

Land West of Watling Street, Park Street, Hertfordshire

Transport Assessment Addendum 2

M Scott Properties Ltd, Ms T Sutton, Ms T Good, Mr W Hughes and Mr J Hughes

18 October 2022

Notice

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Client signoff

Client	M Scott Properties Ltd, Ms T Sutton, Ms T Good, Mr W Hughes and Mr J Hughes
Project	Land West of Watling Street, Park Street, Hertfordshire
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1. Introduction

Atkins have been commissioned by M Scott Properties Ltd, Ms T Sutton, Ms T Good, Mr W Hughes and Mr J Hughes to provide additional evidence in support of an outline planning application for up to 95 dwellings on Land West of Watling Street, Park Street, Hertfordshire (application reference 5/2022/0267).

This Transport Assessment (TA) Addendum outlines Atkins’ response to the LHA’s comments on the submitted TA supporting the development on Land West of Watling Street, Park Street (dated 14th January 2022).

All comments provided by HCC are addressed in Section 2. Comments that require additional details are set out in Table 1-1 and responses are provided in the subsequent sections of this Addendum.

Table 1-1 - Matters for Further Consideration

Matter	HCC Comment from Response Letter	Atkins’ Response	Addendum
Cycle Provision	<i>‘Demonstrate how the proposed internal cycle link shown on drawing IL-01-P3 (Illustrative site layout) connects with the existing and proposed sustainable infrastructure along Watling Street. The proposals need to demonstrate that they are LTN 1/20 compliant.’</i>	Further narrative has been provided to demonstrate how the internal cycle provision is to connect with the existing and proposed sustainable infrastructure along Watling Street. This development proposal seeks to comply with the guidance set out within the LTN1/20 document wherever possible, and at a commensurate level to the traffic flows and development. This has been reviewed and highlighted where necessary. Atkins comments on this are provided in section 2.1 of this Addendum.	2.1
Toucan Crossing	<i>‘It was agreed at STIB that the proposed signalised pedestrian crossing to the north of the development must be in the form of a toucan crossing which therefore link in with the existing shared footway /cycle way leading north towards St Albans.’</i>	Atkins have updated the proposed signalised pedestrian crossing to the north of the development to a toucan crossing and have demonstrated how this will link into the existing active travel provision towards Park Street Roundabout and St Albans. Atkins comments have been provided in section 2.2 of this Addendum. The proposed design for the toucan has also been sketched and provided in the appendix to this addendum.	2.2
Modelling of Park Street Roundabout	<i>‘The LHA also request that the Park Street roundabout is assessed.’</i>	Atkins have assessed Park Street Roundabout. Comment is provided in section 2.3.	2.3

2. Atkins' Response

This section of the Addendum addresses HCC comments provided in their response letter to the proposed development at Land West of Watling Street. All comments in the response letter have been set out in the following section and are shown in *italics*. Atkins' response is provided underneath.

The majority of comments show that the assessments undertaken by Atkins are acceptable as they meet HCC's requirements for a TA.

2.1. Active Travel Provision

This section of the Addendum addresses the first matter as detailed in Table 1-1, with regard to the active travel provision and compliance with the LTN1/20 guidance document. The comment from HCC is as follows:

'Demonstrate how the proposed internal cycle link shown on drawing IL-01-P3 (Illustrative site layout) connects with the existing and proposed sustainable infrastructure along Watling Street. The proposals need to demonstrate that they are LTN 1/20 compliant.'

Pedestrian and cycle access into the proposed development will be provided from Watling Street in three locations:

- *In the northernmost part of the site connecting to the existing footway on Watling Street, where a new signalised pedestrian crossing is proposed;*

Atkins comment: In the northernmost section of the site a 3m wide shared-use path (SUP) is proposed which will connect to the existing footway on Watling Street, where a new toucan crossing is proposed. This will provide pedestrian and cycle links to the wider active travel provision existing to the north of the development and include direct access to the bus stop located on Watling Street. Internally, the SUP will connect to a shared surface providing access to plots 82-95 and linking to the spine road as shown on the illustrative layout. This level of provision is compliant with LTN1/20 guidance as it is commensurate to the low flows and speed of internal traffic and provides priority to cyclists.

- *A 2m footway on the north side of the site access and a 3m on the southern side of site access;*

Atkins comment: A 2m footway on the north side of the site access road and a 3m cycleway on the southern side of site access road is proposed providing off-road cycling and pedestrian access through the site. This is LTN1/20 compliant as it is providing off road segregated cycle provision giving priority to cyclists.

- *To the south of the site access where a footpath will connect with a pedestrian cycle access adjacent to the existing signalised crossing on Watling Street.*

Atkins comment: To the south of the site access a segregated SUP between plots 5 and 8 will connect to Watling Street adjacent to the existing signalised crossing on Watling Street. This segregated active travel provision will provide full priority to cyclists and pedestrians and is therefore considered to be LTN1/20 compliant.

2.2. Proposed Pedestrian/Cyclist Crossing

This section of the Addendum addresses the second matter as detailed in Table 1-1, relating to the alteration of the pedestrian crossing to a toucan crossing to the north of the development. The comment from HCC is as follows:

'It was agreed at STIB that the proposed signalised pedestrian crossing to the north of the development must be in the form of a toucan crossing which therefore link in with the existing shared footway /cycle way leading north towards St Albans.'

In order to address the comment from HCC, Atkins has reviewed the design of the crossing located to the north of the development and agreed to facilitate a toucan crossing to allow for both cyclist and pedestrian use. A sketch of the potential crossing is included in Appendix A. This will provide connectivity to other sustainable

travel provisions, such as footways, cycleways, and bus stops along Watling Street and further north towards Park Street Roundabout. The crossing will also be designed with two signal heads to ensure that vehicles can see the crossing is in use even in the event of a bus using the bus stop and potentially restricting the view. By ensuring maximum safety of users and including cyclists as well as pedestrians, this crossing will be compliant with the guidance stated in the LTN1/20 document.

2.3. Modelling of Park Street Roundabout

This section of the Addendum addresses the third matter as detailed in Table 1-1, detailing the need to assess the Park Street roundabout to the north of the development. HCC provided the following comment:

'The LHA also request that the Park Street roundabout is assessed.'

To address this comment from HCC, Atkins have modelled Park Street Roundabout in a consistent approach to that of the site access TA which has been accepted by HCC. This has been undertaken in order to further assess the potential impact of the development on traffic flows in specific relation to the Park Street Roundabout. The roundabout has been assessed using TRL Junctions 9 ARCADY for the AM and PM peak periods, using baseline traffic data from surveys undertaken in November 2021 (see original TA for discussion about impact of COVID on 2021 survey data). The junction modelling output data is provided in Appendix B. For the purposes of providing robust modelling scenarios the following assumptions and inclusions are adhered to:

- A base year of 2021 has been considered with a five-year post application year of 2026 considers for the peak period;
- The peak periods considered were 08:00-09:00 (AM peak hour) and 17:00-18:00 (PM peak hour);
- Local growth rates derived from TEMPRO for the St Albans 019 MSOA were used to derive traffic growth factors from 2021 to 2026;
- Distribution and assignment was applied to the trip generation as described in the original Transport Assessment;
- Scenarios modelled include the following:
 - 2026 Baseline plus development – 2021 traffic data factored to 2026 using TEMPRO growth factors of 1.0509 for the AM peak and 1.0599 for the PM peak plus development traffic.

The results of the junction modelling for the Park Street Roundabout are presented in Table 2-1. The results, as per the modelling in the Transport Assessment (TA), are displayed in terms of average queue length in Passenger Car Units (PCUs), delay in seconds, and the Ratio of Demand Flow to Capacity (RFC).

RFC is a measure that determines the performance of a junction and how it handles traffic flow across the peak hours. For junctions modelled using the Junctions 9 software, the RFC values represent the following:

- Less than 0.85 – Junction is operating below capacity;
- 0.85 to 1.0 – The junction is operating towards its full capacity (marked in orange in the tables below); and
- Greater than 1.0 – The junction is operating over capacity (marked in red in the tables below).

Table 2-1 - Summary of Performance - Park Street Roundabout

Arm	AM Peak (08:00 – 09:00)		PM Peak (17:00 – 18:00)	
	Queue (PCU)	RFC	Queue (PCU)	RFC
2021 Baseline				
A414 E	1.2	0.53	8.5	0.90
Watling Street	1.0	0.49	2.2	0.69
A405	1.4	0.57	3.5	0.78
A414 W	1.2	0.54	1.2	0.55
A5183	1.6	0.62	6.6	0.88
2026 Future Baseline				

Arm	AM Peak (08:00 – 09:00)		PM Peak (17:00 – 18:00)	
	Queue (PCU)	RFC	Queue (PCU)	RFC
A414 E	1.3	0.55	12.3	0.93
Watling Street	1.1	0.51	2.9	0.75
A405	1.5	0.60	4.6	0.82
A414 W	1.3	0.57	1.4	0.57
A5183	1.9	0.66	11.4	0.95
2026 Future Baseline + Development				
A414 E	1.3	0.55	12.8	0.94
Watling Street	1.1	0.53	3.1	0.77
A405	1.6	0.60	4.7	0.83
A414 W	1.3	0.57	1.4	0.57
A5183	1.9	0.66	12.5	0.96

The results in Table 2-1 show that during the AM peak, Park Street roundabout is expected to operate within capacity with some additional flow from the proposed development. The highest RFC recorded is 0.66 on the A5183 arm occurring in the 2026 baseline for all scenarios (with or without the development). The development only causes the RFC to increase by 0.02 on the Watling Street arm of the roundabout. This is considered to be negligible and therefore the development on the Land West of Watling Street, is expected to have a minimal impact on the roundabout during the AM peak.

During the PM peak, the A414 E and A5183 arms of the roundabout are already at theoretical capacity, with an RFC above 0.85, across all years and scenarios. The highest recorded RFC being 0.96 occurring on the A5183 arm of the roundabout in the 2026 plus development scenario. However, the greatest increase in RFC between the 2026 development scenarios is 0.02. As such the development on the Land West of Watling Street is expected to have a minimal impact on the performance of the roundabout during the PM peak.

It should be noted here that the modelling software used to assess the impact of the development on the roundabout has its limitations, and although it is the industry standard modelling tool used to assess roundabouts, it can struggle to replicate conditions on the ground. With this in mind, the modelling results show mean queues of 3 PCU's on the Watling Street approach when in reality the queuing on that arm can reach between 20 to 30 vehicles. With respect to the impact on that queue from the development, the impact is considered negligible, and the modelling is considered appropriate in understanding the impact of the development on the roundabout.

Following this assessment, Atkins considers the development on the Land West of Watling Street to have a negligible impact on the Park Street roundabout, owed to the fact that the development increases the RFC by a maximum of 0.02 between the 2026 scenarios. Therefore, the proposed development is considered to have a nil detriment impact on the performance of the roundabout.

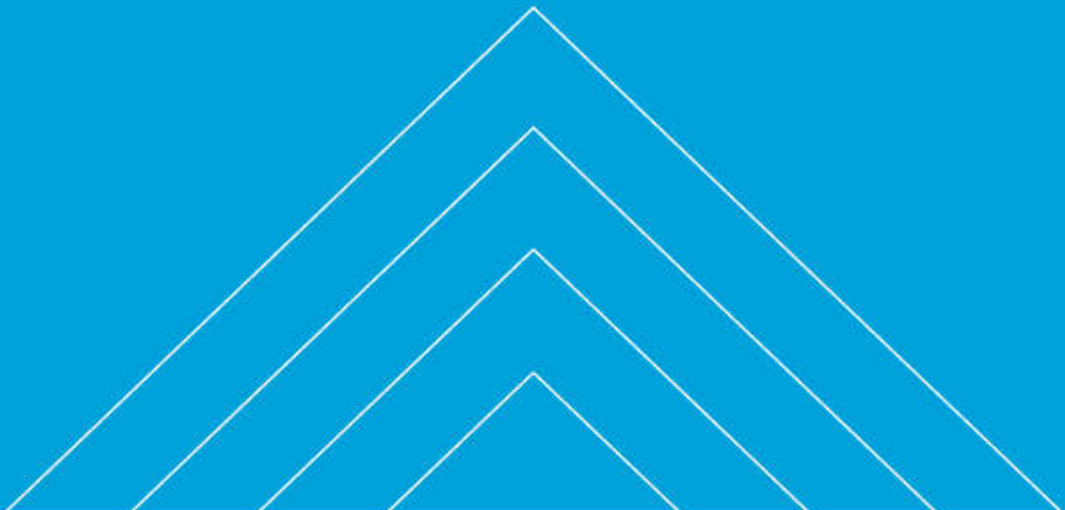
3. Summary

This Transport Assessment Addendum seeks to address comments received from HCC Highways Authority in regard to the proposed development on Land West of Watling Street, Park Street, St Albans (application reference 5/2022/0267). There are three key matters that the HCC Highway Authority have sought clarification on which have been addressed in this Addendum. These include:

1. Active travel provision and LTN1/20 compliance;
2. Instalment of a toucan crossing; and
3. The modelling of Park Street Roundabout.

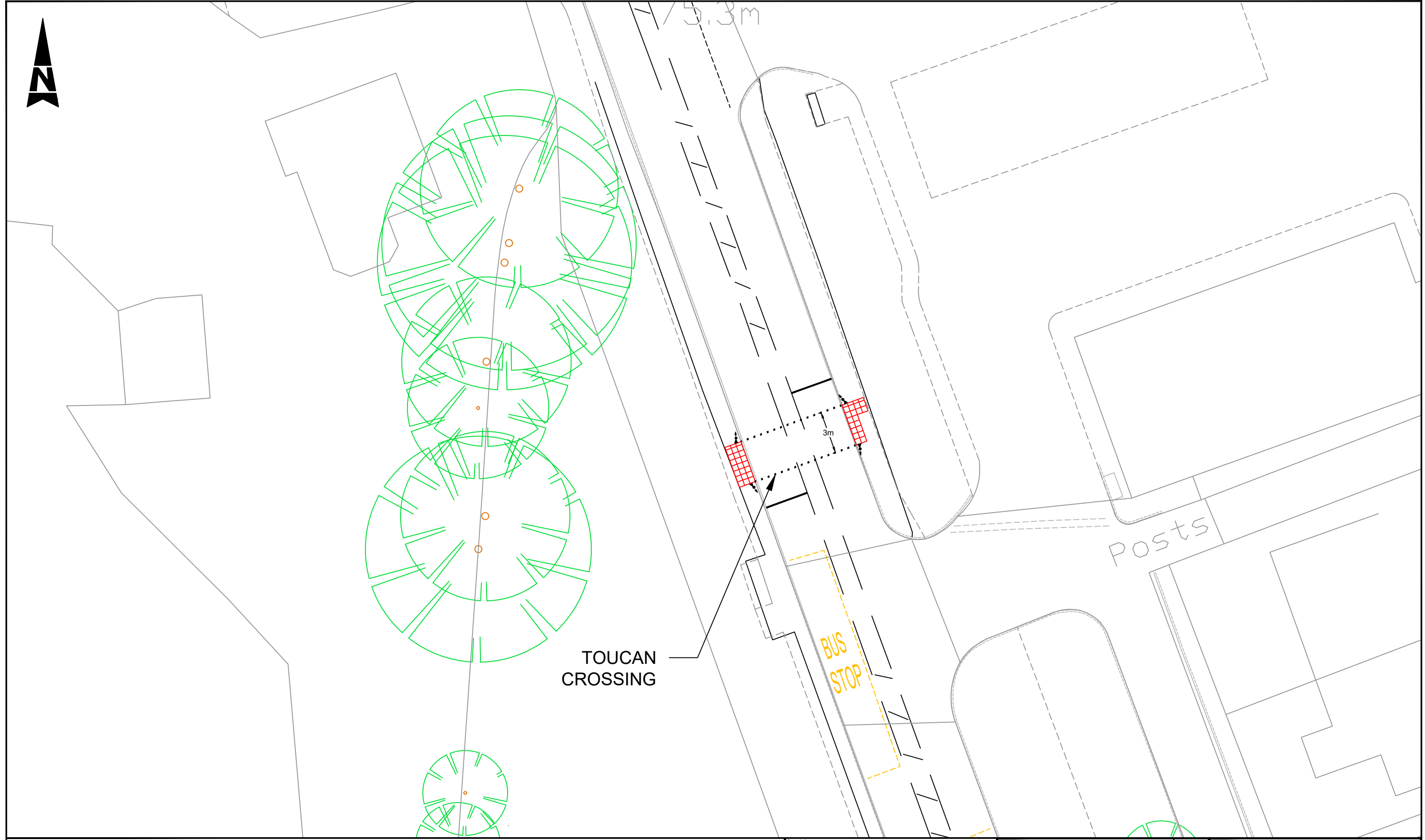
With the additional information provided within this TA Addendum, provision of supplementary data, it is considered that HCC Highways Authority now has enough evidence to support the planning application for the development on Land West of Watling Street.

Appendices



Appendix A. Sketch of Toucan Crossing

Millimetres
0 10 100
DO NOT SCALE



- NOTES:**
- ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE STATED.
 - TOUCAN CROSSING TO BE NO LESS THAN 3m WIDE AND NO MORE THAN 4m WIDE.
 - VEHICLE STOP LINES TO BE BETWEEN 1.7m AND 3m FROM TOUCAN CROSSING.

Description	Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date

Drawing Suitability: **FOR INFORMATION**

Status: **S0**

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SCOTT PROPERTIES

Project Title	PARK STREET ST ALBANS		
Drawing Title	PARK STREET ST ALBANS PROPOSED TOUCAN CROSSING		
Drawing Number	Project	Originator	Volume
5153233	5153233	- ATK	- GEN -
PRKST	- SK - C -	0002	
Location	Type	Role	Number
Original Size: A3	Scale: 1:250	Project Ref: 5153233	Sheet: 1 of 1 Rev: P1.1

Appendix B. Junction Modelling Output Data

<h1>Junctions 9</h1>
<h2>ARCADY 9 - Roundabout Module</h2>
Version: 9.5.0.6896 © Copyright TRL Limited, 2018
For sales and distribution information, program advice and maintenance, contact TRL: +44 (0)1344 379777 software@trl.co.uk www.trlsoftware.co.uk
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Filename: Park Street Roundabout.j9

Path: P:\INBLD\TRANSPORTATION\5153233- M Scott Properties -YOUN8902\400 Technical Information\405 Base Model

Report generation date: 16/08/2022 14:57:31

«2026 with Development , PM

- »Junction Network
- »Arms
- »Traffic Demand
- »Origin-Destination Data
- »Vehicle Mix
- »Detailed Demand Data
- »Results

Summary of junction performance

	AM				PM			
	Queue (PCU)	Delay (s)	RFC	LOS	Queue (PCU)	Delay (s)	RFC	LOS
Base 2016								
1 - A 414 E	1.0	2.79	0.50	A	5.5	9.16	0.85	A
2 - Watling Street	0.8	4.75	0.45	A	1.5	10.52	0.61	B
3 - A 405	1.1	5.65	0.52	A	2.5	10.30	0.71	B
4 - A 414W	1.0	3.30	0.50	A	1.0	3.36	0.51	A
5 - A 5183	1.3	8.39	0.56	A	3.7	19.50	0.80	C
Base 2021								
1 - A 414 E	1.2	3.00	0.53	A	8.5	13.71	0.90	B
2 - Watling Street	1.0	5.30	0.49	A	2.2	14.51	0.69	B
3 - A 405	1.4	6.48	0.57	A	3.5	13.85	0.78	B
4 - A 414W	1.2	3.67	0.54	A	1.2	3.71	0.55	A
5 - A 5183	1.6	10.21	0.62	B	6.6	33.97	0.88	D
Base 2026								
1 - A 414 E	1.3	3.13	0.55	A	12.3	19.43	0.93	C
2 - Watling Street	1.1	5.65	0.51	A	2.9	18.88	0.75	C
3 - A 405	1.5	7.04	0.60	A	4.6	17.56	0.82	C
4 - A 414W	1.3	3.90	0.57	A	1.4	3.98	0.57	A
5 - A 5183	1.9	11.58	0.66	B	11.4	56.39	0.95	F
Development Traffic								
1 - A 414 E	0.0	0.00	0.00	A	0.0	0.00	0.00	A
2 - Watling Street	0.0	1.68	0.01	A	0.0	1.66	0.01	A
3 - A 405	0.0	0.00	0.00	A	0.0	0.00	0.00	A
4 - A 414W	0.0	0.00	0.00	A	0.0	0.00	0.00	A
5 - A 5183	0.0	0.00	0.00	A	0.0	0.00	0.00	A
2026 with Development								
1 - A 414 E	1.3	3.14	0.55	A	12.8	20.15	0.94	C
2 - Watling Street	1.1	5.92	0.53	A	3.1	19.90	0.77	C
3 - A 405	1.6	7.23	0.60	A	4.7	18.15	0.83	C
4 - A 414W	1.3	3.95	0.57	A	1.4	4.02	0.57	A
5 - A 5183	1.9	11.86	0.66	B	12.5	61.09	0.96	F

There are warnings associated with one or more model runs - see the 'Data Errors and Warnings' tables for each Analysis or Demand Set.

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle.

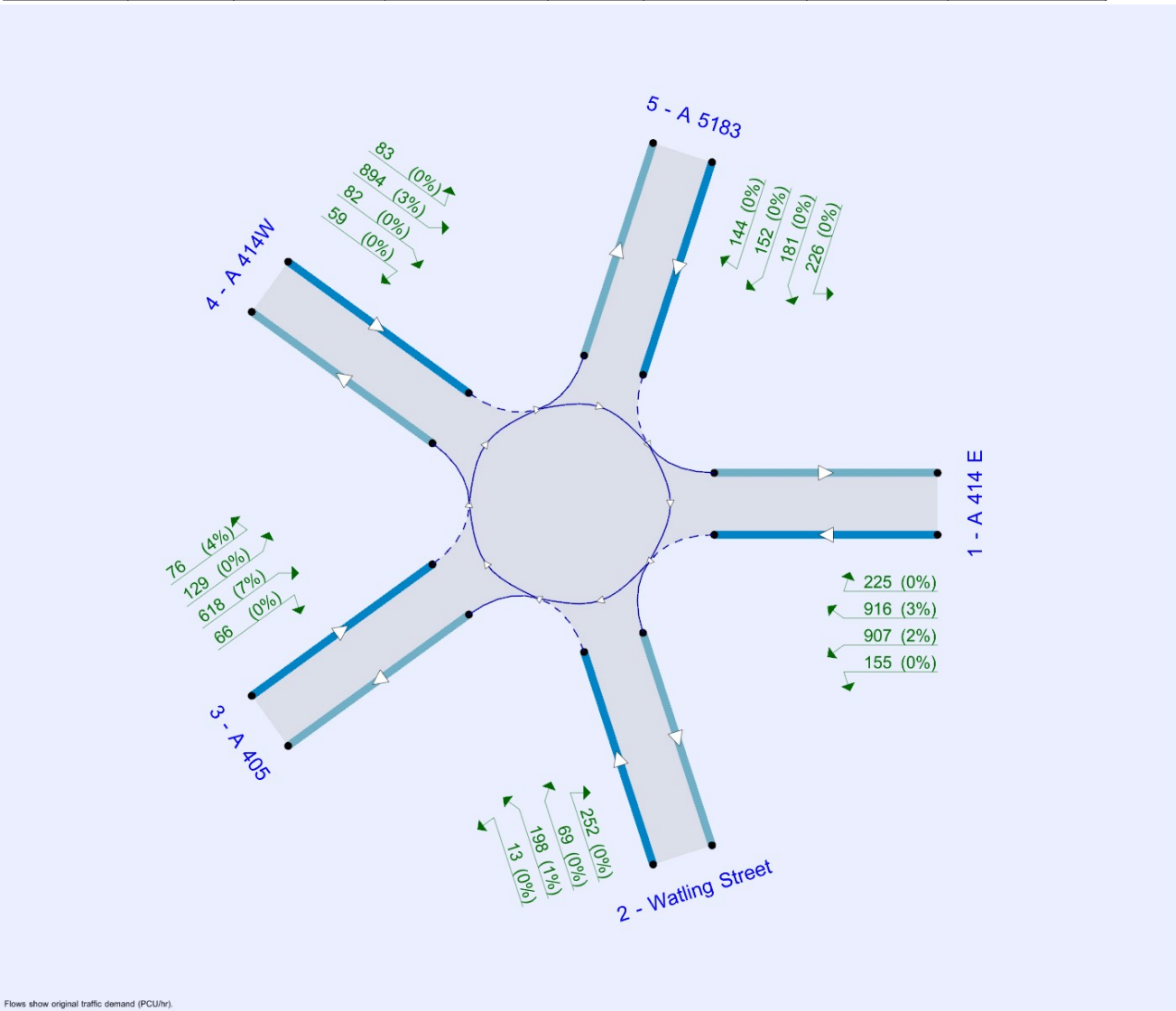
File summary

File Description

Title	
Location	
Site number	
Date	04/08/2022
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	WSATKINS\ALAK1706
Description	

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
m	kph	PCU	PCU	perHour	s	-Min	perMin



Flows show original traffic demand (PCU/hr).

The junction diagram reflects the last run of Junctions.

Analysis Options

Vehicle length (m)	Calculate Queue Percentiles	Calculate detailed queueing delay	Calculate residual capacity	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
5.75				0.85	36.00	20.00

Analysis Set Details

ID	Include in report	Network flow scaling factor (%)	Network capacity scaling factor (%)
A1	✓	100.000	100.000

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D10	2026 with Development	PM	ONE HOUR	16:00	17:30	15	✓

2026 with Development , PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	5 - A 5183 - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	untitled	Standard Roundabout		1, 2, 3, 4, 5	21.77	C

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description
1	A 414 E	
2	Watling Street	
3	A 405	
4	A 414W	
5	A 5183	

Roundabout Geometry

Arm	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit only
1 - A 414 E	7.67	11.01	20.6	30.5	100.3	27.0	
2 - Watling Street	5.43	6.83	15.4	50.7	100.3	7.0	
3 - A 405	6.80	7.51	10.0	24.1	100.3	36.0	
4 - A 414W	7.53	12.50	18.5	29.5	100.3	32.0	
5 - A 5183	3.25	6.88	34.7	31.7	100.3	33.0	

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Final slope	Final intercept (PCU/hr)
1 - A 414 E	0.647	3072
2 - Watling Street	0.541	2190
3 - A 405	0.518	2208
4 - A 414W	0.650	3119
5 - A 5183	0.468	1823

The slope and intercept shown above include any corrections and adjustments.

Traffic Demand

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1 - A 414 E		ONE HOUR	✓	2203	100.000
2 - Watling Street		ONE HOUR	✓	532	100.000
3 - A 405		ONE HOUR	✓	889	100.000
4 - A 414W		ONE HOUR	✓	1118	100.000
5 - A 5183		ONE HOUR	✓	703	100.000

Origin-Destination Data

Demand (PCU/hr)

		To				
		1 - A 414 E	2 - Watling Street	3 - A 405	4 - A 414W	5 - A 5183
From	1 - A 414 E	0	155	907	916	225
	2 - Watling Street	252	0	13	198	69
	3 - A 405	618	66	0	76	129
	4 - A 414W	894	82	59	0	83
	5 - A 5183	226	181	152	144	0

Proportions

		To				
		1 - A 414 E	2 - Watling Street	3 - A 405	4 - A 414W	5 - A 5183
From	1 - A 414 E	0.00	0.07	0.41	0.42	0.10
	2 - Watling Street	0.47	0.00	0.02	0.37	0.13
	3 - A 405	0.70	0.07	0.00	0.09	0.15
	4 - A 414W	0.80	0.07	0.05	0.00	0.07
	5 - A 5183	0.32	0.26	0.22	0.20	0.00

Vehicle Mix

Heavy Vehicle Percentages

		To				
		1 - A 414 E	2 - Watling Street	3 - A 405	4 - A 414W	5 - A 5183
From	1 - A 414 E	0	0	2	3	0
	2 - Watling Street	0	0	0	1	0
	3 - A 405	7	0	0	4	0
	4 - A 414W	3	0	0	0	0
	5 - A 5183	0	0	0	0	0

Average PCU Per Veh

		To				
		1 - A 414 E	2 - Watling Street	3 - A 405	4 - A 414W	5 - A 5183
From	1 - A 414 E	1.000	1.000	1.020	1.030	1.000
	2 - Watling Street	1.000	1.000	1.000	1.010	1.000
	3 - A 405	1.070	1.000	1.000	1.040	1.000
	4 - A 414W	1.030	1.000	1.000	1.000	1.000
	5 - A 5183	1.000	1.000	1.000	1.000	1.000

Detailed Demand Data

Demand for each time segment

Time Segment	Arm	Demand (PCU/hr)	Demand in PCU (PCU/hr)
16:00-16:15	1 - A 414 E	1659	1659
	2 - Watling Street	401	401
	3 - A 405	669	669
	4 - A 414W	842	842
	5 - A 5183	529	529
16:15-16:30	1 - A 414 E	1980	1980
	2 - Watling Street	478	478
	3 - A 405	799	799
	4 - A 414W	1005	1005
	5 - A 5183	632	632
16:30-16:45	1 - A 414 E	2426	2426
	2 - Watling Street	586	586
	3 - A 405	979	979
	4 - A 414W	1231	1231
	5 - A 5183	774	774
16:45-17:00	1 - A 414 E	2426	2426
	2 - Watling Street	586	586
	3 - A 405	979	979
	4 - A 414W	1231	1231
	5 - A 5183	774	774
17:00-17:15	1 - A 414 E	1980	1980
	2 - Watling Street	478	478
	3 - A 405	799	799
	4 - A 414W	1005	1005
	5 - A 5183	632	632
17:15-17:30	1 - A 414 E	1659	1659
	2 - Watling Street	401	401
	3 - A 405	669	669
	4 - A 414W	842	842
	5 - A 5183	529	529

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1 - A 414 E	0.94	20.15	12.8	C	2022	3032
2 - Watling Street	0.77	19.90	3.1	C	488	732
3 - A 405	0.83	18.15	4.7	C	816	1224
4 - A 414W	0.57	4.02	1.4	A	1026	1539
5 - A 5183	0.96	61.09	12.5	F	645	968

Main Results for each time segment

16:00 - 16:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A 414 E	1659	415	512	2740	0.605	1652	1492	0.0	1.5	3.358	A
2 - Watling Street	401	100	1802	1215	0.330	399	363	0.0	0.5	4.416	A
3 - A 405	669	167	1352	1507	0.444	666	848	0.0	0.8	4.484	A
4 - A 414W	842	210	1018	2457	0.343	840	1000	0.0	0.5	2.276	A
5 - A 5183	529	132	1478	1130	0.468	526	379	0.0	0.9	5.923	A

16:15 - 16:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A 414 E	1980	495	612	2675	0.740	1975	1785	1.5	2.8	5.209	A
2 - Watling Street	478	120	2154	1024	0.467	477	434	0.5	0.9	6.582	A
3 - A 405	799	200	1617	1370	0.583	797	1014	0.8	1.4	6.571	A
4 - A 414W	1005	251	1218	2327	0.432	1004	1196	0.5	0.8	2.785	A
5 - A 5183	632	158	1768	994	0.636	629	454	0.9	1.7	9.754	A

16:30 - 16:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A 414 E	2426	606	730	2599	0.933	2392	2167	2.8	11.2	15.740	C
2 - Watling Street	586	146	2601	782	0.749	578	521	0.9	2.8	17.118	C
3 - A 405	979	245	1955	1195	0.819	967	1224	1.4	4.3	15.863	C
4 - A 414W	1231	308	1478	2158	0.570	1229	1445	0.8	1.3	3.955	A
5 - A 5183	774	194	2155	813	0.952	742	551	1.7	9.6	40.023	E

16:45 - 17:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A 414 E	2426	606	745	2590	0.937	2419	2186	11.2	12.8	20.151	C
2 - Watling Street	586	146	2635	764	0.767	584	529	2.8	3.1	19.902	C
3 - A 405	979	245	1979	1183	0.828	977	1240	4.3	4.7	18.149	C
4 - A 414W	1231	308	1493	2148	0.573	1231	1463	1.3	1.4	4.017	A
5 - A 5183	774	194	2168	807	0.959	762	556	9.6	12.5	61.094	F

17:00 - 17:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A 414 E	1980	495	645	2654	0.746	2019	1817	12.8	3.1	6.129	A
2 - Watling Street	478	120	2214	991	0.482	487	450	3.1	0.9	7.279	A
3 - A 405	799	200	1659	1349	0.593	812	1042	4.7	1.6	7.211	A
4 - A 414W	1005	251	1242	2311	0.435	1007	1228	1.4	0.8	2.830	A
5 - A 5183	632	158	1788	985	0.641	675	462	12.5	1.8	13.145	B

17:15 - 17:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - A 414 E	1659	415	518	2737	0.606	1664	1503	3.1	1.6	3.444	A
2 - Watling Street	401	100	1816	1207	0.332	402	366	0.9	0.5	4.500	A
3 - A 405	669	167	1364	1501	0.446	672	855	1.6	0.9	4.580	A
4 - A 414W	842	210	1027	2451	0.343	843	1008	0.8	0.5	2.292	A
5 - A 5183	529	132	1488	1126	0.470	533	382	1.8	0.9	6.112	A

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