptions:

Base HH 13782

Base Jobs 18926

Future HH 13782

Future Job 18926

APPENDIX 4.1 TRIP RATES

The trips rates documented in the table below were taken from various sources and, with the exception of the new residential trip rates, each contains a level of agreement either with the Highways Agency (through previous projects in nearby Burton) or the Development Control Team of Staffordshire County Council (through submitted Transport Assessments). The new residential trip rates were obtained in February / March 2014 through local surveys.

Land Use	AM Peak			PM Peak		
	Trip Rates (per Residential Unit / 100sqm)			Trip Rates (per Residential Unit / 100sqm)		
	In	Out	Total	In	Out	Total
Housing (New Surveys)*	0.097	0.401	0.498	0.401	0.181	0.582
Offices	1.634	0.206	1.84	0.218	1.327	1.545
Retail Park**	0.944	0.577	1.521	1.427	1.485	2.912
Friarsgate	0.56	0.51	1.07	0.82	1.31	2.13
B1 (a) – Stofords	1.588	0.335	1.923	0.152	1.156	1.308
B1 (C) – Stofords	0.397	0.141	0.538	0.089	0.32	0.409
B2 – Stofords						
B8 - Stofords						
Industrial Unit	0.266	0.068	0.334	0.059	0.33	0.389
Warehouse/ Distribution	0.219	0.102	0.321	0.12	0.315	0.435

* Sheltered Housing will have a 50% reduction of the full trip rate & City Centre Locations will have a 25% reduction

** Based upon the Vulcan Road TA

Emerging Local Plan – Housing and Employment

The office trip rates were previously agreed with the Highways Agency for the nearby Burton Growth Point Study. The housing trip rates have been calculated from new surveys on local sites. These have been used to quantify all of the proposed housing and employment sites.

Emerging Local Plan – Retail

The proposed retail sites, which are likely to be located in the city centre and in Eastern Lichfield, used trip rates from the Friarsgate committed development and the recently opened Vulcan Road development.

The Vulcan Road TA was utilised to provide a trip rate for the additional bulky goods retail development as it is located in a similar area. However, the TA only contains a weekday assessment for the period 16:00 to 17:00 hours. Trip rates within the TA were obtained from TRICS, for Retail Parks (excluding food). On examination of the TRICS database it became apparent that these trip rates are higher during 16:00 to 17:00 than the 17:00 – 18:00 period being considered by this report. Therefore, for this study, the TRICS trip rates for

the traditional AM and PM peak periods were extracted. A copy of the TRICS output is contained in Appendix 4.2.

The Friarsgate development is discussed in more detail below.

Committed Development - Friarsgate

The trip rates assumed for the City Centre Friarsgate development were taken from the Transport Assessment (TA). The TA only contains a weekday assessment for the period 16:15 to 17:15 hours, for which the trip rate was derived using City Centre car park surveys and comparing these to the overall retail floor area offered by the city centre.

In the absence of an analysis for the traditional AM and PM peak periods the 16:15 – 17:15 period was assumed to be similar to the 17:00 – 18:00 PM peak hour with an adjustment made to this to calculate a trip rate for the AM peak hour. Trip rates to retail are usually lower in the AM peak hour and the proportional difference from another recent development in Lichfield, Tesco, was applied to this development. Research from other Tesco stores which suggests that an increase in floor area of this magnitude would lead to an increase in trips of 42.6%. This methodology was applied to existing AM (08:00 – 09:00) and PM (17:00 – 18:00) count data to arrive at the likely number of additional trips generated by this development in the traditional AM and PM peak periods. This assumption is considered robust as the Friarsgate development is similar to Tesco, having a mix of convenience and comparison goods. In addition, Tesco is situated only a few hundred metres from the Friarsgate development.

Committed Development – Stofords (Land off Cappers Lane)

A TA has already been prepared for the committed Stofords development (Land off Cappers Lane), which contains agreed trip rates. These have been applied to this study.

APPENDIX 4.2 TRICS OUTPUT FOR RETAIL PARK (EXCLUDING FOOD)

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 01 - RETAIL
Category : K - RETAIL PARK - EXCLUDING FOOD

VEHICLES

Selected regions and areas:

02 SOUTH EAST	
ES EAST SUSSEX	1 days
06 WEST MIDLANDS	
WM WEST MIDLANDS	1 days
WO WORCESTERSHIRE	1 days

Main parameter selection:

Parameter: Gross floor area
Range: 2057 to 9816 (units: sqm)

Date Range: 01/01/00 to 29/11/08

Selected survey days:

Thursday	1 days
Friday	2 days

Selected survey types:

Manual count	3 days
Directional ATC Count	0 days

Selected Locations:

Edge of Town	2
Neighbourhood Centre (PPS6 Local Centre)	1

Selected Location Sub Categories:

Industrial Zone	1
Residential Zone	1
Retail Zone	1

TRIP RATE for Land Use 01 - RETAIL/K - RETAIL PARK - EXCLUDING FOOD
VEHICLES

Calculation factor: 100 sqm

BOLD print indicates peak (busiest) period

Time Range	ARRIVALS			DEPARTURES			TOTALS		
	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00 - 01:00	0	0	0.000	0	0	0.000	0	0	0.000
01:00 - 02:00	0	0	0.000	0	0	0.000	0	0	0.000
02:00 - 03:00	0	0	0.000	0	0	0.000	0	0	0.000
03:00 - 04:00	0	0	0.000	0	0	0.000	0	0	0.000
04:00 - 05:00	0	0	0.000	0	0	0.000	0	0	0.000
05:00 - 06:00	0	0	0.000	0	0	0.000	0	0	0.000
06:00 - 07:00	0	0	0.000	0	0	0.000	0	0	0.000
07:00 - 08:00	1	5854	0.171	1	5854	0.051	1	5854	0.222
08:00 - 09:00	3	7451	0.944	3	7451	0.577	3	7451	1.521
09:00 - 10:00	3	7451	1.584	3	7451	1.056	3	7451	2.640
10:00 - 11:00	3	7451	1.821	3	7451	1.705	3	7451	3.526
11:00 - 12:00	3	7451	1.924	3	7451	1.884	3	7451	3.808
12:00 - 13:00	3	7451	2.156	3	7451	2.080	3	7451	4.236
13:00 - 14:00	3	7451	2.116	3	7451	2.264	3	7451	4.380
14:00 - 15:00	3	7451	2.054	3	7451	2.058	3	7451	4.112
15:00 - 16:00	3	7451	1.839	3	7451	1.901	3	7451	3.740
16:00 - 17:00	3	7451	1.570	3	7451	1.700	3	7451	3.270
17:00 - 18:00	3	7451	1.427	3	7451	1.485	3	7451	2.912
18:00 - 19:00	3	7451	1.570	3	7451	1.611	3	7451	3.181
19:00 - 20:00	3	7451	1.508	3	7451	1.821	3	7451	3.329
20:00 - 21:00	2	7797	0.551	2	7797	1.039	2	7797	1.590
21:00 - 22:00	1	5854	0.102	1	5854	0.171	1	5854	0.273
22:00 - 23:00	0	0	0.000	0	0	0.000	0	0	0.000
23:00 - 24:00	0	0	0.000	0	0	0.000	0	0	0.000
Total Rates:			21.337			21.403			42.740

Parameter summary

Trip rate parameter range selected: 2057 - 9816 (units: sqm)
 Survey date range: 01/01/00 - 29/11/08
 Number of weekdays (Monday-Friday): 3
 Number of Saturdays: 0
 Number of Sundays: 0
 Optional parameters used in selection: NO
 Surveys manually removed from selection: 0

APPENDIX 4.3 DEVELOPMENT TRIPS

AM Peak

Housing Sites

Planning Status	Location	No. of Dwellings	Initial Trip Rates (AM)			Sheltered Housing	Town Centre	Revised Trip Rates (AM)		
			In	Out	Total			In	Out	Total
			0.097	0.401	0.498			50%	75%	0.097
Local Plan - Streethay Direction	North of Streethay SDA	750	73	301	374			73	301	374
Local Plan - South Lichfield Direction	South of Lichfield SDA	450	44	180	224			44	180	224
Local Plan - Cricket Lane	Cricket Lane SDA	450	44	180	224			44	180	224
Local Plan- Deans Slade	Deans Slade SDA	450	44	180	224			44	180	224
PP (Full)	Friarsgate	48	5	19	24		Yes	3	14	18
PP (Full)	Friary Outer	60	6	24	30	Yes		3	12	15
PP (Outline)	Trent Valley Buffer Depot	75	7	30	37			7	30	37
Under Construction	Land fronting Church Street (former PH), Lichfield Tesco Store	22	2	9	11		Yes	2	7	8
PP Full	Malthouse, Birmingham Road	41	4	16	20			4	16	20
Local Plan - Fradley	Fradley (inc additional 250hh from 2014)	1250	121	501	623			121	501	623
Local Plan - Burntwood	Burntwood	1051	102	421	523			102	421	523

Employment Sites

Planning Status	Location	Net GFA (sqm)	Development Type	Trip Rates (AM) Per 100sq.m.		
				In	Out	Total
			Office	1.63	0.21	1.84
			B1(a) (Stofords)	1.59	0.34	1.92
			B1(c), B2, B8	0.40	0.14	0.54
			B2	0.27	0.07	0.33
			B8	0.22	0.10	0.32
Local Plan Office Sites	Lichfield City Centre	9670	Office	158	20	178
Local Plan Office Sites	Trent Valley Area	5000	Office	82	10	92
Local Plan Office Sites	Wall Island	10000	Office	163	21	184
PP	Stofords - Streethay	3158	B1(a) (Stofords)	50	11	61
		37807	B1(c), B2, B8	150	53	203
PP	City Wharf (Blocks C and D)	1330	Office	22	3	24
Local Plan Employment	Former Revelan Works, Eastern Avenue	1017	B1	17	2	19
		4930	B2	13	3	16
		5634	B8	12	6	18
Local Plan Employment	Land North of Britannia Park	764	B1	12	2	14
		3701	B2	10	3	12
		4230	B8	9	4	14
PP	Cricket Lane	10500	B1 (c) / B2	28	7	35
		36000	B8	79	37	116

Retail Sites

Planning Status	Location	Net GFA (sqm)	Development Type	Trip Rates (AM) Per 100sq.m.		
				In	Out	Total
			Vulcan Road TA	0.94	0.58	1.52
			Friarsgate (Town Centre)	0.56	0.51	1.07
Local Plan Retail	Additional City Centre	1500	Friarsgate (Town Centre)	50	46	96
		7500				
Local Plan Retail	Additional Bulky Goods - Eastern Lichfield	5000	Vulcan Road TA	47	29	76
Full PP subject to S106 (06/00555/FULM)	Friarsgate	14734	Friarsgate (Town Centre)	83	75	158

PM Peak

Housing

Planning Status	Location	No. of Dwellings	Initial Trip Rates (PM)			Sheltered Housing	Town Centre	Revised Trip Rates (PM)		
			In	Out	Total			In	Out	Total
			0.401	0.181	0.582			50%	75%	0.401
Local Plan - Streethay Direction	North of Streethay SDA	750	301	136	437			301	136	437
Local Plan - South Lichfield Direction	South of Lichfield SDA	450	180	81	262			180	81	262
Local Plan - Cricket Lane	Cricket Lane SDA	450	180	81	262			180	81	262
Local Plan- Deans Slade	Deans Slade SDA	450	180	81	262			180	81	262
PP (Full)	Friarsgate	48	19	9	28		Yes	14	7	21
PP (Full)	Friary Outer	60	24	11	35	Yes		12	5	17
PP (Outline)	Trent Valley Buffer Depot	75	30	14	44			30	14	44
Under Construction	Land fronting Church Street (former PH), Lichfield Tesco Store	22	9	4	13		Yes	7	3	10
PP Full	Malthouse, Birmingham Road	41	16	7	24			16	7	24
Local Plan - Fradley	Fradley (inc additional 250hh from 2014)	1250	501	226	728			501	226	728
Local Plan - Burntwood	Burntwood	1051	421	190	612			421	190	612

Employment Sites

Planning Status	Location	Net GFA (sqm)	Development Type	Trip Rates (AM) Per 100sq.m.		
				In	Out	Total
			Office	0.22	1.33	1.55
			B1(a) (Stofords)	0.15	1.16	1.31
			B1(c), B2, B8	0.09	0.32	0.41
			B2	0.06	0.33	0.39
			B8	0.12	0.32	0.44
Local Plan Office Sites	Lichfield City Centre	9670	Office	21	128	149
Local Plan Office Sites	Trent Valley Area	5000	Office	11	66	77
Local Plan Office Sites	Wall Island	10000	Office	22	133	155
PP	Stofords - Streethay	3158	B1(a) (Stofords)	5	37	41
		37807	B1(c), B2, B8	34	121	155
PP	City Wharf (Blocks C and D)	1330	Office	3	18	21
Local Plan Employment	Former Revelan Works, Eastern Avenue	1017	B1	2	13	16
		4930	B2	3	16	19
		5634	B8	7	18	25
Local Plan Employment	Land North of Britannia Park	764	B1	2	10	12
		3701	B2	2	12	14
		4230	B8	5	13	18
PP	Cricket Lane	10500	B1 (c) / B2	6	35	41
		36000	B8	43	113	157

Retail Sites

Planning Status	Location	Net GFA (sqm)	Development Type	Trip Rates (PM) Per 100sq.m.		
				In	Out	Total
			Vulcan Road TA	1.43	1.49	2.91
			Friarsgate (Town Centre)	0.82	1.31	2.13
Local Plan Retail	Additional City Centre	1500	Friarsgate (Town Centre)	74	118	192
		7500				
Local Plan Retail	Additional Bulky Goods - Eastern Lichfield	5000	Vulcan Road TA	71	74	146
Full PP subject to S106 (06/00555/FULM)	Friarsgate	14734	Friarsgate (Town Centre)	121	193	314

APPENDIX 4.4 TRIP DISTRIBUTIONS FOR POTENTIAL SITES

Two types of trip distributions were utilised in this study. A 2001 Journey to Work (JTW) distribution, utilising a SATURN network of Lichfield to assign trips to the correct routes, was used to distribute the emerging Local Plan housing and employment developments, the committed Stofords development (Land off Cappers Lane) and the emerging Local Plan industrial/ warehousing and distribution development. A manual distribution based upon existing turning counts was used to distribute the Emerging Local Plan retail sites and committed retail sites. These methodologies are described in more detail in the following paragraphs.

Emerging Local Plan - New Housing

In more detail, all 6 central Lichfield Wards (Leamonsley, Chadsmead, Curborough, Stowe, Boley Park and St. Johns) were amalgamated to provide an average JTW distribution for the whole of the city of Lichfield (i.e. the employment destinations travelled to by residents of Lichfield city). This distribution was applied to all new housing in the city.

For work trips contained within the city, the main employment locations were identified and the output areas containing these destinations were combined. This was done to keep the distribution of trips realistic and reasonable in terms of the quantity of places available to work. As a result, 6 locations within Lichfield were chosen to represent all employment trips within the city. These were the city centre; Morrisons and adjacent on Beacon Street including Greenhough Road; north of Eastern Avenue at the Friary school and adjacent locations; Eastern Avenue in the vicinity of Ringway Industrial Estate; Eastern Avenue in the vicinity of Vulcan Road; and land south of Trent Valley Road (west of the railway)/land surrounding Europa Way (Enterprise Industrial Park). The latter was contained in the same output area but enter the road network either on Trent Valley Road or Cappers Lane. It was estimated that 20% load onto Trent Valley Road and 80% on to Cappers Lane.

For trips external to Lichfield city the locations were banded into groups of Wards or Local Authority areas depending largely upon the likely radial route used to enter the city.

As part of the development process new employment locations will be developed in the city by 2029. This report makes the following assumptions regarding office development in Lichfield City based on the GVA Employment Land Review 2012; approximately 11,000sq.m. of office space in the City Centre, 10,000sq.m. at Wall Island and 5,000sq.m. at Trent Valley. Industrial/ warehousing and distribution development comprises the committed large development by Stofords (3,158sq.m. of office and a 37,807sq.m. Industrial Estate) located off Cappers Lane; approximately 22,500sq.m. emerging Local Plan development located in the same area; and 46,500sq.m. (10,500sq.m.

B2/B1c and 36,000sq.m. B8) emerging Local Plan development at Cricket Lane.

These were added into the distribution to allow some interaction between new residential locations and new employment locations. The existing office floorspace (Ref - State of the Cities (2004) by DCLG) in the city centre was 44,600sq.m. The census data shows that 9.74% of Lichfield City residents work in the City Centre output areas (office locations). Therefore, for the Local Plan office development, a ratio of 26,000/ 44,600 (new office/existing office) was applied to the 9.74% to estimate the likely number of trips travelling to the new office developments. This was then proportioned to give 2.40% to city centre, 2.18% to Wall Island and 1.09% to Trent Valley. A similar approach was taken with the Stofords development. A ratio of 297,310/145,367 (new gross site area/existing gross site area) was applied to the 3.76% to estimate the likely number of trips travelling to the new development. This meant that 3.17% of trips from Lichfield residents were apportioned to Stofords, 0.81% to Eastern Avenue, 0.61% to Britannia Park and 3.10% to Cricket Lane.

The census distribution matrix was adjusted for all new housing sites to accommodate these changes. By reducing the percentages globally (and equally) of the existing employment sites by the amount required to travel to the new employment locations (13.37%).

Emerging Local Plan - New Employment

As with the new housing sites, the trips generated by the new employment developments have been assigned to the road network using a SATURN model. Again, the JTW census data has been used to provide a distribution.

In more detail, the City Centre employment zone was used to provide a distribution for the proposed new office developments. This area was defined by grouping 4 output areas together, which largely contain office type employment. The JTW Census data for these output areas was then analysed to identify where people live who travel to this area for work. There were no better alternatives for distributing the proposed office development at Streethay and Wall Island. This was due to the lack of other substantial areas of offices outside the centre of the city that could be used to represent the new developments.

Internally to Lichfield City the resident population was grouped at ward level, with the most appropriate central location used to load the trips onto the SATURN network. Beyond Lichfield locations were banded into groups of wards or Local Authority areas depending largely upon the likely radial route used to enter the city.

The Cricket Lane Local Plan site was distributed assuming the same methodology as the Stofords committed employment site

As discussed in the section regarding new residential developments, trips from the new residential to the new employment were factored in. To avoid double counting, these trip numbers have been deducted from the total trips expected to be generated by the new employment developments.

Committed Employment Development – Stofords (Land off Cappers Lane)

The methodology used in the submitted TA to distribute trips was re-created for this development. This involved the interrogation of the 2001 JTW census data for the employment located in the Boley Park Ward, establishing where people resided who travelled to work here. This is a suitable distribution to take as the new development contains similar uses to the existing employment at the Enterprise Industrial Park.

As with the City Centre employment distribution, internally to Lichfield city the resident population was grouped at ward level, whilst beyond Lichfield it was locations are banded into larger groups of Wards, Local Authority areas, etc. depending largely upon the likely radial route used to enter the city. A matrix a trips was built from the analysed data and the trips travelling to and from the employment zone have been assigned to the road network using SATURN.

Again, some interaction with new housing has been allowed.

Committed Retail Development – Friarsgate

Retail trips have been assigned to the road network manually, as opposed to the method for housing and employment which utilises SATURN. This is due to the difficulties in obtaining a trip distribution that could easily be converted to a SATURN matrix.

Retail trips have been distributed onto the road network based upon the existing turning counts on the surrounding road network. An assumption has been made that very few trips to use the new retail developments come from south of the A38 / A5, except for residents of Shenstone and Fradley. It is assumed these people will have plenty of choice locally to them, and that the new developments are being built to serve local residents, and not provide attractions from further afield, causing in-commuting.

Emerging Local Plan – Retail

The additional retail requirements specified within Lichfield's Local Plan document are likely to be located in the city centre and Eastern Lichfield. The distributions created for Friarsgate will be used for the additional city centre retail. As the additional bulky goods retail will be located in a similar area to the recently opened Vulcan Road development, a distribution of trips was

developed using information from the TA, TRICS output and existing turning count data.

Burntwood and Fradley Housing

Trips from new residential developments in these locations are likely to converge on Lichfield City Centre for employment opportunities. They have therefore been included in this assessment and trips have been distributed to Lichfield in accordance with percentages witnessed in the 2001 JTW census data. The SATURN model has been used to assign the trips onto the appropriate roads. Fradley loads off A38(T) and Burntwood the A5190.

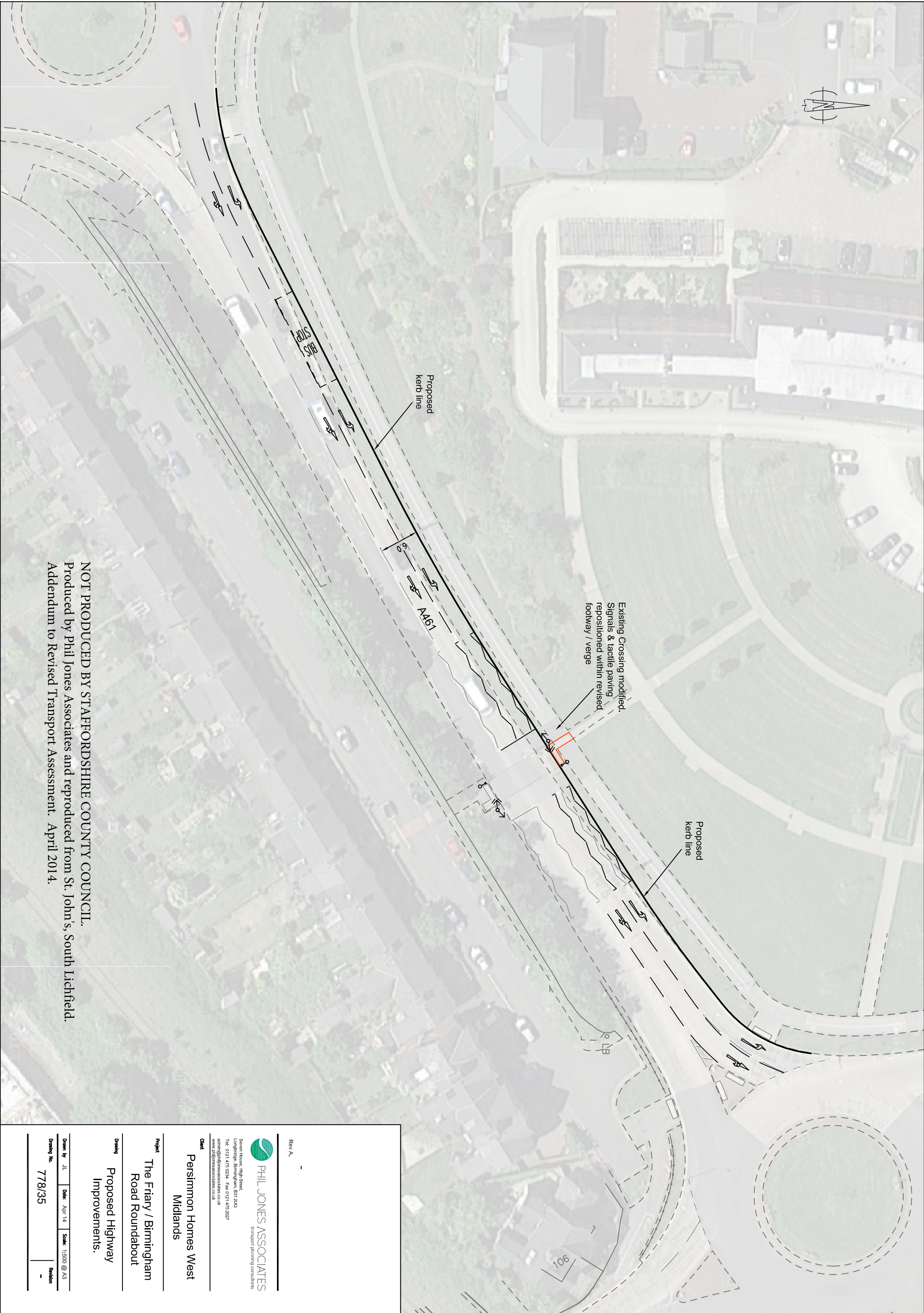
Re-Assignment Effects of the Lichfield Southern Bypass

The completion of Lichfield Southern Bypass is a key long term scheme within the Lichfield District Integrated Transport Strategy, which will be completed prior to 2029. The effects of this scheme on background traffic and the manually assigned retail trips therefore needs to be taken into account for the 2029 scenarios. The new development trips distributed using the SATURN network (i.e. new housing and employment) already consider the completed bypass.

The methodology devised to re-assign traffic used the updated Lichfield SATURN model (2013 update). This model was used to calculate the percentage change in model flows with the completed bypass in comparison to model flows without the completed bypass. The following plan shows the changes that were applied to the traffic flows.

Appendix 7.1

Proposed Improvement Scheme for the Junction of A5127 / Sainte Foy Avenue / The Friary



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 Addendum to Revised Transport Assessment. April 2014.

Rev A.

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Client
 Persimmon Homes West
 Midlands

Project
 The Friary / Birmingham
 Road Roundabout

Drawing
 Proposed Highway
 Improvements.

Drawn by JL	Date Apr 14	Scale 1:500 @ A3	Revision
Drawing No. 778/35			

Appendix 7.2

Proposed Improvement Schemes for the Bowling Green Junction



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Project
Bowling Green Roundabout

Drawing
Proposed Highway Improvements

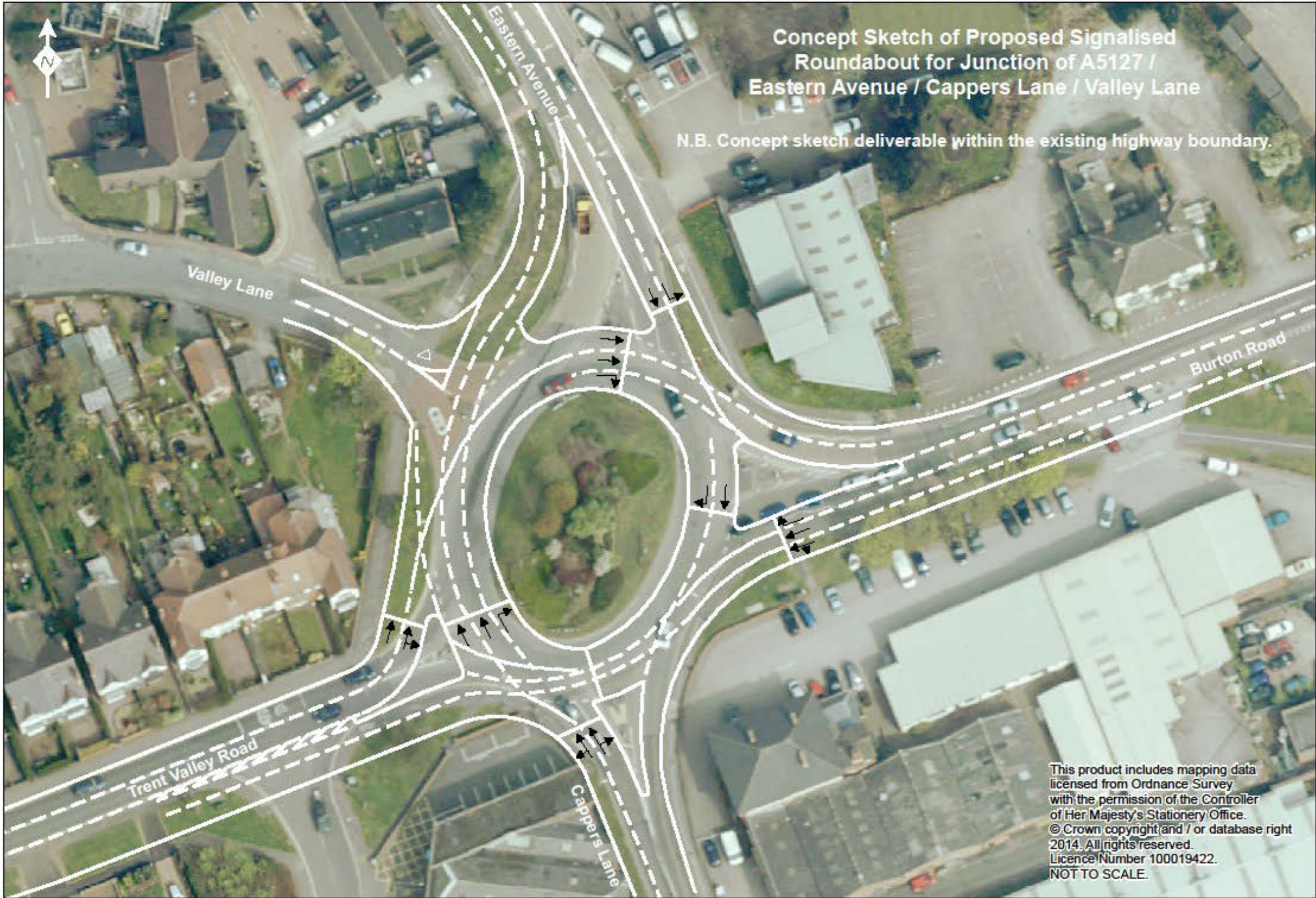
Drawn by JL Date: Mar 13 Scale: 1:500 @ A1
 Drawing No. **778/30** Revision **B**

Appendix 7.3

Proposed Signalised Improvement Scheme for Junction of A5127 / Eastern Avenue / Cappers Lane / Valley Lane

Appendix 7.4

Concept Sketch of the Proposed Signalised Roundabout for Junction of A5127 / Eastern Avenue / Cappers Lane / Valley Lane



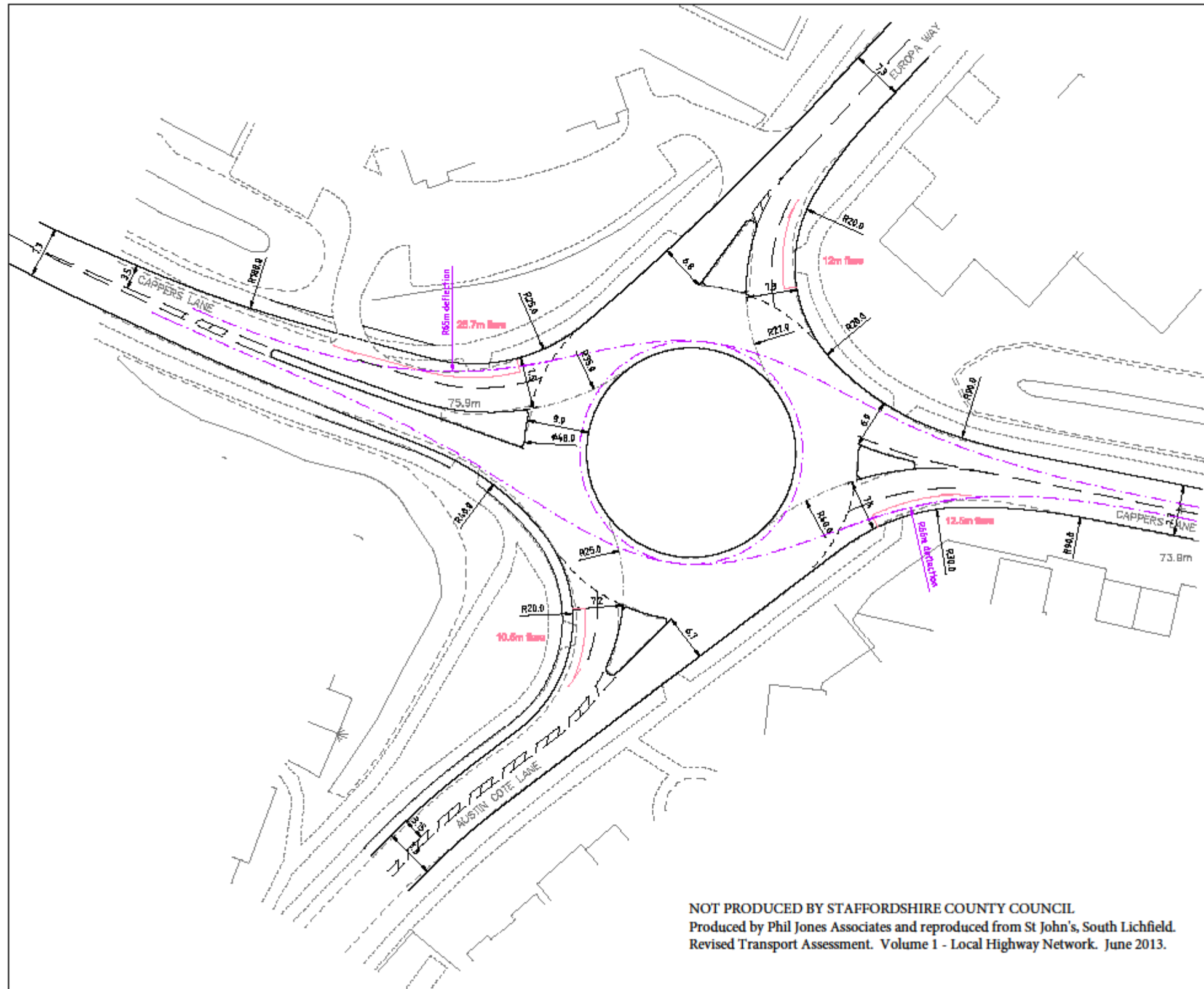
Concept Sketch of Proposed Signalled
Roundabout for Junction of A5127 /
Eastern Avenue / Cappers Lane / Valley Lane

N.B. Concept sketch deliverable within the existing highway boundary.

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NOT TO SCALE.

Appendix 7.5

Proposed Improvement Scheme for Junction of Cappers Lane / Europa Way / Austin Cote Lane



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Client: **Persimmon Homes / Miller Homes**

Project: **Cappers Lane Roundabout, Lichfield**

Study: **Proposed Improvements**

Drawn by: **JL** | Date: **20/01/12** | Scale: **1:500 @ A3**
 Drawing No: **870-03** | Status: **Final**

Appendix 7.6

Proposed Double Roundabout for Lichfield Southern Bypass / A5206 London Road



Drawing No.

H:\Templates\ACAD 2000 Frames\Scs logo new

RON HILTON
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DEVELOPMENT SERVICES DIRECTORATE
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Job Code:

Grid Ref.

Date: Scale: 1:1000

Drawing No.

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